Addis Ababa University, Collage of Health Sciences,

School of Public Health

Ethiopian Field Epidemiology Training Program (EFETP)

Compiled Body of Works in Field Epidemiology

By

Mideksa Kebede

Submitted to the school of Graduates studies of Addis Ababa university in partial fulfillment for the Degree of Masters of Public Health in Field Epidemiology

June 2018

Addis Ababa

Addis Ababa University

Collage of Health Sciences

School of Public Health

Ethiopian Field Epidemiology Training Program (EFETP)

Compiled Body of works in field Epidemiology

By

Mideksa kebede

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

Mentors

Dr. Abiy Girmay

Dr. Ayele Belachew

June 2018

Addis Ababa

Addis Ababa University

School of Graduates Studies

Compiled Body of Works in Field Epidemiology

By Mideksa kebede

Ethiopian Field Epidemiology Training Program (EFETP)

School of Public Health, College of Health Sciences

Addis Ababa University

Approval by Examining Board

_____ _____

Chairman, School Graduate Committee

_____ _____

Advisor

_____ _____

Examiner

_____ _____

Examiner

Acknowledgments

I would like to thank the assistance of many helping hands. I would like to express my deep gratitude to Kolfe keraniyo sub city health office staffs for their valuable hospitality. Special thanks go to my mentors Dr. Ayele Belachew and Dr.Abiy Girmay who helped me by giving constructive comments.

I would like to put across my grateful appreciation to Ethiopian field Epidemiology training program, Addis Ababa University, federal ministry of health who supported me in any aspect of my output work. A special thank of mine goes to the federal police hospital, who made me a candidate for this special program.

Table of Contents

List of table

List of figures

List of Annex

List of Acronyms and Abbreviations

AR	Attack Rate
AWD	Acute Watery Diarrhea
ANC	Antenatal Care
CFR	Case Fatality Rate
CTC	Cholera Treatment Center
CI	Confidence Interval
CDC	Central for Disease Control and Prevention
DRC	Democratic Republic of Congo
EFY	Ethiopian Fiscal Year
EMOH	Ethiopian Ministry of Health
EPI	Expanded Programme Of Immunization
EPHA	Ethiopian Public Health Association
EPHI	Ethiopian Public Health Institute
EDHS	Ethiopian Demographic Health Survey
FMHACA	Food Medicine and Health Administrative and Control Authority
HF	Health Facility
HEW	Health Extension Worker
IHR	International Health Regulation
IgM	Immuno-globulin M
NGO	Non-governmental Organization
PHEM	Public Health Emergency Management
PCV	Pneumococcal Vaccine
RHB	Regional Health Bureau
RDT	Rapid Diagnostic Test
RRT	Rapid Response Team
SNNPR	South Nation Nationality of People Region

SIAS	Supplementary Immunization Activities
UHEWs	Urban Health Extension Workers
WHO	World Health Organization
WDA	Women Development Army

Executive summary

Ethiopia Field Epidemiology Training Program (EFETP) is a two years competency based master's program adapted from United States Centers for Disease Control and Prevention(CDC) Epidemic Intelligence service (EIS) program .Addis Ababa University, the Federal Ministry of Health of Ethiopia/Ethiopian public health institute(EPHI), The Ethiopian Public Health Association(EPHA) and Regional Health Bureaus run the program jointly. It compriseD of 25% class learning and 75% field activities, working in public health emergency and other related priority issues. It is designed to assist the Ministry of Health in building or strengthening health systems by selecting health workers and building their competencies through on the job mentorship and training.

This compiled body of works composed of seven chapters accomplished during the two years residency period .It comprises two outbreak investigation, surveillance data analysis report, surveillance system evaluation, one abstract on measles data analysis, health profile description report, finalized scientific manuscript for peer review journals and protocol or proposal for Epidemiologic research project

All the outputs during the residency period were complied in to single document .the first chapter consist of outbreak investigation ,two outbreaks were investigated ,Cholera in kolfe keraniyo sub city Addis Ababa city, Ethiopia in September 2017 and Malaria in Dasenech district, Libemuket cluster of five villages(Libemuket,cs,gumburbur,gumburburdebermus and Bayo) South Omo zone, Southern Nation and Nationalities of People Region, Ethiopia, in May,2018 .the second chapter is surveillance data analysis on Description of Five Years Measles facility report in Kolfe Keraniyo Sub city from January, 2012-March, 2017, surveillance system evaluation was

conducted in kolfe keraniyo sub city ,Addis Ababa ,Ethiopia, march, 2017 .Health profile description report was conducted in woreda nine, kolfe keraniyo sub city Addis Ababa, 2017.one manuscript and one abstract was prepared. Proposal for epidemiologic research project was also prepared on Assessment of incomplete immunization and associated factors among children age 12-23 month in kolfe-keraniyo sub city health centers, Addis Ababa, Ethiopia, 2018

Chapter: I- Outbreak Investigation

1.1. Cholera outbreak investigation report in Kolfe Keraniyo sub city, Addis Ababa City, Ethiopia, 2017

Abstract

Background: Cholera is a diarrheal disease caused by infection of the intestine with the gram-negative bacteria vibrio cholera, either type o1 or o139. A single case of Cholera initiates outbreak investigation in Ethiopia. Kolfe keraniyo sub-city Public Health Emergency Management reported two Cholera cases on 20 September 2017. Two of the sample investigated by culture and stool RDT kit confirmed that positive for vibrio cholera o1. The index case was 55 years old woman from woreda one kolfe keraniyo sub-city. We aimed to identify the risk factor for the occurrence of the cholera outbreak and institute appropriate measures

Method: we conducted cholera outbreak investigation in woreda1, 2,3,5,9 and 13 of kolfe keraniyo sub city, Addis Ababa town from September 20, 2017-January7, 2017. We defined suspected cases of cholera as occurrence of acute watery diarrhea, with or without vomiting, in a patient aged ≥5 years living in study area. Unmatched case control study design was used and we included all of the identified cases (19) during the course of the outbreak and recruited 38 controls with 2:1 control to case ratio. We searched new cases in health facilities. We assessed houses of cases and holly waters. Structured questionnaire was used to collect data for case control study and using line list.

Result:

19 cases and 0 deaths were registered during September 20, 2017- November 7, 2017 in six woredas with 21.9 per 100,000 populations the highest attack rate among females in woreda five. Among cases, 10(53%) were female and 13(69%) were in the age category of 15-44 years old and15-44 years

old was also the median interval age. In our multivariate analysis, we found that housewives are 87 %(adjusted odds ratio: 0.13; 95%CI]: 0.02, 0.91) less likely to develop cholera than daily laborer

Conclusion and recommendation: Peoples in age group of 15-44 years and females were more affected than males. Lower attack rate with no death and intervention of an outbreak was effective. Drinking contaminated holly water and daily laborers were the risk for occurrence of cholera. Health education on work related personal hygiene and environmental sanitation particularly holly water site was recommended.

Keywords: case-control, analytical, descriptive, cholera, Kolfe Keraniyo

Introduction

Cholera is a diarrheal disease caused by infection of the intestine with the gram-negative bacteria vibrio cholera, either type 01 or 0139. There are over 1000 vibrio species are known but the ‘’cholerae’’ are responsible for cholera epidemic (1).

About 1.4 billion people are at high risk for cholera in endemic countries. An estimated 2.8 million and 87,000 cholera cases occur annually in endemic and non-endemic countries respectively. In the same way every year about 91 000 and 2500 people die of cholera in endemic countries and in non-endemic countries respectively. This is only 5-10% world health organization estimated number (2). Cholera remains a significant public health problem in many parts of the world. In 2015, 42 countries reported a total of 172,454 cases including 1304 deaths, resulting in an overall case fatality ratio (CFR) of 0.8%. Cases were reported from all regions, including 16 countries in Africa, 13 in Asia, 6 in Europe, 6 in the Americas, and 1 in Oceania. Afghanistan, the Democratic Republic of the Congo (DRC), Haiti, Kenya, and the United Republic of Tanzania accounted for 80% of all cases. Of cases reported globally, 41% were from Africa, 37% from Asia and 21% from Hispaniola. Imported cases were reported from 13 countries(3). Sporadic cholera outbreaks can occur in any part of the world where water supply, sanitation, food safety, and hygiene are inadequate; and highly risky in over-crowded population and refugee camps in which poor sanitation, unsafe drinking-water, and increased person-to-person transmission (4).

Literature Review

Cholera is a diarrheal disease caused by infection of the intestine with the gram-negative bacteria vibrio cholera, either type o1 or o139. There are over 1000 vibrio species are known but the ‘’cholerae’’ are responsible for cholera epidemic (1).

About 1.4 billion people are at high risk for cholera in endemic countries. An estimated 2.8 million and 87,000 cholera cases occur annually in endemic and non-endemic countries respectively. In the same way every year about 91 000 and 2500 people die of cholera in endemic countries and in non-endemic countries respectively (2).

Cholera remains a significant public health problem in many parts of the world. In 2015, 42 countries reported a total of 172,454 cases including 1304 deaths, resulting in an overall case fatality ratio (CFR) of 0.8%. Cases were reported from all regions, including 16 countries in Africa, 13 in Asia, 6 in Europe, 6 in the Americas, and 1 in Oceania. Afghanistan, the Democratic Republic of the Congo (DRC), Haiti, Kenya, and the United Republic of Tanzania accounted for 80% of all cases. Of cases reported globally, 41% were from Africa, 37% from Asia and 21% from Hispaniola. Imported cases were reported from 13 countries (3)

Sporadic cholera outbreaks can occur in any part of the world where water supply, sanitation, food safety, and hygiene are inadequate; and highly risky in over-crowded population and refugee camps in which poor sanitation, unsafe drinking-water, and increased person-to-person transmission. Recently, the most cholera prevalent continents are Africa and Asia in the world. Parts of the Middle East and sub-Saharan Africa are broadly affected by repeated cholera epidemics (4)

In sub-Saharan Africa continent, the Central and western regions are highly affected by cholera outbreak yearly. Nigeria, DRC, Cameroon and Ghana collectively are responsible for the 96% and

99% of reported cholera cases in the region in 2014 and 2015 respectively. For example in 2014 among a total of 91,343 reported cholera cases: Nigeria accounts 35,996 cases, Ghana accounts 28,944 cases, DRC=19,306 cases and Cameroun = 3,355 cases in the order of their high magnitude among 18 countries in the regions. And in until 46 weeks of 2015, Democratic Republic of Congo (DRC) = 15,227 cases, 219 deaths with CFR of 1.4%; Nigeria = 5,172 cases, 184 deaths with CFR of 3.6%; Ghana= 687 cases, 10 deaths with CFR of 1.5%; and Cameroun= 89 cases, 5 deaths with CFR of 5.6% (5, 6)

In the first half of 2016 more than 75,000 cholera cases and 1,500 deaths with CFR of 2.0% were reported in 13 countries. The majority of the reported cholera cases were from eastern Africa under the sub-Sahara region. Three countries in eastern Africa region accounted for 87 per cent of the cases: Tanzania (28.5%, with CFR: 1.5%), Kenya (21.2%, with CFR: 1.5%) and DRC (16.0% with CFR: 1.4%) (8)

Frequent cholera outbreak has occurred here in the neighboring countries of Ethiopia particularly South Sudan and Kenya. In South Sudan, for example, there were four consecutive cholera outbreaks from 2006 to 2009. The main risk factors for the existence of cholera outbreak in the country were consuming foods outside home and traveling outside the residential village (9)

Cholera outbreak is the continuous problem in the three regions of Ethiopia. As of week 20, 2016, a total of 1, 884 cholera cases and 19 deaths with CFR of 1.0% had been reported from three regions namely Oromiya, SNNP and Ethiopian Somali regions. This is by individual region, Oromiya exhibited a total of 686 cases and 12 deaths with CFR=1.7%; SNNP reported a total of 405 cases and 2 deaths with CFR=1.2%; and Somali reported relatively high number (793) of cases and 2 deaths

with CFR=0.3%. About 67.3% of the cases were 15 and above years old and 51.3% of them were male (10)

The good knowledge of cholera among community is very important for prevention and control. Poor food preservation methods, eating from road side food vendors were independent risk factors for the occurrence of cholera. Improvement in hygiene and sanitation conditions coupled with water infrastructural development is crucial to combating the cholera epidemic (11)

There are certain challenges in cholera outbreak, notification, reporting, and controlling activities. Among these challenges lack of clean water sources and supply; hygiene and sanitation services; poor health service delivery (4) inadequate laboratory and epidemiological surveillance systems; economic, social and political disincentives cross border involvement of nations (10),

Consumption of vegetables and fruits has remained an unresolved risk factor in cholera outbreaks in Iran in recent years. In order to reduce the risk of cholera, sanitary standards for fruits and vegetables should be observed at all points from production to consumption, the population should be educated regarding hygienic food storage during outbreaks, and sanitary standards should be maintained when traveling during cholera outbreaks(12).

Risk factors like hand washing after latrine usage, drinking treated water, access to latrine (unsanitary latrines) and contact to a case and visiting someone with similar illness had shown statistically significant association with acute watery diarrhea/ cholera. Daily laborers were highly affected by the cholera disease than others because they were lived in mass in camps (13). A single case of AWD initiates outbreak investigation in Ethiopia. Kolfe keraniyo sub-city Public Health Emergency Management reported acute watery diarrhea case on 20 September, 2017 which was confirmed latter cholera. We investigated the outbreak to identify its causative agent, its source, and its associated risk factors and to control the outbreak

OBJECTIVES

General objective

To identify the magnitude of cholera outbreak and risk factors and control the outbreak in kolfe keraniyo sub city, Addis Ababa, 2017

Specific objectives:

To describe the distribution of cholera outbreak by person, place and time

To identify the risk factor for cholera outbreak occurrence

To implement control and prevention measures to contain the outbreak.

Study method

Study area and period

Addis Ababa is located at the geographic center of the country lying at 9°1′48″N latitude and 38°44′24″E longitude in the foothills of the Entoto Mountains with altitudinal range of 2,100-3,000 meters above sea level. Addis Ababa has a population density of 165.1/km² and total land area of 540km^2 Administratively, Addis Ababa is divided into ten sub-cities and sub-cities are further classified into 118 woredas. It has a total population of 3,352,000 accounting for 4.3% and 40% of the population of the country and urban, respectively (14)

The study was conducted in Kolfe keraniyo sub-city. Kolfe keraniyo sub city is one of the ten sub city in Addis Ababa city administration. the sub city is bounded by Gulele and Addis ketema in the north, Lideta sub city in the east , Nifasilk –Lafto sub city in the south and Oromiya regional state of government the west . The sub city has 15 Weredas'. Kolfe keraniyo sub city in 2016/17 (estimated from 2009 population census) has a total population of 524200 of which 48% are males. The selected woredas to study include: woreda 1, 2,3,5,9 and 13.The selected woredas collectively have an

estimate of 135,202 populations 48% are males, and 9,200 (6.8%) less than five years. The study was conducted during the September 20, 2017-November 7, 2017

Study design

We used unmatched case control study design, the study examined the differences in types of exposures between individuals who have cholera cases based on standard case definition and with rapid diagnostic test culture and (RDT); and the healthy controls people who do not have cholera and not fulfill standard case definition of cholera.

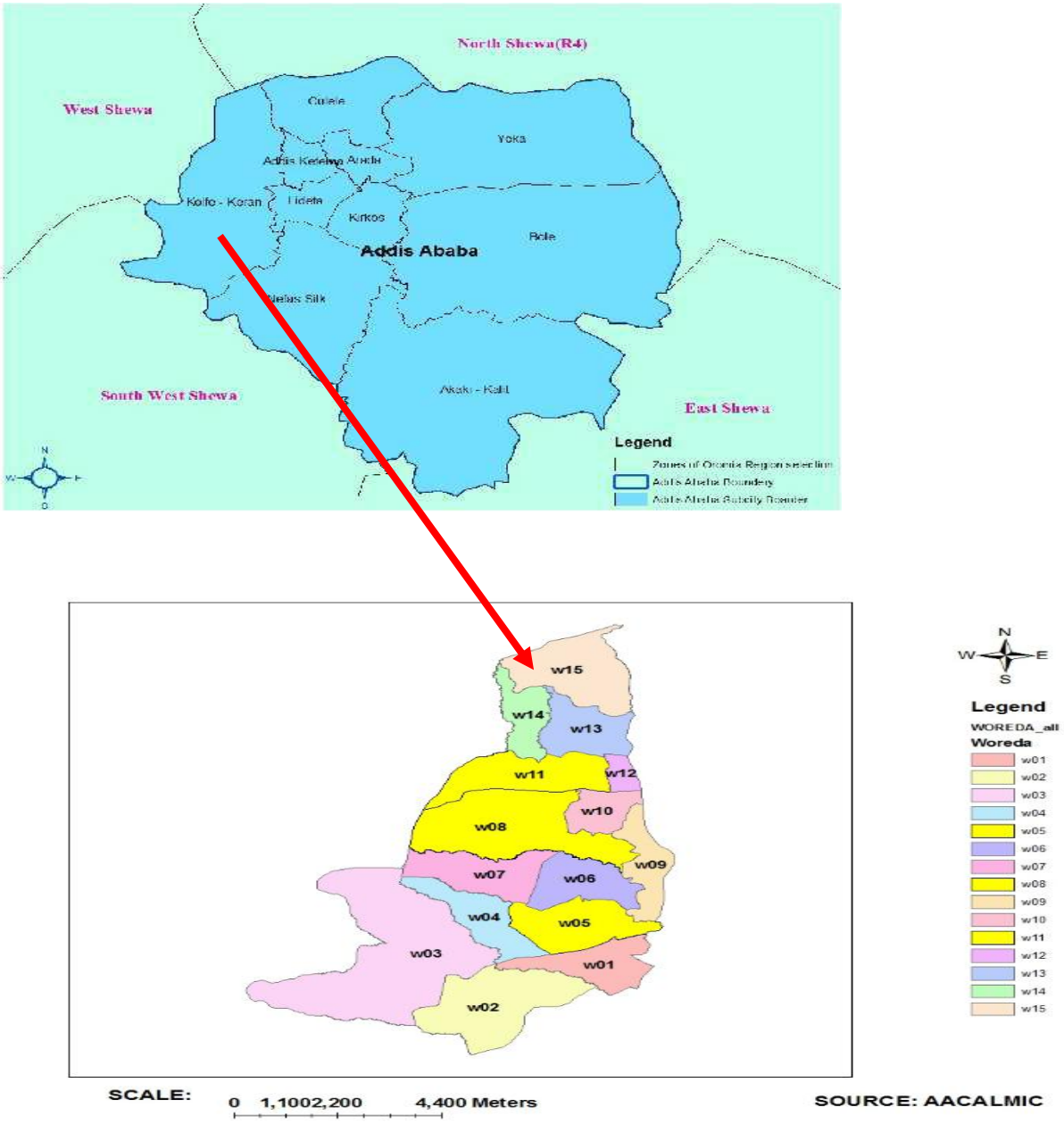

Figure 1 map of kolfe keraniyo sub city

Target and Study population

We defined our population as persons aged >=5 years old living in 01, 02, 03, 05, 09 and 13 woredas of Kolfe keraniyo sub-city during the outbreak. We also defined our study as cases and controls included in our study.

Case definition

Suspected case: A patient age 5 years or more who develops profuse watery diarrhea with or without vomiting.

Confirmed case: A patient age five years or more with clinical presentation of profuse watery diarrhea with or without vomiting and confirmed as presence of 01 or/and 0139 Vibrio cholerae sero-types by RDT or culture in the laboratory.

Sample size determination

We included all of the identified cases (19) during the course of the outbreak and recruited 38 controls with 2:1 control to case ratio. We used purposive sampling technique to identify.

Selection of cases

New cases were identified in the Mikililand CTC and health centers. The primary study subjects were newly confirmed cases of Vibrio cholera RDT/ culture; or a case that fulfilled the case definition of cholera without laboratory confirmation whose age with five years and above admitted to the Mikililand Cholera treatment center (CTC)

Selection of controls

A person whose age 5 years or more without a history of acute watery diarrhea in the last two weeks residing in kolfe keraniyo sub city within the same period was selected as control. For each case, two controls selected and interviewed during cases interviewed. Controls were selected from the same neighborhood communities of cases.

Exclusion and inclusion criteria

Exclusion criteria: under five year children and who was absent during the study period were excluded. Under five years children were excluded due to no cases during an outbreak investigation.

Inclusion criteria : cases any resident of kolfe keraniyo sub city who had a bacteriological confirmed and case with sign and symptom of cholera based on PHEM cased definition and who agreed to participate in the study was included.

Study Variables

Dependent variables: Cholera

Independent variables: sex, age, marital status, educational status, occupation, residential area, date of onset, date of admission/hospitalization, and risk factors include: food source, water source both domestic and drinking, personal and environmental hygiene, sanitation, and contact history

Data collection techniques and tools

Exposure and risk factor information was collected by face to face interview of cases and control by using the semi structured questionnaire. The questionnaire was adopted from Ethiopian Ministry of Health (EMoH) which was used as tool for cholera data collection. WHO, case definition was used to classify study participants as case or control. During the active case searching and interviewing cases and controls, intervention was made about prevention technique.

Data management

All data were checked for completeness before entry and analysis. Prior to entering the data in to the computer, the missing variables and consistency of filling of questionnaires and completeness of data was checked out by list command of Epi Info. The questionnaire that was developed by English language for this data collection was translated in to Amharic language to easily communicate with the interviewee

Data analysis

The data were entered and analyzed using Epi –Info version 7.1. We described the outbreak in person, place and time. We also calculated frequencies (univariate analysis). Moreover, we calculated unadjusted odds ratio (Bivariate analysis) and adjusted odds ratio (multivarible logistic regression analysis) . Result was displayed

Using tables and graphs. We used a significant level of less than 0.05 and a 95% confidence interval. Attack rate was also calculated.

Operational definitions:

Case: A case in this study was: - A patient age five years or more who develops profuse watery diarrhea with or without vomiting.

Control: A person age five years or more in whom no sign and symptom of cholera at the time of this data collection and he/she not recovered from the same infection.

Exposure: Any person exposing for any risk factors within the five days of proceeding to the data collection day.

Reporting of findings

The findings of the study interpreted and shared to local or woreda cholera outbreak response task forces, and the sub city health office to assist them in improving the same outbreak response interventions in the future.

Ethical considerations

Letter of permission was obtained from kolfe keraniyo sub city health office to respecting woredas. Permission was gained from woredas health offices to collect data for cases and controls from CTC and community respectively. Verbal consent was obtained from the study participant.

Results

Descriptive Epidemiology

The cholera outbreak in kolfe keraniyo sub city started during September 20, 2017, when two suspected cases reported to the kolfe keraniyo sub city health office. Two of the samples were investigated by RDT kit and culture at the CTC center and regional laboratory and positive for vibrio cholera, the index case (the first confirmed cholera case in the sub city) was 55 years old woman from woreda 1of kolfe keraniyo sub city.

The date of onset of diarrhea was 20 September 2017 and was admitted on 20 September 2017 at Zewuditu memorial hospital. She survived the infection after being managed with intravenous infusions (IV) such as ringer lactate and ORS, and Erythromycin antibiotic. Stool specimen taken from her on the date of reporting tested positive for vibrio cholera 01. In morning before onset of diarrhea the index case drunk holy water (locally called Tekilaymanot tsebel). 9 of cases positive by rapid diagnostic test (RDT).

Distribution of cholera cases by time

A total of 19 cases and no death were registered during September 20 to November 7, 2017 in the six woreda of kolfe keraniyo sub city .the high attack rate(AR)(%) among female were 21.9per 100,000 population in woreda 5 and 19.9 among men in woreda 1, respectively. Among cases, 10(53%) were female and 13(69%) were in the age category of 15-44 years old and (15-44 years old was also the median interval age). cholera cases were notified starting from September 20, 2017 and continued until

the November 7, 2017. The maximum cases were three cases per day. Figure 1 below summarizes the number of cholera case per day of notification.

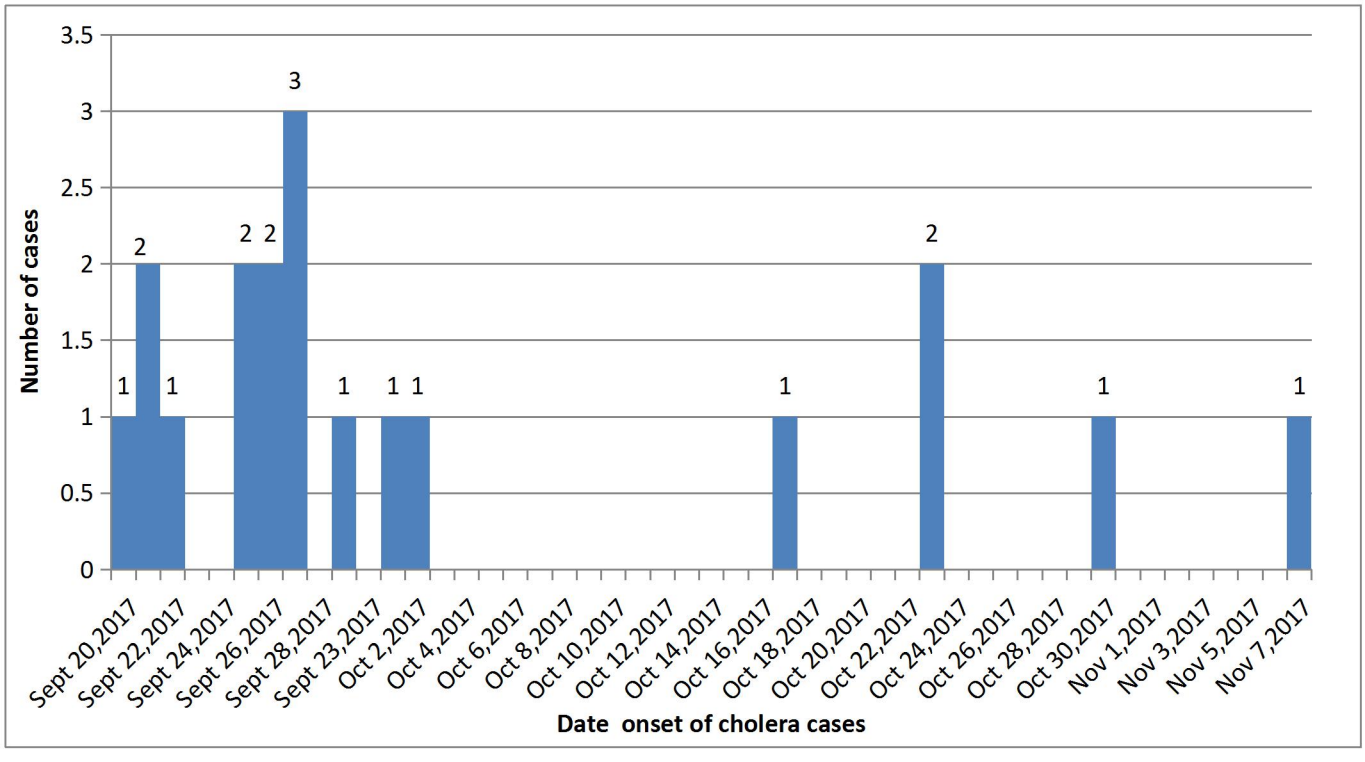

Figure 2 Number of cholera cases by date of onset in kolfe keraniyo sub city, Addis Ababa city, Ethiopia, 2017

Distribution of cholera cases by woredas (place)

In kolfe keraniyo sub city majority of the cases forty two (42%) were in the woreda 1 and list in the woreda 3 and 13 five (5%).

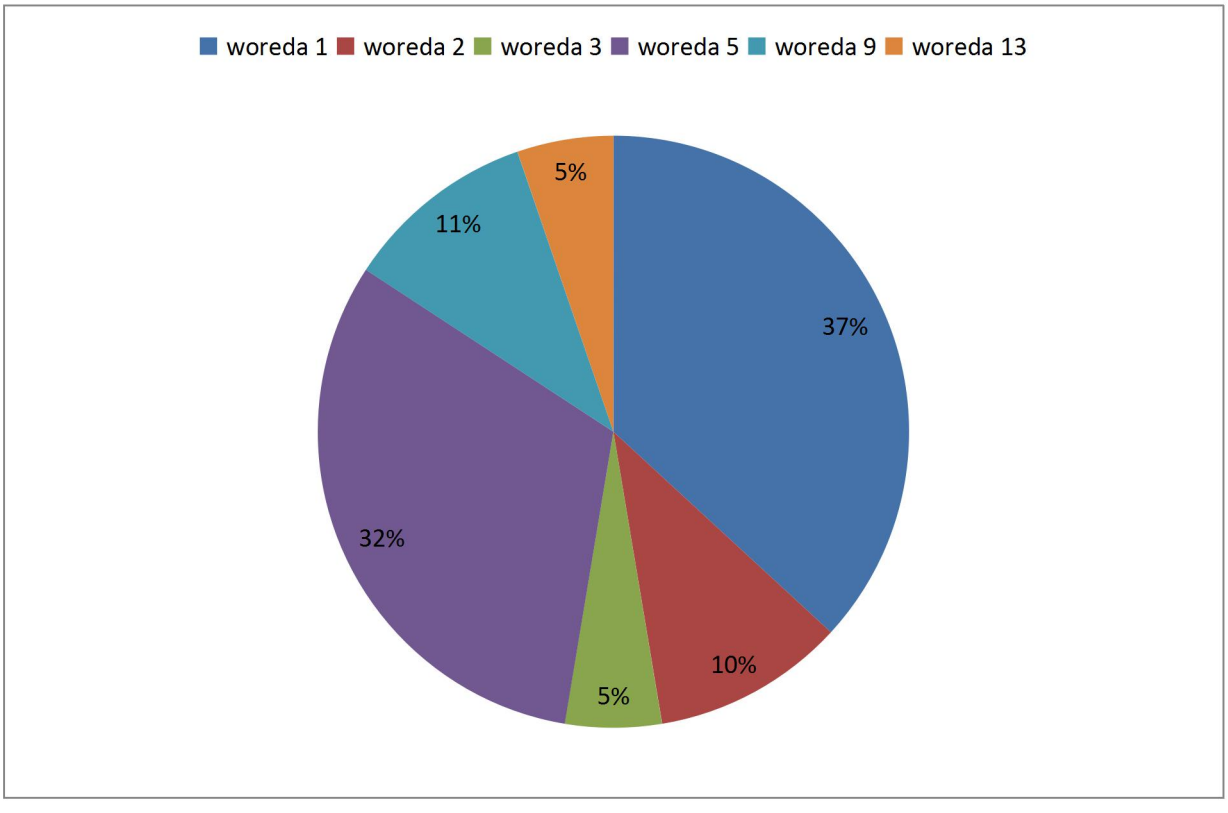

Figure 3 percentage of cholera affected woredas in kolfe keraniyo sub city Addis Ababa city, Ethiopia, 2017

Distribution of cholera cases by person

Females more affected by the outbreak than males. Out of notified 19 cases ten were females. Regarding distribution of case by age the most age group affected was 15-44 years

Table 1 distribution of cholera cases by age group in kolfe keraniyo sub city, Addis Ababa city, Ethiopia, 2017

Age group	Number of case
5-14 years	1
15-44 years	13
44+	5
Total	19

The highest and least attack rate was 21.9 per 100,000 population and 6.0 per 100,000 populations. This was recorded in woreda5 and 13 respectively. Regarding sex attack rate females were highly attacked than males. The woreda that recorded high attack rate for female population was woreda 5 with an attack rate 21.9 per 100,000 populations (table2).

Table 2 Attack rate of cholera cases by sex in each study woreda kolfe keraniyo sub city, Addis Ababa city, Ethiopia, 2017

Name of woredas	Total population					Total number of cases	AR/100,000 population	
	Male	Number cases	Female	No. Cases	Total population		Male	Female
Woreda 1	20,116	4	21,317	3	41,433	7	19.9	14.1
Woreda 2	15,500	2	17,058	0	32,558	2	12.9	0
Woreda 3	14,529	0	14520	1	26,829	1	0	6.9
Woreda 5	12,857	2	18,250	4	31,107	6	15.6	21.9
Woreda 9	16,078	1	16,294	1	32,372	2	6.2	6.1
Woreda 13	21,504	0	16,742	1	38246	1	0	6.0

Table 3 Socio demographic -characteristics of cholera cases and controls in kolfe keraniyo sub city, Addis Ababa city, Ethiopia, 2017

Socio-demographic information		Cases(n=19)		Controls(n=38)	
		No.	%	no	%
Age group	15-44yrs	13	69	31	82
	5-14yrs	1	5	0	0
	44+ yrs	5	26	7	18
Sex	Male	9	47	20	52
	Female	10	53	18	47
Occupation	Daily laborer	10	26.7 %	10	53%
	Government worker	1	21.3 %	8	5%
	House wife	5	34%	13	26%
	Merchants	3	18%	7	16%
Marital status	Married	14	74%	23	61%
	Single	4	21%	15	39%
	Others	1	5%	0	0%
Educational status	College diploma and above	2	11%	9	24%
	Secondary(9-12)	6	32%	16	42%
	Primary (1-8)	8	42%	7	18%
	Read and write	3	16%	6	16%

Epidemic preparedness and response

Kolfe keraniyo sub city had an epidemic plan and an epidemic preparedness committee in place prior to an outbreak. The protective materials and IV fluids CTC establishment were provided by the support of UNICEF and regional health department. All sectors of the sub city involved on the prevention of the outbreak and supported each other. Disinfectants were available at the health centers and CTC in the woredas visited. The sub city health office distributed chlorine for water treatment in the all woredas visited. The holy water site locally called Tekilaymanot tsebel also treated with chlorine by sub city health office

Environmental investigation

During the environmental assessment, among visited latrine (n=57) 36(63%) latrine had no hand washing facilities. Majority of the household's source of drinking water in the woredas were tap water. The general sanitation in the woredas were poor especially woreda 1.there were unclean environment and no drainage system in some areas.

Figure 4 resident house and environment during out break field investigation

Laboratory results

At the CTC, for those all patients admitted stool sample were taken and rapid Diagnostic Test (RDT) was performed. Among RDT positives 1case was positive for both RDT and culture test for vibrio cholera o1 and 8 cases were by RDT kit. The other cases were epidemiologically linked. A water sample was taken for analysis and positive for vibrio cholerae 01.

Clinical investigation

Assessment of level of dehydration and treatment

Ninety (90%) of cases enrolled in the study visited the CTC within 2 days of onset of cholera symptoms .all patients had diarrhea and vomiting. Four (21 %) of cases had sign of severe dehydration. Majority the cases were treated by ORS and IV Ringer lactate fluid. Erythromycin and Doxycycline antibiotics were used.

Awareness of prevention assessment

During an outbreak investigation the level of awareness and prevention of the disease was assessed .out of 57 households twenty-six (46%) used soap for hand washing before outbreak investigation.

Analytical epidemiology

The majority age of cholera cases were 15-44 years thirteen (69%). The less affected age of cholera cases were 5-14 years one (5%) and above 44 years old were five (26%). Among 19 cholera cases female accounts ten (53%)

We found that those who drank holy water 5 days prior to their illness onset were 8.1(crude odds ratio: 8.1; 95% confidence interval [95%ci]: 2.3, 28.1) times more likely to develop cholera illness than those not drank (Table 5). In our multivariate analysis, we found that housewives are 87 %(adjusted odds ratio: 0.13; 95%CI]: 0.02, 0.91) less likely to develop cholera than daily laborer. However, merchants are nearly 99% less likely to develop cholera than daily laborer. Further, those who drank holy water were 9.84 more likely to develop cholera illness than those who did not drink (Table 5).

Table 4 comparing cholera cases and controls against cholera risk factors using bivariate analysis, kolfe keraniyo sub city, Addis Ababa city, Ethiopia 2017

Variables	Category	Case(n=19)	Control(n=38)	COR(95% CI)	P value
Age group	15-44yrs	13(69%)	31(82%)	Reference	
	5-14yrs	1(5%)	0(0)	Undefined	0.132**
	44+ yrs	5(26%)	7(18%0	1.7(0.4,6.4)	0.425**
Sex	Male	9(47 %)	20(52 %)	0.8(0.3,2.4)	0.707**
	Female	10 (53 %)	18(47 %)	Reference	
Occupation	Daily Laborer	10(26%)	10(53%)	Reference	
	Government worker	1(21%)	8(5%)	0.12(0.01,1.2)	0.0458*
	House wife	5(34%)	13(26%)	0.4(0.1,1.5)	0.1617*
	Merchant	3(18%)	7(16%)	0.4(0.1,2.1)	0.297**
Educational status	College diploma and Above	2(11%)	9(24%)	Reference	
	Primary(1-8)	8(42%)	7(18%)	5.1(0.8,32.3)	0.068*
	Read and Write	3(16%)	6(16%)	2.3(0.3,17.8)	0.436**
	Secondary(9-12)	6(32%)	16(42%)	1.7(0.3,10.2)	0.565**
Marital status	Married	14(74%)	23(61%)	Reference	
	Single	4(21%)	15(39%)	0.4(0.1,1.6)	0.202**
	Other	1(5%)	0(0)	Undefined	0.209**
Hand wash with soup	**Yes**	3(16%)	13(35%)	0.35(0.1,1.4)	0.129*
	No	16(84%)	24(65%)	Reference	
Latrine Availability	Yes	15(79 %)	28(80 %)	0.9(0.2,3.7)	0.926**
	No	4(21 %)	7(20 %)	Reference	

Open defecation	Yes	4(21 %)	6 (16 %)	1.4(0.3,5.8)	0.622**
	No	15(79 %)	32(84 %)	Reference	
Open dumping of wastes	Yes	19(100%)	34(89.5%)	Undefined	0.142**
	No	0	4(10.5%)		
Contact history	Yes	8(42%)	7(18 %)	3.2(0.9,10.9)	0.055*
	No	11(58%)	31(82%)		
Water source for domestic use	Community	0	5(13%)	Undefined	0.097**
	House hold tap water	19(100%)	33(87%)	Undefined	0.087**
Treating water before use	Yes	2(10.5%)	8(21%)	0.4(0.1,2.3)	0.324**
	No	17(89.5)	30(79%)		
Holly Water	Yes	13(68%)	8(21%)	8.1(2.3,28.1)	0.00047*
	No	6(32%)	30(79%)	Reference	
Eat Vegetable	Yes	2(10.5%)	4(10.5%)	1(0.2,6.0)	1.000**
	No	17 (89.5 %	34(89.5 %)		
Eat from Hotel or Restaurant	Yes	4(21%)	6(16%)	1.4(0.3,5.8)	0.622**
	No	15(79%)	32(84%)		

Key: *Variables with P value of less than 0.2 in Bivariate analysis

** Variables with P value of greater than 0.2 in bivariate analysis

Table 5.comparing cholera cases and control agonist cholera risk factor using multivariate analysis, kolfe keraniyo sub city, Addis Ababa, Ethiopia, 2017

Variables	Category	Case(n=19)	Control(n=38)	COR(95% CI)	AOR	P value
Occupation	Daily Laborer	10(26%)	10(53%)	1*		
	Government worker	1(21%)	8(5%)	0.12(0.01,1.2)	0.16(0.01,2.7)	0.2017
	House wife	5(34%)	13(26%)	0.4(0.1,1.5)	0.13(0.02,0.91)	0.0398
	Merchant	3(18%)	7(16%)	0.4(0.1,2.1)	0.08(0.01,0.99)	0.0488
Educational status	College diploma and Above	2(11%)	9(24%)	1*		
	Primary(1-8)	8(42%)	7(18%)	5.1(0.8,32.3)	2.46(0.21,28.57)	0.4707
	Read and Write	3(16%)	6(16%)	2.3(0.3,17.8)	0.76(0.04,13.18)	0.8511
	Secondary(9-12)	6(32%)	16(42%)	1.7(0.3,10.2)	0.67(0.07,6.83)	0.7386
Hand wash with soup	**Yes**	3(16%)	13(35%)	0.35(0.1,1.4)	0.31(0.04, 2.43)	0.2633
	No	16(84%)	24(65%)	1*		
Contact history	Yes	8(42%)	7(18 %)	3.2(0.9,10.9)	3.05(0.50,18.72)	0.2276
	No	11(58%)	31(82%)			
Drink Holly Water a weak before	Yes	13(68%)	8(21%)	8.1(2.3,28.1)	9.84(1.86,51.97)	0.0071
	No	6(32%)	30(79%)	1*		

* refers to reference variable

Discussion

This study shows that a total of 19 cholera cases were reported from kolfe keraniyo sub city, Addis Ababa town. The cholera affected all age group but adults from 15-44 years were more affected than the others age group. Females 10(53%) were affected than males. This finding is not in line with case control study conducted in Afar region, Ethiopia, 2014(13). In contrary cross-sectional study conducted in Nigeria 2016, female population was more affected by cholera outbreak (14). The possible assumption for this finding females use holy water than males and work on sanitary activities.

Age is one of the major concerns of cholera infection. This study showed that the most affected age group in the study areas was the age between 15 and 44 years which accounted 69% of the all cholera cases in those study woredas. This was similar to the acute cholera disease documented in the Buea health district of Cameroon(15) .But contrary to the previous study conducted on Meta analysis on the issue of global burden of cholera which showed that children less than five years of age were more vulnerable for cholera infection than any age groups (2). The cholera affected age groups in this study were productive age group, who may have eaten outside the home, contact with working groups, and possibility of lacking water and soap for hand washing.

Acute watery diarrhea/ cholera infection is directly or indirectly associated with occupational status of the people. The finding in this study revealed that daily laborer was more affected by AWD/cholera disease. This was similar with study conducted in Afar region, Ethiopia, 2014 and. This is may be due to they may have access to eat contaminated water ,foods outside home and poor hand washing facilities on their working place.

The bivariate and multivariable analysis indicated as drunken contaminated holly water and working as daily laborer was the risk factor for the cholera disease. Work exposure, no treated holy water, poor sanitation of the environment around the holly water site and summer season will be the possible factors.

Conclusion and recommendation

Peoples in age group of 15-44 years and females were more affected than males.

Lower attack rate with no death and intervention of an outbreak was effective

Drinking contaminated holly water and daily laborers were the risk for occurrence of cholera.

Recommendation

The woredas administration in collaboration with woredas and sub city health office and Saint Tekle Haymanot Church has to give health education the community. We recommended construction of flood barriers around the holly waters Saint Tekle Haymanot Church to prevent contamination by flooding

References

1. Kumar MaS,Outbreak Investigation of Cholera in a Slu of Northern India. OpenJornal of epidemiology,2014.

2. Mohammad A, Anna L, Young A, Young E, Binod e. The global burden of cholera. Bulletin of the World Health Organisation. 2014:1-12.

3. WHO. Relevé épidémiologique hebdomadaire. 2016;23:1-8.

4. Ethiopian Health and Nutrition Research Institute, Center PHEM. Guideline onCHOLERA OUTBREAK MANAGEMENTEthiopia. 2011.

5. UNICEF. Cholera outbreak in the West and Central Africa: Regional Update. 2014;WEEK 52:1-2.

6. UNICEF. Cholera outbreak in the West and Central Africa: Regional Update. 2015;WEEK 6:1-4.

7. P. E. Cholera in Zimbabwe. Research Gate. 2014(1-16).

8. (PRC): AUPRC. Concept note on briefing on the outbreaks of communicable diseases in different parts of Africa AUC Addis Ababa, Ethiopia. Africa CDC. 2016:1-9.

9. Thomas T, Joseph F, Wamala, J.etall. J. Risk Factors for Sustained Cholera Transmission, Juba County, South Sudan. 2014:1-4.

10. report WHOEREs. Emergency Response; Ethiopia situation report. 2016:1-6.

11. Dickson S, Julius A, Peter N Ee. Assessing the risk factors of cholera epidemic in the Buea Health District of Cameroon. BMC Public Health. 2015:1-7.

12. Ghobad M MA, Parvin M, Elham E.Etall. A cholera outbreak in Alborz Province, Iran: a matched case-control study. CrossMark. 2016;38:1-6.

13. B. B. Epidemiology of Acute Watery Diarrhea Outbreak and Challenges of Control—Afar, Ethiopia, 2009. International Invention Journal of Medicine and Medical Sciences. 2014;1:1-9.

14.Federal Democratic Republic of Ethiopia Central Statistical Agency. Population Projection of Ethiopia for All Regions at Weredas Level from 2014 – 2017, Addis Ababa, Ethiopia, August 2013

Annex 1 Data collection tools for cholera outbreak

Part A: General information

1. Code----------
2. Case ☐ Control ☐
3. Age (in years): ----------
4. Sex: Male ☐ Female ☐
5. Occupation_____
6. Educational status: 1.Illitrate ☐ 2.Read & write ☐ 3. Primary education (1- 8) ☐ 4. Secondary education (9-12) ☐ 5. College education ☐
7. Marital status: 1.singe ☐ 2. Married ☐ 3. Divorced ☐ 4. Separated ☐ ☐ 5. Widowed
8. Residential Address Sub city_____ Woreda _____ Ketene_____ House No _____ Telephone No_____

Clinical Information (for cases)

1. Date of onset (dd/mm/yyy) ----------
2. Presenting symptoms

Watery Diarrhoea ☐ Vomiting ☐ Dehydration ☐ Others (specify) ------

Hospitalized? Yes ☐ No ☐

3. Date of hospitalization (dd/mm/yyyy) ----------

Part B: Exposures

Water

1. What is your regular source of water for domestic use in the last 5days? ☐

Household Tap water ☐ Communal tap water ☐ River ☐ Well

Borehole ☐ Spring ☐ Street vended water ☐

Tanker water (Roto) ☐ Bottled water ☐

others (specify)_____

2. What is your regular source of drinking water within the last five days?

Household Tap water ☐ Communal tap water ☐ River ☐

Well ☐ Borehole ☐ Spring ☐ Street vended water ☐

Tanker water (Roto) ☐ Bottled water ☐

Others (specify)_____

3. Yes ☐ No ☐

4. If yes, how did you treat it? Filter ☐ Boiling ☐ Aqua tab ☐

water guard ☐ Bishangari ☐ Pure ☐ Other (specify ☐

5. Did you drink water from a holy water site in the last five days? Yes ☐

No ☐

6. If yes, what is the source of the holy water site? Tap water spring ☐

Well ☐ others sources (specify) ☐_____

Food and Beverages

7. Did you eat any of the following in the last 5 days?

Vegetable salad ☐ Fruits ☐ Raw meat ☐ partially roasted meat ☐

Fish ☐ Milk ☐ others (specify) ----------

8. Where did you get (or buy) food for your household?

Local market ☐ Private garden/farm ☐ Street shops ☐

Supermarkets ☐ Others (specify) ----------

9. Did you eat food outside your home in the last 5days? Yes ☐ No ☐

10. Where did you eat? Sold by street vendors ☐ Hotel ☐ Restaurant ☐

At a gathering ☐ School/work cafeteria ☐

Others (specify)_____

11. Did you eat any cold left-over food in the last 3days? Yes ☐ No ☐

12. If yes, where is the source of the food? Home ☐ Hotel ☐

Restaurant ☐ University ☐ Others (specify)_____

13. Did you drink any of the following locally-made beverages in the last 3 days?

Yes ☐ No ☐

14. If yes, which one of the following? Shameta ☐ Mewuded ☐ Borde ☐

Besso ☐ others (specify) _____

Hygiene and sanitation

15. Do you regularly wash your hands with soap before eating? Yes ☐ No ☐

16. Is there a latrine in your home? Yes ☐ No ☐

17. If yes, Communal or private? Communal ☐ Private ☐

18. If No to Q.15, where do you discharge human waste (faeces)?

Open defecation ☐ In the river ☐ bury in the soil ☐

Others (specify) _____

19. Did you wash your hands every time with soap after defecation? Yes ☐ No ☐

20. Where do you dispose of your refuse? Open dumping ☐ Open pit ☐

In the river ☐ Bury ☐ Burn ☐ Others (specify)_____

Other exposures

21. In the last one week, did anyone in your household have diarrhea or vomiting?

Yes ☐ No ☐

22. Did you visit anyone having diarrhea or vomiting Yes ☐ No ☐

23. Did you attend a funeral within the last five days? Yes ☐ No ☐

24. Did you travel to a place affected with diarrhea and vomiting illness?

Yes ☐ No ☐

25. If Yes, where? _____ (Name of Kebele/Ketena, Woredas,)

1.2 Malaria Outbreak Investigation report in Dasenech District, Libemuket Cluster, South Nation and Nationality People Region of South Omo, Ethiopia May, 2018

Background: On May 3/2018, south Omo zone dasenech district Health office was alerted of unusual sudden increased malaria cases in libemuket village .We investigated to confirm the outbreak and determine associated factor of malaria outbreak occurrences in Dasenech district, Libemuket cluster, south nation and nationality of people region from may 3/2018 to prevent further infection.

Methods: We defined a malaria case as any person with fever or fever with headache confirmed either microscopically to have plasmodium parasites or by RDT detecting of the malaria antigens. We reviewed the previous one year malaria record in 2017 at cluster level to establish a baseline incidence of malaria in village. We identified cases using line list and conduct house to house active case search on daily basis. We conducted unmatched case-control study with 1:1 ratio conveniently selected cases 117 and community controls 117 Controls were a neighbor of cases and who did not develop symptoms of malaria in the last three months. Data was collected through structured interview administered questionnaire and entered to Epi-info version 7 and analyzed

Result: A total of 542 suspected and 402 confirmed malaria cases with no deaths were identified. The predominant species was Plasmodium falciparum accounted 95.5%. The median age was 25 years (ranges 2- 63years). The highest age specific attack rate was seen above 15 years (63.7/1000 populations).

Conclusion: Poor insecticide treated bed net utilization, presence of stagnant water and sleeping outside of their home during night were attributed for this outbreak. We recommended proper utilization of insecticide treated bed net, community mobilization on disruption of potential mosquitoes breeding site.

Keywords: Dasenech, Malaria, Outbreak, P.Falciparum

Introduction

Malaria is mosquito-borne parasitic disease and one of the most serious health problems of Human being. It causes 300 million to 500 million episodes of acute illness and 1.2 million deaths per year globally. Malaria is known to kill one child every 30 seconds, 3000 under five children per day and is affecting over 100 countries of tropical and subtropical regions of the world (1).

In Ethiopia malaria transmission is generally seasonal and highly unstable because of the variations in topography, climate and rainfall patterns. Hence, large scale outbreak frequently occurs particularly in epidemic prone areas of the country. Generally outbreak occur in places where there is low and unstable malaria transmission, and where people have low or no immunity(6).

Other triggering factors like unusual local weather phenomena and activities resulting in environmental modification that increase vector population, increased vulnerability of population from famine and malnutrition, Interruptions of anti-malarial measures which have kept malaria under control. However, there could be outbreak in high transmission areas if there is deterioration of health system, interruption of anti-malarial measures or migration of non-immune individuals(10).

Many localized but severe outbreaks of malaria occurred in Amhara and SNNP Regional States, leading to widespread epidemic malaria in highland and highland fringe areas (up to 2,500 meters) in 2003. Conventionally in areas of high-endemicity, prevalence of malaria infection is known to peak at an early age with an increase up to the age of 5 years; followed by a sharp fall in age groups 10-15 years and continuing on a slow decline with increasing age(12).

Dasenech geography and climate influence (seasonal) outbreaks of malaria epidemics. Peculiarities of this region (lowlands and seasonal heavy rainfall) lead to a high prevalence of mosquito breeding sites. The dasenech district is characterized by the lowland areas (≤1500 m altitude) with hot or warm climate. Malaria transmission in the region is generally seasonal and highly unstable due to variations in topography and rainfall patterns. Malaria transmission in the region is perennial due to the availability of large perennial river bodies and hot climate favoring the transmission throughout the year, with seasonal peak extending from August to December.

There was a normal trend of malaria cases in dasenech district during the last five years. On last week of May/2018 libemuket health center of dasenech district reported an unusual increased number of

malaria cases from libemuket village. Then the district requested the SNNPR regional Public Health Emergency Management for assistance with investigation of an unusual increased number of malaria cases.

On May 8 /2018 after having this, teams from Public Health Emergency Management, UNICEF, AMRF, JSI and district health office representative who include Addis -Ababa University field epidemiology residents, prepared for field visit and deployed to the district. The team came up with a series of prevention and control measures to stop the propagation of the outbreak which include; enhancing malaria surveillance and treatment capacity at existing health facilities, providing health education on proper utilization of bed nets, general environmental hygiene.

The aim of this investigation was conducted to identify risk factors associated with this outbreak, to assess the level of preparedness in the affected districts and to control the outbreak.

OBJECTIVES

General objective

- To describe the magnitude of morbidity and mortality due to malaria outbreak ,identify the etiologic agent and investigate factors associated with an occurrence of malaria outbreak in SNNPR Debub Omo,dasenech District Libemuket cluster ,Ethiopia, may,3/2018-15/2018

Specific objectives

- To verify existence of Malaria outbreak
- To describe Malaria cases by Persons, Place, and Time in the District
- To identify Malaria species that causes outbreak in the District
- To determine Factors associated with occurrence of outbreak in the District

Methods

Study setting and Period

The malaria outbreak investigation was conducted in Libemuket cluster five villages (libemuket, Cs, Gumburbur, Bayo and Gumburburdebermus) of Dasenech district from May 3 to 15 /2018**.**

Dasenech is bordered on the south by Kenya, on the west by the Bench Maji, on the north Konta, Gamo Gofa and on the east Oromiya Region. Dasenech district has one urban village and 39 rural villages. Libemuket clutter has five villages (libemuket, Cs, Gumburbur, Bayo and Gumburburdebermus).total population number of the villages was 19791. Female accounts 51%.The means monthly temperature of

the district between 19^0c and 34^0c implying tropical or 'Kola' temperature condition. The mean annual rainfall of the district is about 560mm.

Study design

Descriptive epidemiology

Malaria was defined and identified as acute febrile illness with blood RDT positive for malaria in Dasenech district during this outbreak. We reviewed the previous 1 year 2017data of malaria from libemuket clustter health office and health facility to set epidemic threshold level and comparing with similar week of this year (2018). The number of malaria cases was collected from health facilities on daily and weekly basis. Magnitude of outbreak was described by person, place and time. RDT positivity rate was calculated as those positive for malaria among total examined. Attack rates were calculated by person & place. An epidemic curve was constructed.

Analytical epidemiology

An un-matched case-control study was conducted to identify risk factors associated with malaria outbreak . A community controls were selected for recently (not more than two weeks before interview) confirmed malaria case patients in 1:1 ratio basis. Controls were defined as having no malaria signs and symptoms for the last three months. A standard checklist was used to assess risk factors including sleeping and staying area during night, use of insecticide bed net, indoor residual spray, and presence of stagnant water or any other mosquito breeding area.

Sampling method and Sample Size Determination: The cases and controls were recruited by convenient sampling method irrespective of the variables. Sample size determination with a ratio of 1; 1 cases and control. The assumption taken from previous study indicates that proportion of controls exposed was 50% for a power of 80% with odds ratio (OR) of 2.2. The sample sizes which were conveniently taken from each group can be determined by Epi-info version 7.2.1. Proposed sample size therefore, 117 cases and 117 controls needed for the study was 234

Laboratory Method: Rapid Diagnostic Test (RDT) was used in the health center. Health extension workers also used RDT to identify confirmed malaria cases at health post and Community level during outbreak investigation case searching.

Environmental Assessment

Data was collected on the presence of potential mosquito breeding sites. Selected case-patients and controls were interviewed about presence of mosquito breeding sites in their compound and near to home within 500 meters or less than it. In addition, availability of uncovered plastic water container, old tires and broken glasses in the home or outside the home were also critically assessed.

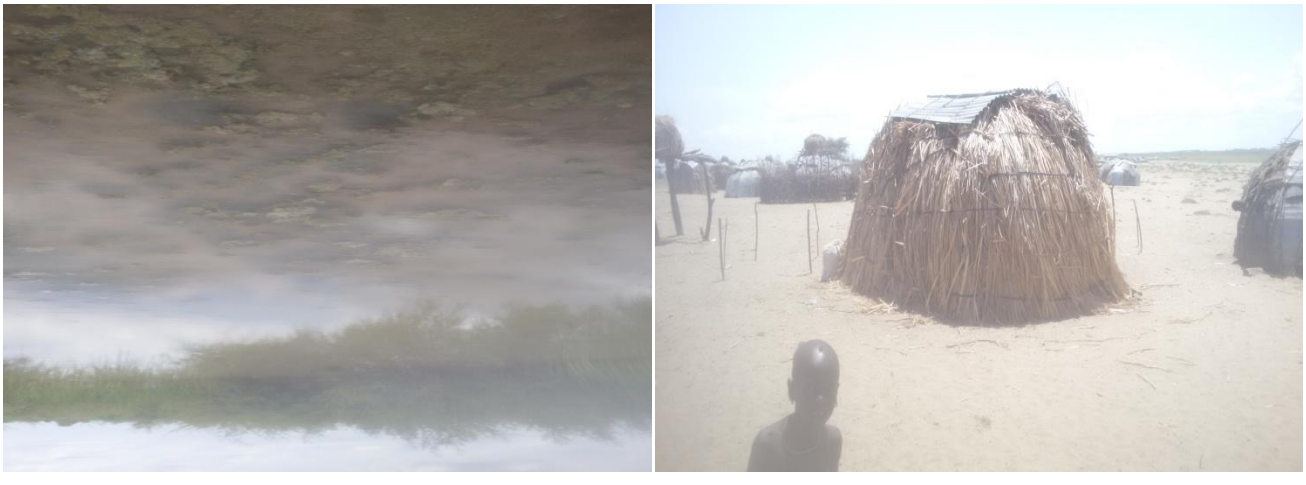

Figure 5 mosquito breeding site and sleeping area of the Cs, district residents.

Data collection technique and Analysis

Quantitative data was collected using standardized face to face interviewer administered questionnaire that addressed socio-demographic characteristics, clinical manifestation , potential exposures, discussing with relevant bodies (task force), review of weekly integrated disease surveillance and response at different level (District Health office and Health facilities), visited of the affected village and interview community members (patients) about knowledge of malaria transmission and control measure. RDT diagnosis was performed. Epi Info version 7.3.1 was used to analyze associated risk factors. The significance of risk factors for the outbreak was determined through bivariate and multivariate analysis by calculating Adjusted Odds Ratio and 95% Confidence Interval.

Data Quality Management

To ensure quality, the standardized questionnaire was used. We reviewed and revised the questionnaire to ensure internal validity. We pre-tested it on 5% of calculated sample size. Data collectors and supervisors were trained for three days on the data collection tools and process of data collection. To ensure completeness, 5% of the collected data were checked and the investigators monitored the overall

quality of data collection. We used line list for describing malaria cases in terms of time, place and person.

Case definitions

Community case definition

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

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

Suspected: Patient with fever or history of fever in the last 48 hours and lives in malaria endemic areas or has history of travel within the past 30 days to malaria-endemic areas.

Probable: Any person with fever and one or more of major sign such as headache, rigor, back pain, chills, sweats, myalgia, nausea, and vomiting diagnosed clinically as malaria.

Confirmed: Any suspected case that confirmed by microscopy or RDT for plasmodium parasites.

Inclusion criteria

Cases: Any residents of Libemuket, cs, Gumburbur, gumburburdebermus and bayo village, who had symptoms of malaria and agreed to participate

Controls: Any resident's libemuket, cs, Gumburbur, gumburburdebermus and bayo village during the study who was a neighbor to a case and who did not develop signs and symptoms of malaria and agreed to participate.

Exclusion criteria

Cases: Those who refused to participate

Control: Those who refused to participate and didn't fulfill inclusion criteria

Ethical Consideration

All participants were informed about the objective of the study, confidentiality of the participant was assured and informed consent was sought from and given by the participants, with the knowledge they were free to withdraw at any time. Ethical clearance was obtained from the institutional review board of Ethiopian public health institute and the support letter was written from SNNPR regional health bureau to Dasenech district health office**.**

Results

Distribution of Malaria Cases by Person

This study revealed that, among a total of 542 suspected malaria cases, 231(42.6), 311 (57.4%) were males & female respectively. Fever and headache were the two predominant clinical manifestations. Cough and Diarrhea was less frequent.

Table 6 clinical masfistation among Malaria cases in dasenech district, libemuket cluster (libemuket, Cs, Gumburbur, Gumburburdebermus, Bayo) Ethiopia, May, 2018

S.N	Symptom	Frequency; n (%)
1	Fever	111(94.87%)
2	Vomiting	40(34.19%)
3	Diarrhea	21(17.95%)
4	Headache	104(88.89%)
5	Sweating	61(52.14%)
7	Back pain	71(60.7%)
6	Chilling and shivering	102(87.2%)
7	Rigor	60(51.3%)
8	Cough	16(13.7%)

The median age of suspected malaria cases were 25 years old (range- 2 to 63 year). The most affected age group was5-14 years age group 162 (68.9%) followed by>=15 age groups 34 (15%) and <=4 years age group (7.7%) of all notified suspected malaria cases

The highest and lowest positivity rate was reported in the age group above5- 14 years (90%) and > 15years (54%) respectively (table 8).

Table 7 distribution of malaria case by Age and plasmodium species

Age group (in years)	Total tested by (RDT & Micro)	Total positive	Positivity rate (%)	Plasmodium Species	
				P.Falciparum; n (%)	P.Vivax; n (%)
<=4	162	128	79.1	128	2
5-14	182	165	90.6	165	0
>=15	198	107	54.04	107	0
Total	542	402	74.5	402	0.36

All suspected malaria cases (542) were examined by RDT treated clinically. Of the total positive cases, plasmodium falciparum accounts for 400/402(99.6%) followed by plasmodium vivax 2/402 (0.36 %). The screened 402 febrile cases, RDT result comes out with 74.6% positivity rate. As the national guideline the outbreak threshold is 50% positive, these results confirmed outbreak (table 9).

Table 8 Distribution of malaria cases by sex and plasmodium species libemuket, Cs, Gumburbur, Gumburbur debermus, and bayo village, Ethiopia, May, 2018

Gender	Total tested by (RDT)	Total positive	Positivity rate (%)	Plasmodium Species	
				P.Falciparum; n (%)	**P.Vivax; n (%)**
Male	255	190	74.5	189	1
Female	342	212	62.0	211	1
Total	542	402	74.2	99.5	0.5

The overall attack rate was 36.7 per 1000 population with a case fatality ratio of zero. Age group above 15 years was the most affected with an AR of 63.7 per 1000popn followed by age group 5-14 years which accounts 11.4 per 1000 population (table 10).

Table 9 Malaria attack rate by Age in libemuket, cs, Gumburbur, gumburburdebermus and bayo village Ethiopia, May 5/2018

Age group (in year(	Eligible Population	Number of cases	Attack rate Per 1000 population
<=4	10696	119	11.1
5-14	22106	192	8.7
>=15	32038	231	7.2
Total	**64840**	542	8.4

Distribution of Malaria Cases by Place

Among the total suspected malaria cases, 542/302(56%) were from Libemuket village and 184 (34%) were from Cs village, Dasenech district. The most dominant species responsible for this outbreak was plasmodium falciparum followed plasmodium Vivax. Positivity rate was high in Cs village (87%) as compared to Libemuket, Gumburbur and bayo village (table 11)

Table 10 Distribution of malaria cases by village and plasmodium species in libemuket, cs, Gumburbur, gumburburdebermus and bayo in May, 5/2018

Name of Village	Total tested (RDT)	Plasmodium Species	
		P.Falciparum; n (%)	P.Vivax n (%)
Libemuket	302	200(66%)	2(0.6%)
Cs	184	160(87%)	
Gumburbur	23	16(69.5%)	
Gumburbur debermus	27	23(85.2%)	
Bayo	6	3(50%)	

The populations in CS and Libemuket village were more affected by malaria outbreak followed by Gumburbur debermus village with attack rate of 148.9, 112.9 and 17.2 per 1000popn respectively (table 12).

Table 11 malaria attack rate by sex, village and age group dasenech district, libemuket cluster, Ethiopia, May 2018.

Name of Village	Total Population	Sex		Age group (in year)			Total Cases	AR per 1000
		Male	Female	<=4	5-14	>=15		
Libemuket	2674	1310	1364	163	511	2000	302	112.9
Cs	1235	605	630	193	312	730	184	148.9
Gumburbur	1341	657	684	209	312	820	23	17.2
Gumburbur debermus	13500	664	691	212	1200	12088	27	2.0
Bayo	1041	510	537	163	300	578	6	5.7

Distribution of Malaria cases by Time

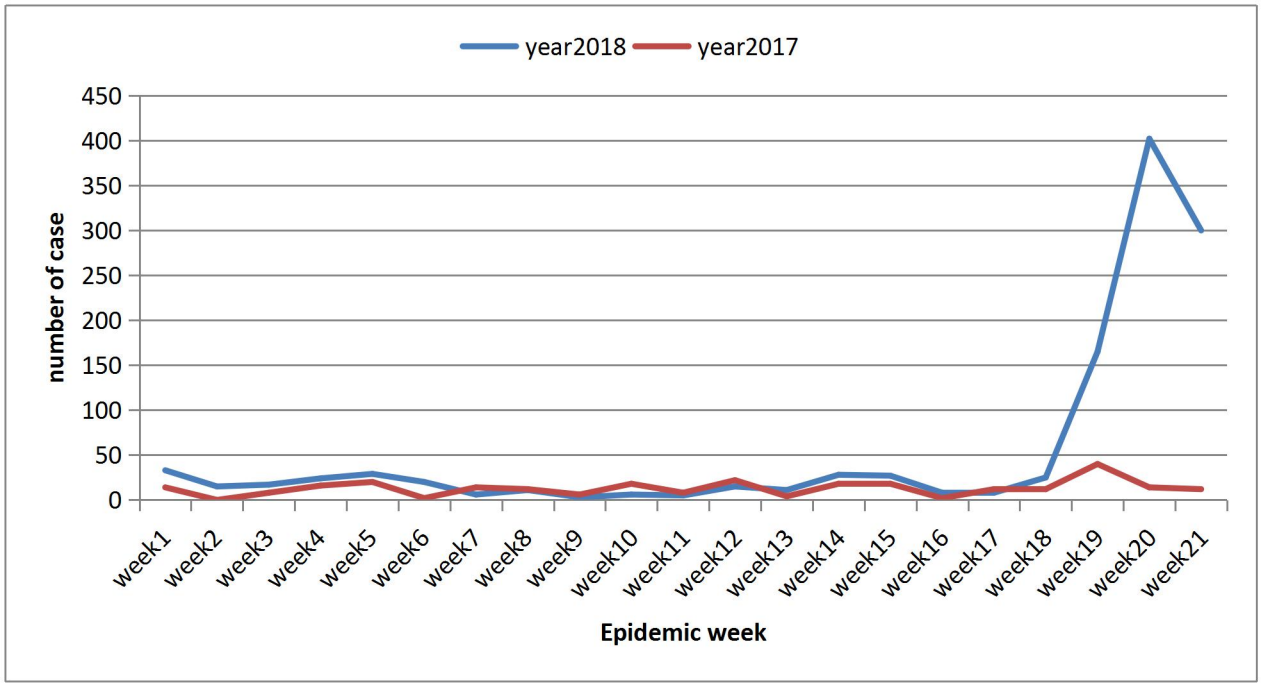

Figure 6 Trends of Malaria cases in Dasenech district, Libemuket cluster SNNPR, Ethiopia, by WHO Epidemic Week in 2018 Ethiopia

The number of malaria reported cases were more than two times compared to the prior year in WHO epidemic week 19 and 20. The peak magnitude of malaria cases showed in week 20, 2018. The outbreak was occurred from week 19 to week 20. Response for the outbreak was started in the beginning of the outbreak.

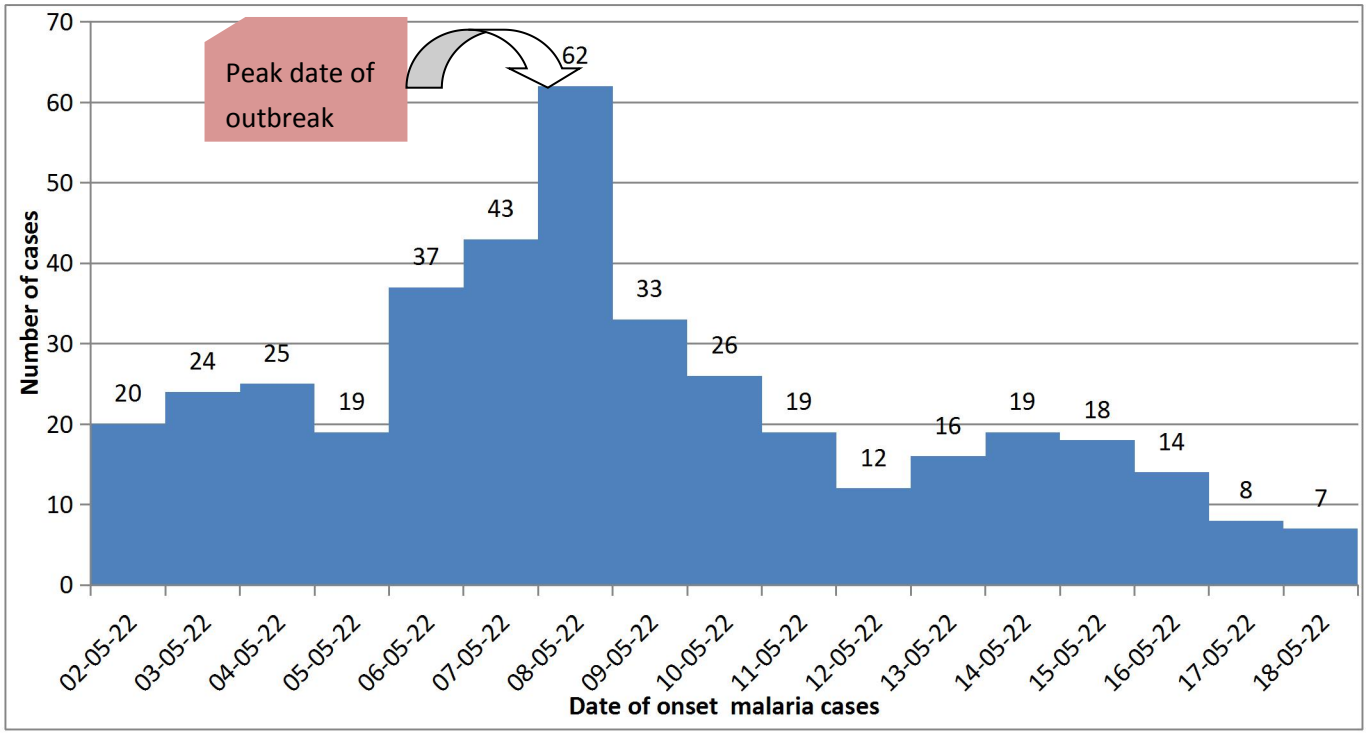

Figure 7 Epi-curve showing confirmed malaria cases by date of onset in Dasenech district, Libemuket cluster, SNNPR, Ethiopia, from, 01-17/May, 2018

Epic curve showed that, district health office departed to the outbreak area lately, a week after the outbreak started. The Epi-curve showed the outbreak was a propagated one with multiple peaks with a possibility of person to person transmission (Figure 7). The weeks when epidemic started were on May 1, 2018. However, the district health department was notified on May 3, 2018. The peak numbers of malaria patients were on 6th-7th May, 2018. The proportion of Plasmodium falciparum infections was higher than plasmodium Vivax.

Risk Factor analysis:

In order to asses associated factors, 117 malaria case-patients and 117 community controls were selected conveniently and interviewed from Libemuket, CS, Gumburbur, Gumburbur debermus and Bayo village of the Dasenech district. Of 117 case- patients and 117 controls, 67(57.26%)and 56(47.86%)were females for case-patients and controls respectively.

The multivariable binary logistic regression analysis showed that, a person used insecticide treated bed nets were 68% protected from malaria infection than those who do used insecticide treated bed nets with (AOR=0.3251(0.174,0.61)

In addition, a person who live an area where presence of stagnant water exited were 4.6 times more likely to be exposed to malaria parasite than those who didn't live an area where no presence of stagnant water (AOR=4.6752(2.5,8.8)

Moreover, sleeping outside of their home during night were 1.9 times contributing risk factors for the occurrence of the outbreak and statistically significant with (AOR of 1.9563(1.01,3.78) and not leaving around intermittent river was 51% prevent from malaria infection with an (AOR=0.4004(0.20,078)

Table 12 Bivariate and multivariate analysis of predictor variables related to malaria outbreak in Dasenech woreda districts, Libemuket cluster, SNNPR, south Omo zone, May, 2018

Characteristics	Cases (n=117)		Control (n=117)	COR(95% CI)	AOR(95% CI)	p-value
Sex	Male	50	61	07(0.40,1.15)	1.8415(0.97,3.44)	0.055
	female	67	56	1		
using insecticide treated bed nets	Yes	62	89	0.4(0.21, 0.62)	0.3251(0.174,0.61)	0.0004*
	No	55	28	1		
Presence of stagnant water in study area	Yes	85	51	3.44(1.99, 5.94)	4.6752(2.5,8.8)	0.0000*
	No	32	66	1		
Sleeping outside of their home during night	Yes	84	72	1.6(0.91,2.75)	1.9563(1.01,3.78)	0.0471*
	No	33	43	1		
Intermittent water around home	Yes	27	45	0.49(0.34, 0.86)	0.4004(0.20,078)	0.0074*
	No	89	72	1		
Family size	1-5	69	0	0.6389(0.4,1.1)	1.9565(1.009,3.79)	0.0316*
	>5	48	117	1		

*Significant at P < 0.05 bivariate analysis, ** Significant at P < 0.05 multivariate analysis, 1= Reference group

Environmental Assessment; Thirty-three households from each affected village were arbitrarily selected and visited to search new malaria cases and observe the status of insecticide treated bed

nets utilization during night time. All households had at least one insecticide treated bed nets in their house.

Public Health Interventions

A total of 1284 households were sprayed with Propoxur and Bendiocarb chemical in Dasenech district. A Communities were mobilized and taught on prevention and control measures of malaria disease. Health professionals were mobilized and assigned to affected village for active case search and early case management at the community.

DISCUSSION

The number of malaria reported cases were more than two times compared to the prior year in WHO epidemic week 20, 2018

Malaria outbreak appreciated at the first week of may 1/2018 when it started to cross epidemic threshold. The health facility had weekly malaria outbreak monitoring chart for early detection of outbreak but they were not reported to the district health office when the number of cases crossed the threshold. It was an exaggerated seasonal increase precipitated by interruption of vector control activities. There were multiple potential mosquitoes breeding sites difficult for environmental management (Omo River) which surround the village and might be the probable source of the outbreak.

Malaria outbreak started date in the district was related to the national data, actually the outbreak occurred at different times depending on the region, but overall it is believed to have started in April, and lasted until the end of December, many areas of Ethiopia began reporting an abnormal number of malaria cases(9, 10).

This study revealed that, the high proportion of Plasmodium falciparum cases shows difference as compared to the nationally registered proportion of Plasmodium falciparum and plasmodium Vivax which is 60% and 40% respectively(1). The possible reason for this high case positive rate of this outbreak maybe linked to high sensitivity of the Malaria rapid diagnostic test. Since clients who get cured from malaria have also the chance to be positive for malaria if tested by the RDT within 14 days of treatment, this may increase the positivity rate falsely when clients visit health posts within 14 days of treatment which is consistence study from Oromia region. The possible factors may be attributed for the occurrence of this outbreak include poor personal practice towards malaria prevention, rainfall and population movement are contributed for the existence of malaria outbreak (9, 10).

Heavy rain fall that occurred in the mid April was significantly contributed for the availability of stagnant water, and unconditional temperature in the district might also favored mosquito breeding which is consistence with literature (11). Unusual heavy rainfall followed by high temperature is considered as the cause of malaria outbreak which is comparable with study from northeastern Ethiopia (8-10)

This study revealed that, Using of bed net every night is associated with malaria infection and absence of bed net was associated with higher risk of febrile illness which is consistence with study from Oromia region (12).

The results of the analytical epidemiological study showed that, stagnant water was the main risk factor for malaria parasite exposure, a finding that is consistent with previous reports in the literature (3, 9, 10) and study from Sri Lanka and India indicated that people living closer to vector breeding sites were at higher risk for malaria parasite exposure than those living farther away(13).

This outbreak has clearly demonstrated that control and elimination of malaria is not only a question of designing a strategy, but rather of ensuring its continuous, strict implementation through well organized policies and programmes. Political will, commitment for inter-sectoral collaboration between all involved parties and close monitoring and evaluation of the control measures implemented are unquestionable prerequisites for disease control and elimination

Limitation of the study

Mosquito breeding sites were visited in the village but observation of mosquito larva not conducted due to lack of expert

CONCLUSIONS

The malaria outbreak current situation is high in magnitude than one year ago. This study revealed that, the attack rate was highest among above 15years age groups compared to the other age groups with sex difference. Sleeping outside of their home during night, presence of stagnant water, and poor utilization of insecticide treated bed net were attributed with malaria infection. Plasmodium falciparum species is the predominate for the outbreak

RECOMMENDATIONS

To prevent subsequent malaria outbreaks in the village it is recommended that South northern nation and nationalities people Region Health Bureau, Dasenech district health office, District health facility and other sectors interested in malaria prevention ;

- Since most of the village of the district are malarious area, insecticide treated bed net should be distributed for all households and utilization of bed net should be monitored and optimized.
- Timely indoor residual spraying operations have to be planned as per required standard (twice per year) and applied before rainy season with appropriate chemical.
- Community mobilization on disruption of potential mosquitoes breeding site.

REFERENCE

1. Daddi J AAea. Analysis of malaria surveillance data. . BioMed central. 2012:1-14.

2. Policy USGH. The Global Malaria Epidemic. The Kaiser Family Foundation. 2013.

3. WHO. Eliminating Malaria 2015;4:1-25.

4. Assembly. WH. Global Technical Strategy For Malaria 2016-2030. . 2016:1-29.

5. Gemechu B AB, Adamu A , Zegeye H. A Malaria Outbreak in Ameya Woreda, South-West Shoa, Oromia, Ethiopia, . American Journal of Health Research 2015;3.

6. D H. Malaria Outbreak Investigation in Seba Boru and Melka Soda Woredas, Guji and Borena Zones, Oromia, Ethiopia. American Journal of Health Research. 2015;3:1-45.

7. Kevin J BM, etal. Epidemiological Measures of Risk of Malaria. . SPRINGER. 2010;5:1-20.

8. Hurissa DA. Malaria Outbreak Investigation in Seba Boru and Melka Soda Woredas, Guji and Borena Zones, Oromia, Ethiopia,. 2015:1-45.

9. A. T. Guidelines For Malaria Epidemic Prevention And Control In Ethiopia. American Journal of Health Research. 2013;3:1-30.

10. Addisu Workineh Kassa MAT, and Addisu Gize Yeshanew. Assessment of Control Measures and Trends of Malaria in Burie-Zuria District, West Gojjam Zone, Amhara Region, North West Ethiopia. Hindawi. 2015:1-5.

11. ANTHONY E. KISZEWSKI A AT. A REVIEW OF THE CLINICAL AND EPIDEMIOLOGIC BURDENS OF EPIDEMIC MALARIA. The American Society of Tropical Medicine and Hygiene. 2014.

Annex 2 Data collection Tools for Malaria Outbreak Investigation

Data Collection form for malaria outbreak investigation, SNNPR south Omo zone dasenech woreda, May, 2018

I. Socio-demographic information:

1. ID number of respondent_____

2. Age in years_____

3. Sex: M F

4. Address: Region _____Zone_____ Woreda_____ kebele _____village_____

5. Occupation: Employed unemployed Student Pastoralist farmer

6. Total family member's _____

7. Ethnicity: _____

8. Religious: Orthodox, Protestant, Muslim other

9. Marital status: Married, single Widowed Divorced

10. Education status: Illiterate Primary, Secondary tertiary , non-formal

11. Case status

a) Case Yes

b) Control yes

II. Clinical presentations:

***(For case only)**

12. What was the first symptom? _____

13. When was the 1st symptom started (date of onset of symptoms)

DD/MM/YY_____

14. What were others symptoms?

a) Fever: Yes No , if yes duration of fever____ was it constant fever? Yes No

Or every other days fever? Yes No

b) Vomiting: Yes No

c) Diarrhea: Yes No ,

d) Anorexia (appetite loss): Yes No ,

e) Headache: Yes No

f) Sweating Yes No

g) Chilling and shivering: Yes No

h) Weakness: Yes No

i) Caught: Yes No

j) Back pain: Yes No

k) Muscle pain: Yes No

l) Rigor: Yes No

Ask the following signs (M to Y) for complicated malaria only

m) Altered consciousness (e.g. confusion, sleepy, drowsy, comma) Yes No

n) Not able to drink or feed yes No

o) Severe dehydration, Yes No

p) Persistent fever, Yes No

q) Frequent vomiting yes No

r) Convulsion or recent history of convulsion Yes No

s) Unable to sit or stand up Yes No

t) Pallor (Anemia) Yes No

u) No urine output in the last 24 hours Yes No

v) Bleeding yes No

w) Jaundice (yellowish coloration) Yes No

x) Difficult breathing Yes No

y) Other conditions that cannot be managed at this leve_____

15. Did you visit health facilities? Yes No if yes, when did you visit health facilities? DD/MM/YY_____

16. Did you get any treatment 1.Yes No if yes, what treatment did you get?

(a) Coartem Yes No , was it for PF Yes No

(b) Chloroquine? Yes No , was it for PV Yes No

(c) Quinine tablets Yes No , was it for pregnant and <5 Kg? Yes No

(d) Quinine injection Yes No , was it for sever malaria Yes No

(e) Other treatment given

_____

_____

17. Did you recover completely after the treatment: Yes- No

18. Place of residence during 2 weeks before onset of illness_____

19. Blood samples taken: Yes- No

20. If yes Q18, what was the result: Positive negative

III. Risk Factors:

***(For both cases and controls)**

21. Specific living areas _____

22. Sleeping areas in side home _____outside home_____

23. Do you stay outside over night? Yes- No

24. Is there anybody in your home with similar sign and symptoms? Yes- No

25. Did you travel outside your village in the past 2-3 wks Yes- No

26. If yes Q 24, indicate

(a) Date of travel DD/MM/Y_____

(b) The place of travel

(c) Date when you returned back DDMMYY_____

27. If Q 24 is yes, Is there sick patients (same symptoms) in the place where you have been Yes- No

28. Is there a similar sick patient in your house hold Yes- No

29. Do you have bed net in your household Yes- No , If is yes, how often do you use Always Sometimes Never

30. Do mothers and children given priority of using bed nets? Yes- No

31. If yes Q 28 the number of bed nets _____

32. Was bend card sprayed this year? Yes- No

33. If yes Q31 when? _____

34. If yesQ31 how many? Once twice

IV. Environmental investigation

35. Place of stay during night? _____

36. Is there any artificial water -holding containers close to your home? Such as:

a. old tires: Yes- No

b. Plant in the containers /flower –pots Yes- No

c. plant with temporary water pools Yes- No

d. Open deep well: Yes- No

e. Broken glass bottles Yes- No

f. Cans Yes- No

g. Plastic container Yes- No

h. Gutter to collect rainwater: Yes- No

i. Uncovered water storage/ septic tank Yes- No

j. Stagnant water Yes- No

37. Presence of mosquito vectors/ mosquitoes breeding sites around the home or vicinity?

Yes- No

38. If Q36 yes, presence of larvae in breeding sites Yes- No

39. Types of house screened Yes- No unscreened Yes- No

40. Do you use repellents Yes- No

41. Protective clothing Yes- No

42. Waste collection: Yes- No

43. Unprotected irrigation Yes- No

44. Presence of Intermittent rivers cloths to the community Yes- No

45. Presence of tick grass Yes- No

V. Awareness assessment

46. Do know malaria? Sign and symptoms ----------

Chapter II: Surveillance Data Analysis Report of cases and deaths

2.1 Description of five years Measles Facility Report in Kolfe Keraniyo sub city, Ethiopia, from January, 2012-March, 2017

Abstract

Background: Analyses of surveillance data is important for detecting outbreaks and monitoring disease trends and evaluating the effectiveness of disease control programs and policies. Measles is an acute infectious disease caused by measles virus. It is the leading cause of death among young children

Objectives: To describe measles surveillance data of Kolfe Keraniyo sub city, by person, place and time from January, 2012 to March 2017.

Method: Secondary analysis of Measles surveillance data was conducted in Kolfe keraniyo sub-city The sub city has 15 Weredas' and has a total population of 524200 from which 48% are males .The study was conducted in March 2017 by reviewing measles case based surveillance data recorded from January, 2012 to march 2017 interims of place person and time. Microsoft Excel version 2007 and SPSS version 20 was used to analyze and summarize the data.

Result During the period of January, 2012 to March, 2017 a total of 294 measles cases were reported from 15 woredas of Kolfe Keraniyo sub cities. One to four years of age accounted for 89(30.3%). 165(56.12%) were 5-14 years of age and 40(13.6%) were 15-44 years of age. The median age of cases was 6 years while the youngest and the oldest suspected measles cases investigated were a 1 year child and 30 years old man. The most affected age group is 5-14 years (56.12%) followed by 1-4 years (30.3%). The leading woredas with large number of measles suspected incidence rate were woreda 9 (212.9), woreda 4(147) and woreda14 (57.2) respectively. Out of 294 reported measles cases only 8 %(23) cases were confirmed measles IgM, 22 %(64) were probable case and 70 %(207) were suspected cases. Measles cases were almost equally distributed between female and male51% and 49% respectively. High number of Measles cases was reported in the year of 2012 and 2015. During the 5 years period suspected measles cases were reported in almost every months of the years and seasonal variation observed with peaks in the first quarter (January to March second quarter May and last quarter (October to December).

Regarding the vaccination status of the cases 110(37%) received one dose, two dose 45(15%), three dose 43(15%), unvaccinated 47(16%) and 49(17%) were unknown.

Conclusion: Higher number of measles cases were reported in 2012 and 2015, Kolfe Keraniyo sub city, Woreda 9 and Woreda 4 than other woredas during the study period. Age group between one to four predominates among the reported cases .The report document more cases of Children with unknown vaccination status, unvaccinated and vaccinated only one dose. All suspected cases of measles were not reported with case based and also important variable are not completed, so that this study does not include all Kolfe Keraniyo sub city cases of measles.

Introduction

Analyses of surveillance data is important for detecting outbreaks and unexpected increase or decreases in disease occurrence, monitoring disease trends and evaluating the effectiveness of disease control programs and policies. This information is also needed to determine the most appropriate and efficient allocation of public health resources and personnel. Analyses of surveillance data begins with characterizing the pattern of disease reports by person, place, and time. (1) Measles is one of the public health importance's among reportable disease under surveillance

Measles is a highly contagious and serious respiratory viral disease leads to serious illness, for lifelong complication and death (1)Measles vaccination programmes have contributed to a steep decline in the number of infections and deaths, but in 2014 measles still caused an estimated 114,900 death worldwide, mostly in low income countries. Case fatality is reported to be up to 6% in developing countries and especially high in infants and young children (3).

Statement of the problem

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

Measles infection presents with a two to four day prodrome of fever, malaise, cough, and runny nose (coryza) prior to rash onset. Conjunctivitis and bronchitis are commonly present. A harsh cough is present throughout the febrile period.

In certain high-risk populations, the disease case-fatality rates as high as 30% have been reported in infants aged less than one year of age. Malnutrition (including vitamin A deficiency), underlying immunodeficiency and lack of access to medical care are all factors leading to the high case fatality rates observed in many parts of the world. In Ethiopia context, the expected case-fatality rate is between 3% and 6%; the highest case-fatality rate occurs in infants 6 to 11 months of age, with malnourished infants at greatest risk. These rates may underestimate the true lethality of measles because of incomplete reporting of outcomes of measles illness (1).

The number of measles cases reported worldwide each year and decreased 73%, from 853,480 to 226,722, and measles incidence decreased 77%, from 146 to 33 cases per million populations per

year. Similarly, the number of measles cases decreased by 80%, from 520,102 in 2000 to 106,052 in 2012, and measles incidence decreased 85%, from 841 cases in 2000 to 125 cases in 2012 per million populations in African region (2).

Ethiopia adopted the African regional accelerated measles control strategies to reduce measles mortality in 2002. In Ethiopia the expected case fatality rate is between 3% and 6%.(1). Routine measles vaccination is provided for infants at 9 months of age and a second opportunity for measles vaccination through supplementary immunization activities (SIAs), targeting children aged 6 months –14 years(3).

Significance of the study

The analysis of surveillance data is the back bone of public health row data analysis, interpretation, dissemination and take an action; measles data analysis is also in needed to be interpreted since it is public health concerns and there is no formal and regular data analysis trend on measles data in terms of place, person, and time in Kolfe Keraniyo sub city health office.

Literature review

Measles is a leading cause of death among children even though a safe and effective vaccine has been available for over 50 years. According to global measles and rubella initiative 2015 report 20 million people affected by measles each year, 400 children killed by measles complication each day that's 16 every hour (4) .Measles is caused by the measles of the genus morbilli virus of the paramyxoviridae koplik's spot. It is one of the most infectious of human which can cause serious illness, lifelong complication and death .measles is transmitted through breathing-in airborne droplets from the cough and sneezes of person infected with the disease(5). Manifestation of measles is prodrome of fever as high a$105^{0}{}_{f}$ and malaise, cough, coryza and conjunctivitis followed by a maclo popular rash. The rash is usually appears 14 days after exposure and spreads from head to lower extremities .the average incubation period for measles is 14 days with range of 7-21 days .Person with measles are usually considered infectious from four days before until four days after onset of rash with the onset being considered as day zero(5). Possible risk factors to acquire measles virus infection include children with immunodeficiency due to their immunization status, traveling areas where measles is endemic or contact with

travelers to endemic areas and infants who lose their passive antibody before the age of routine immunization are at risk for infection .the another factors are malnutrition, underlying immunodeficiency, pregnancy and vitamin A deficiency.

The immediate complication of measles is lymphadenopathy, diarrhea, vomiting and splenomegaly while occurrence of prolonged fever also suggestive for presence of the complication (1) complication of measles usually involves the respiratory tract (bronchitis, laryngitis, croups) the gastrointestinal tract (gastroenteritis, hepatitis appendicitis, ileocolitis and mesenteric adenitis) and the central nervous system. The most responsible for death in children is pneumonia and acute encephalitis is in adult. (3, 5)

Thirty percent of cases develop one or more complication approximately. The complication is more common in children less than five years of age and adult of 20 years and older.

Vaccination is the most important prevention of measles disease .measles is made from attenuated virus when correctly administered at 9 month of age; measles confers life-long protection to approximately 85% of those vaccinated. WHO UNICEF january2017 .the WHO measles control strategy is decreasing measles mortality and morbidity to a level at which measles is no longer a major public health problem.

In 2010, the world health assembly committed to reduce measles death by 95% of the 2000 levels by 2010 estimated global measles mortality decreased 74% from 535,300 deaths in 2000 to 139,300 in 2010. Measles mortality was reduced by more than three –quarters in all WHO regions except the WHO Southeast, Asia Region. According to MDG summary report between 2000 and 2013, measles vaccination prevented 15.6 million deaths. Globally the number of reported measles cases declined by 67% for the same period. Global measles and rubella strategic plan (2012-2020) with a vision of achieving and maintaining a world without measles, rubella and congenital Rubella syndrome (CRS).the main five focus areas for the strategies are:

- achieve and maintain high level of population immunity by providing high vaccination coverage with two doses of measles and rubella containing vaccines
- monitor diseases using effective surveillance ,and evaluate programmatic efforts to ensure progress
- develop and maintain outbreak preparedness, respond rapidly to outbreak and manage cases

- Communicate and engage to build public confidence and demand for immunization.
- Perform the research and development needed to support cost effective operation and improve vaccination and diagnostic tools.

Objectives

Genera objective

To describe measles surveillance data of Kolfe Keraniyo sub city from January, 2012 to March 2017.

Specific objectives

- To describe the distribution of measles in terms of place
- To describe the distribution of measles in terms of person
- To describe the distribution of measles in terms of time
- To describe the vaccination status of measles in the sub city
- To provide recommendation based on findings

Method

Study area

The study is conducted in Kolfe Keraniyo sub-city. Kolfe Keraniyo sub city is one of the ten sub city in Addis Ababa city administration.The sub city is bounded by Gulele and Addis ketema in the north, Lideta sub city in the east , Nifasilk –Lafto sub city in the south and Oromiya regional state of government the west . The sub city has 15 Weredas'. Kolfe keraniyo sub city in 2016 has a total population of 537023 from which 48% are males.

Study period

The study was reviewed from January, 2012 to march 2017 GC.

Inclusion criteria: complete line lists and case based reports of measles recorded in the data base of Kolfe Keraniyo sub city health office of all from January, 2012-March, 2017.

Exclusion criteria: line lists and case based reports registered before January 2012 and after March 2017in addition to this the line lists with incomplete data variables.

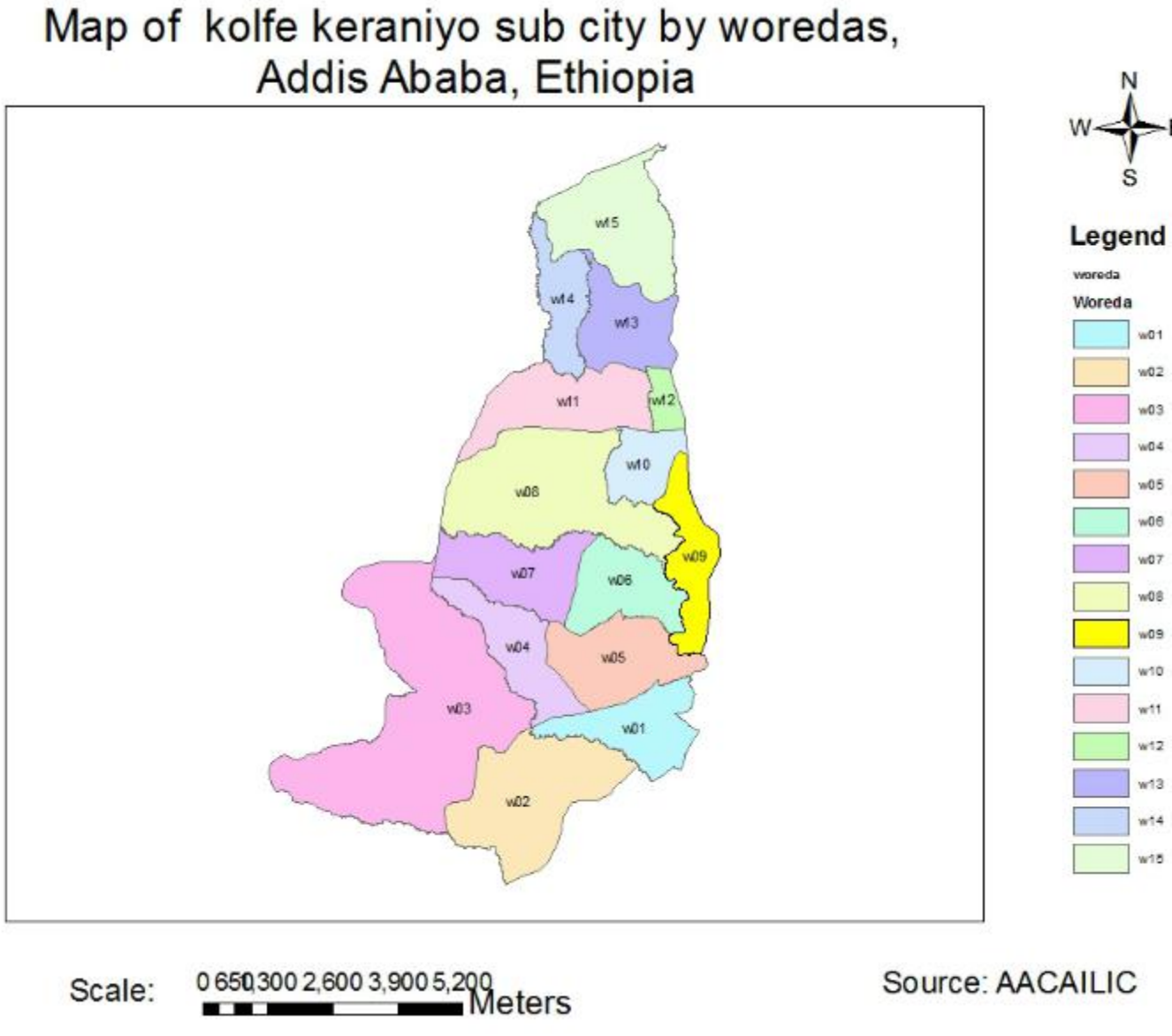

Figure 8 map kolfe keraniyo sub city by woredas .

Study design

Descriptive cross-sectional review of secondary data of measles case based reports from all woreda from January, 2012 up to March, 2017

Data source

Secondary data were obtained from data base of Kolfe Keraniyo sub city health office case based

Data collection tool

Quantitative data were collected from Kolfe Keraniyo sub city case based registery book using prepared check list

Data analysis

A descriptive record review analysis was made .All suspected measles cases that filled in case based reporting format obtained from all woreda and reported to sub city for laboratory confirmation and those epidemiologically linked from January, 2012 to March, 2017 GC, was used for analysis. Data was entered and analyzed using Excel Microsoft 7 and SPSS version 20. Descriptive summary was used and presented by graphs.

Data management

Data was checked for completeness.

Case definition

Suspected measles case: any person with fever and macula popular (non vesicular) generalized rash and cough, coryza or conjunctivitis or any person whom a clinician suspects measles.

Confirmed measles case: a suspected case with laboratory confirmation (positive IgM anti body) or epidemiologically linked to confirmed cases in an outbreak.

Epidemiologically –linked case: is a suspected case, which has contact with laboratory confirmed case or another epidemiologically –confirmed case

Data dissemination

The result of this study was planned to disseminate for Kolfe Keraniyo sub city health office and Addis Ababa university school of public health.

Ethical consideration

Official permission to access surveillance data from Kolfe Keraniyo sub city health office was obtained prior data collection.

Result

During the period of January, 2012 to March, 2017 a total of 294 measles cases were reported from 15 woredas of Kolfe Keraniyo sub cities out of which 89(30.3%) were 1year to 4 years of age. The median age of cases was 6 years and range between one and 30 years. The most affected age group is 5-14 years (56%) followed by 1-4 years (30.3%).

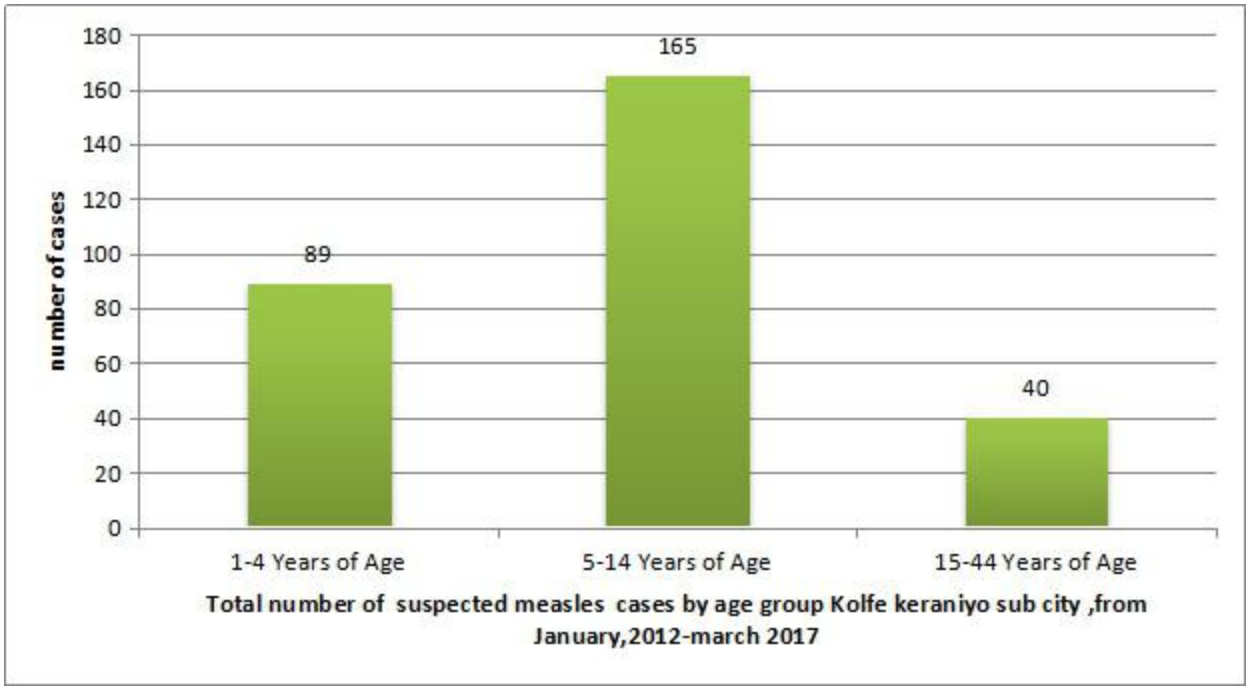

Figure 9 Total number of suspected measles cases by age group in kolfe keraniyo sub city, Addis Ababa, Ethiopia 2017

The leading woredas with large number of measles suspected incidence rate were woreda 4 (90.1) with the age group of 5-14 years, woreda 9(77.8) with the age group 1-4 years.

Table 13 Total measles incidence per 100,000 population by age group, kolfe keraniyo sub city, Addis, Ababa, Ethiopia, 2012-2017

Name of woreda	1-4 years	5-14 years	15-44 years	Total
Woreda 1	2.4	9.7	24.1	24.1
Woreda 2	12.3	9.2	-	2.3
Woreda 3	3.0	48.5	11.1	89.5
Woreda 4	33.3	84.7	36.3	72.6
Woreda 5	8.6	43.2	8.6	60.4
Woreda 6	21.0	27.9	10.5	59.4
Woreda 7	17.5	35.1	-	52.6
Woreda 8	33.6	52.1	6.1	90.2
Woreda 9	77.8	90.1	9.0	153.3
Woreda 10	6.7	6.7	3.4	16.8
Woreda 11	7.0	0	3.5	10.5
Woreda 12	0	44.6	4.5	49.0
Woreda 13	34.0	44.4	7.8	86.3
Woreda 14	18.7	37.4	-	56.1
Woreda 15	10.6	17.7	14.1	42.3

Epidemiologically linked measles cases were higher than confirmed and discarded- IgM negative.

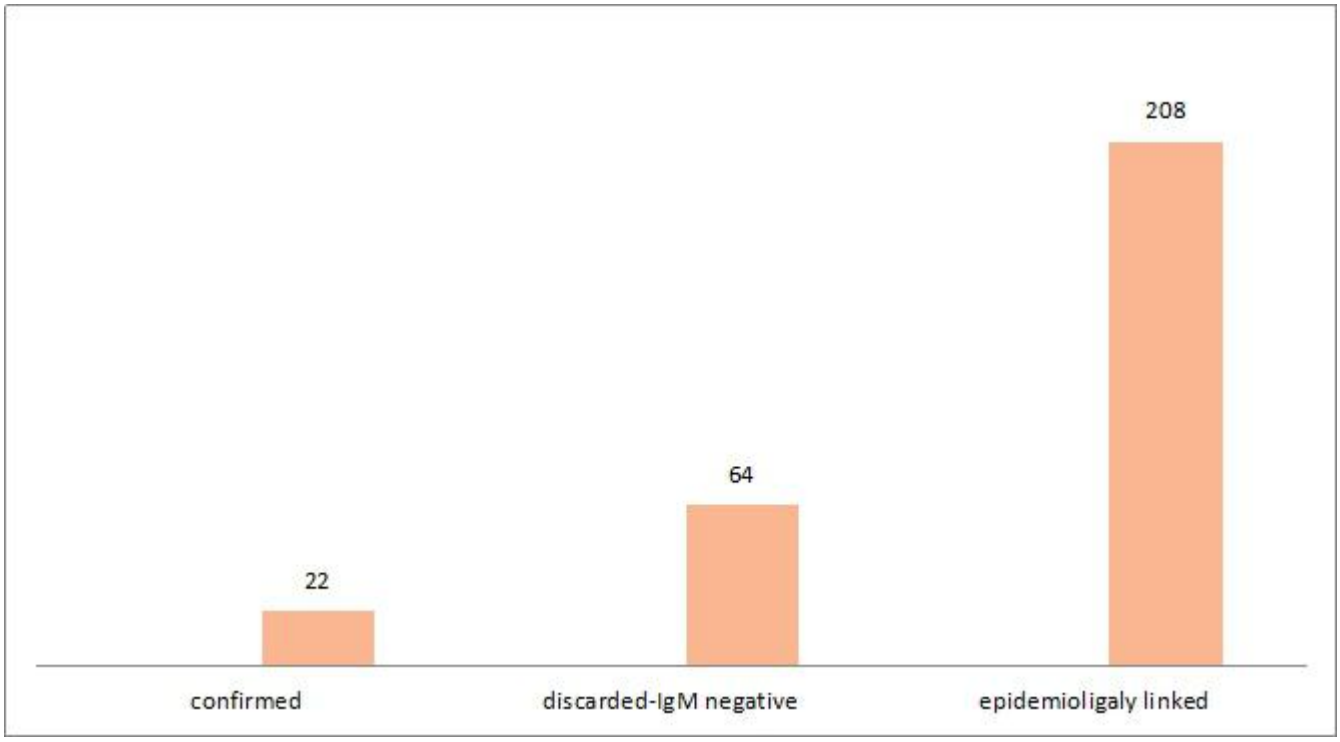

Figure 10 Measles cases by final classification in kolfe keraniyo sub city Addis Ababa, Ethiopia, 2012-2017

Female and males were nearly equally affected by measles in kolfe keraniyo sub city.

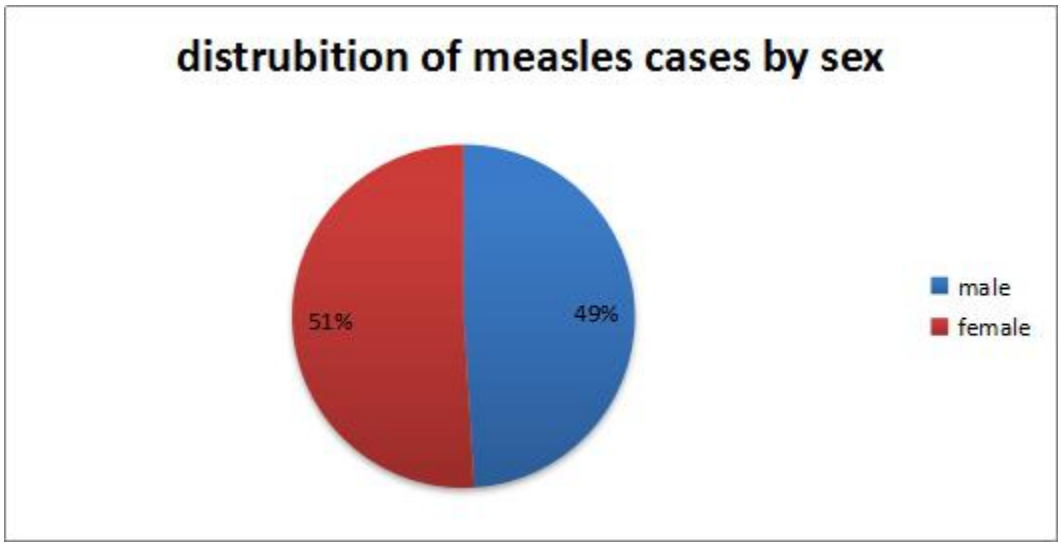

Figure 11 Distribution of measles cases by sex from January, 2012- March2017

More measles cases were reported during the year of 2012 and 2015.

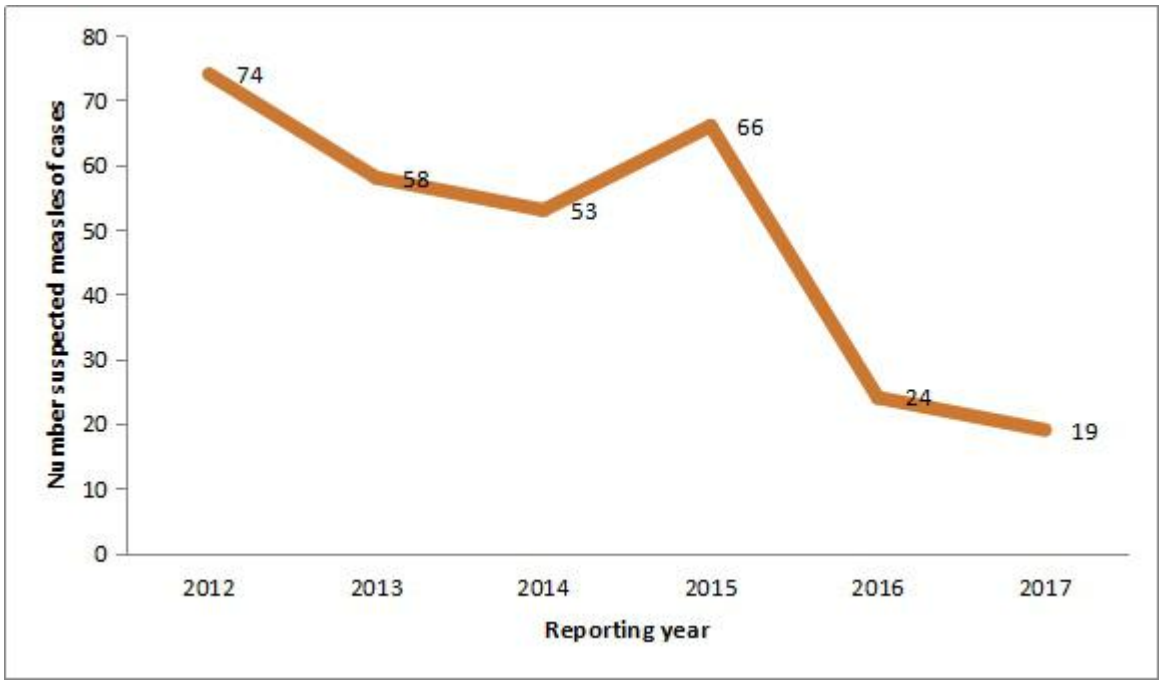

Figure 12Trend of Measles cases in kolfe keraniyo sub city, Addis Ababa ,Ethiopia, from January,2012-March,2017Figure 9

Regarding the vaccination status of the cases 110(37%) of them vaccinated one dose, two dose 45(15%), three dose 43(15%), unvaccinated 47(16%) and 49(17%) were unknown.

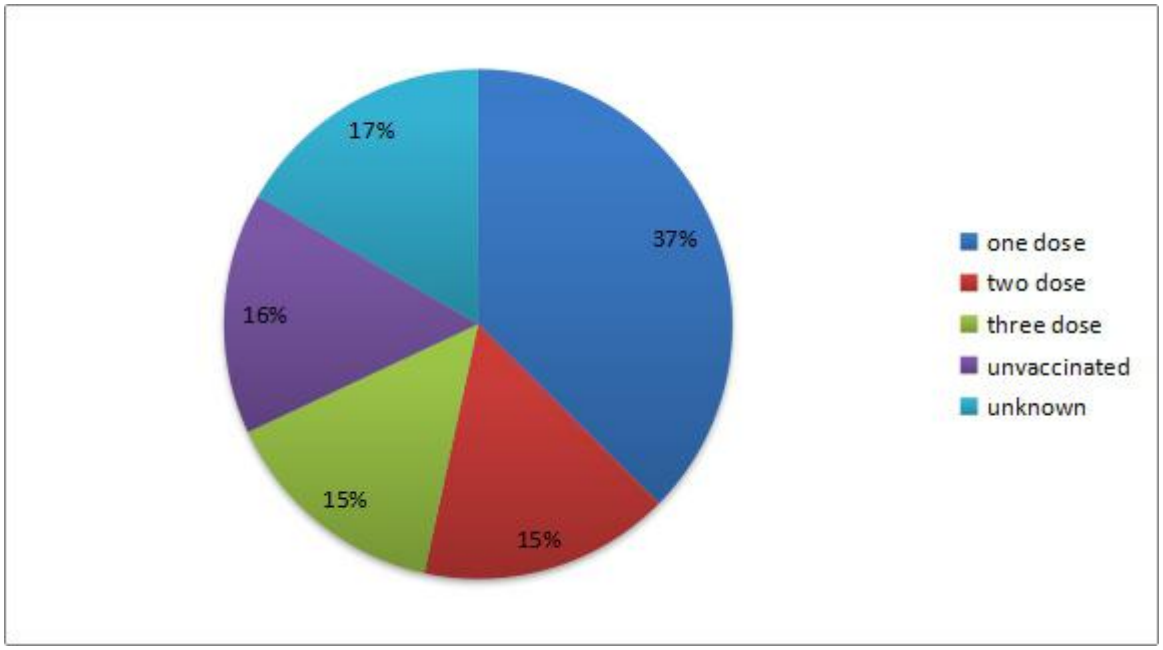

Figure 13Measles suspected cases by vaccination status in kolfe keraniyo sub city, Addis Ababa, Ethiopia, from Jan, 2012-Mar, 2017

Discussion

The suspected measles cases and incidence was varies from years to years, during the year of 2012 and 2015 there were an increment of measles suspected cases than the other years that are 2013,2014, 2016. The increment was seen on children 5-14 years and 1-4 years old children respectively. The increment might be due to unvaccinated status and one dose vaccination is because of no herd immunity developed. According study conducted in Ethiopia 2015 on review of Measles situation in Ethiopia; past and present a seasonal patterns of occurrence of measles has been observed over the years with increased number of cases during the late early part of the year (December to February) which is similar with our study (6).The analysis shows that male and female were almost equally affected and all age groups were affected having median age of 6 years. The study conducted in Malawi on measles outbreak indicates that male and females were equally affected which is supported my finding (7). The incidence is increase lower age group and decreasing in older age group children 1-4 years(42.1/100,000),5-14(18.7/100,1000),15-44 years (5.3/100,1000) in my study there is also 1-4 years of age (16.9/100,000),5-14 years(31.5/100,0000) and 15-30 years were(7.6/100,000) which shows as age increase the incidence decrease. Among the 294 suspected measles cases 110(37%) were took one dose of measles vaccine, 47(16%) were took two measles vaccine dose, 43(15%) were took three measles vaccine dose, 45(15%) were unvaccinated and 49(17%) were unknown vaccination status, in addition to this highest number of cases were reported from Woreda 9 and the least were from 12.

Limitation

All suspected measles cases were not filled in the case based format due to reporting by telephone which has not complete variable and no sent hard copy report on time and significant

proportion of data had missing on important variables that is age, sex, vaccination status and residence of measles cases.

There were data discrepancies between soft copy which has no complete variables and cased based report, so that the data is not representative of all measles cases in Kolfe Keraniyo sub city.

Conclusion

Higher number of measles cases was reported in 2012. Woreda 9 and Woreda 4 were the highest cases. Measles affected mostly children between 1 to 14 years old. Children unknown vaccination status, unvaccinated and vaccinated only one dose are mostly affected by measles.

Recommendation

- Routine immunization should be strengthened especially the age group under 15 years of should be targeted for SIA campaign by woredas and kolfe keraniyo sub city.
- All variables should be filled properly in order to analyze surveillance indicators properly.
- A farther study is needed why the reporting is not sending timely and incompleteness
- Soft copy report format must have important variables which is very important for meaningful data analysis.

Reference

1.T Woudenberg 1 2 RvB, EAM Sanders 1 2 , J Wallinga 1 3 , HE de Melker , WLM Ruijs 1 , SJM Hahné . Large measles epidemic in the Netherlands. 1 National Institute for Public Health and the Environment (RIVM), Bilthoven, the Netherlands

2 University Medical Center Utrecht, Utrecht, the Netherlands

3 Leiden University Medical Center, Leiden, the Netherlands. May 2013 to March 2014: changing epidemiology;2014: changing epidemiology. Euro Surveill. 2017;22(3):pii=30443. DOI

4 . World Health Orginazation .measles fact sheets data.http://www.measlesrubellainitiative.org, 2015.

5 . Alberta Health Public Health Notifiable Disease Management Guidelines November 2013

6. Habtamu Belete Akalu Review on Measles Situation in Ethiopia; Past and Present 2015

7. Minetti A, Kagoli M, Katsulukuta A, Huerga H, Featherstone A, Chiotcha H, et al. Lessons and challenges for measles control from unexpected large outbreak, Malawi. Emerg Infect Dis. 2013;19(2):202–9.

Annex 3 Data collection check list measles data analysis

Client code	woreda	age	sex	Classification				Date of onset	Vaccination status					Out come	
				confirmed	Discarded Igm	epidemiologically linked	Suspected		1st dose	2nd dose	3rd dose	unknown	unvaccinated	Alive	Died

Chapter III: Evaluation of Surveillance System

3.1. Measles Surveillance system evaluation report in kolfe keraniyo sub city, Addis Ababa, 2017

Abstract

Background: Measles is highly contagious, acute viral systemic infection caused by virus with family paramyxovirus, genus Morbillivirus. Globally, an estimated 267,000 measles cases and 146,000deaths with measles complication are reported annually. Presence of reported Measles cases, absence of community based-surveillance, and data discrepancy between woreda and health centers are reasons to study measles surveillance system evaluation.

Objective: To evaluate the surveillance system of measles in four selected woredas and health centers in Kolfe keraniyo sub city, Addis Ababa, Ethiopia, 2017.

Methods: The study was conducted in selected three health centers and three woredas and sub city health office of Kolfe Keraniyo sub city. Woredas are selected by lottery method. Retrospective descriptive record was performed by principal investigator using tools adapted from Center for Disease control (CDC) and World Health Organization (WHO). Woreda PHEM Officers, focal persons in the health centers, medical directors, woreda health office heads, and other responsible bodies and clinicians were interviewed. Registration, and other relevant documents and files were reviewed. Micro soft Excel 2007 and MS word 2007 used as a tool for analysis and to write up summary report. Data collected with written later of consent.

Result: A total of seven (7) health institutions were assessed. All assessed institutions have National PHEM and Measles Guideline in soft copy and hard copy. Standard case definitions were posted at the appropriate and visible places. Thirteen detected measles cases in the health centers. Community based-surveillance was not started in all woredas .There were no measles

outbreak in all woredas. No any woreda has emergency preparedness plan. Supervision and feedback activity were done. Some of focal persons in HCs were not given basic surveillance training and others not yet refreshed.

Conclusion and recommendation: Measles surveillance system in evaluated woredas and health centers was weak on the area of core components, emergency preparedness, and support components and in the surveillance attributes. Comprehensive woredas, health office and health centers collaboration is needed to eliminate measles infection.

Introduction

Measles is highly contagious, acute viral systemic infection caused by virus with family paramyxovirus, genus Morbillivirus. Its transmission is via aerosol droplets or direct contacting with respiratory secretion from nose, mouth, and throat of infected individuals. The average incubation period of Measles is 14 days with range of 7 to 21 days from exposure to the development of rash. The case fatality rate of Measles reaches two to seven percent even it exceeds 10 to 30 percent in developing countries in the outbreak and certain humanitarian situation. Mortality is common in less than five years and under nourished children especially more common in 6-11 months age infants (1, 2, 3).

Measles can be a serious problem in all age group populations but too serious in children younger than five years of age and adults over than 20 years of age in developing measles complication. Ear infections and diarrhea are the common measles complication. Ear infections occur one out of every 10 children with measles and resulting in an irreversible hearing loss. Pneumonia (lung infections), encephalitis (swelling of the brain), and sub acute sclerosing panencephalitis (SSPE) also are severe measles complication in some people and need hospitalization. Pneumonia is the most common cause of death resulting from measles in younger children (4).

Children who have not ever got measles vaccine, children with less sero-conversion rate for measles vaccine, and anyone with certain immunodeficiency are most high risk for contracting measles infection. Measles infection during pregnancy increases the likelihood of the occurrence of premature labor, miscarriage, and low birth weight in infant (5).

Globally, an estimated 267,000 measles cases and 146,000 (4) 114,900 [6] deaths with measles complication is reported annually. The burden of Measles disease is high in different parts of

Ethiopia including Addis Ababa. A number of outbreaks of measles disease were exhibited in different time in all regions of a country. There were a total of 4,395 measles cases had been reported throughout the country in the first half of 2016. SNNP, Oromiya, and Ethiopian Somali were most affected regions by measles outbreak in the last Gregorian calendar (in 2016). Children less than five (53% of all cases) were the most affected age group population (7). In Ethiopia, five percent of less than five mortalities are attributed to measles complication (8)

Statement of the problem

According to public health surveillance system of Ethiopia a suspected outbreak of immediately reportable diseases such as measles should be notified from level to level within 30 minutes of identification of a problem for early detection and immediate action. All woredas and levels above should calculate the completeness and timeliness of the reports received on weekly basis. The national target for report completeness and timeliness is greater or equals to 80%. Surveillance data analysis and interpretation is a crucial part that guides responses to public health emergencies. Therefore, data analysis and interpretation should be done daily and weekly at each level where data are collected (starting from health facility level to national level). The minimum data analysis practice that has to be generated should include disease trends over time (line graph, bar graph or histogram), geographic distribution of the disease or the outbreak (dot map), frequency of cases and deaths (table), case fatality rate (CFR) and attack rate(7). Like most Africa countries in Ethiopia; surveillance data are not processed timely and completely to guide health interventions, data processing and utilization at the district and health facility level is limited, there is hardly any feedback at all levels, and epidemic preparedness and management capability are weak (9). In Kolfe keraniyo sub city measles outbreaks have occurred frequently, but there is delay in detection, reporting, and response. Therefore, surveillance activities should be strengthening through periodic evaluation of the surveillance system.

Objectives

General objective

To evaluate the surveillance system of measles in three selected woredas and health centers in Kolfe keraniyo sub city, Addis Ababa, Ethiopia, 2017.

Specific objectives

To assess the core activities of the surveillance system such as case detection, reporting, analysis, and response system in kolfe keraniyo sub city.

To evaluate the attributes of surveillance system of measles in kolfe keraniyo sub city.

To identify the strength and weakness of the surveillance system in kolfe keraniyo sub city.

To provide recommendation based on the findings.

Method and material

The study conducted in selected three health centers and three woredas and sub city health office in the Kolfe Keraniyo sub city which are selected by lottery method. Retrospective descriptive record review study method used. Data was collected by principal investigator. Data collection tools adapted from CDC and WHO and simple modification was done to capture local information. The data collection process used with structured questionnaire both at health offices and health centers levels. Woreda PHEM Officers, focal persons in the health centers, medical directors, woreda health office heads, and other responsible bodies and clinicians were interviewed. Registration, and other relevant documents and files were observed in each study unit. Data consistency and completeness was checked, tallied, and coded manually before entering into a computer. MS Excel 2007 and MS word 2007 used as a tool for analysis and to write up summary report. Data collected with written later of consent.

Study area

The study is conducted in Kolfe keraniyo sub-city. Kolfe keraniyo sub city is one of the ten sub city in Addis Ababa city administration. the sub city is bounded by Gulele and Addis ketema in the north, lideta sub city in the east , Nifasilk –Lafto sub city in the south and Oromiya regional state of government the west . The sub city has 15 Weredas'. Kolfe keraniyo sub city in 2016/17 (estimated from 2009 population census) has a total population of 524200 from which 48% are males. The selected woredas to study include: woreda 5, 8, and 11. The selected woredas collectively have an estimate of 135,202 populations 48% are males, and 9,200 (6.8%) less than five years population under the surveillance system in the selected three woredas. There are a total of 15 health facilities expected to be in the surveillance system.

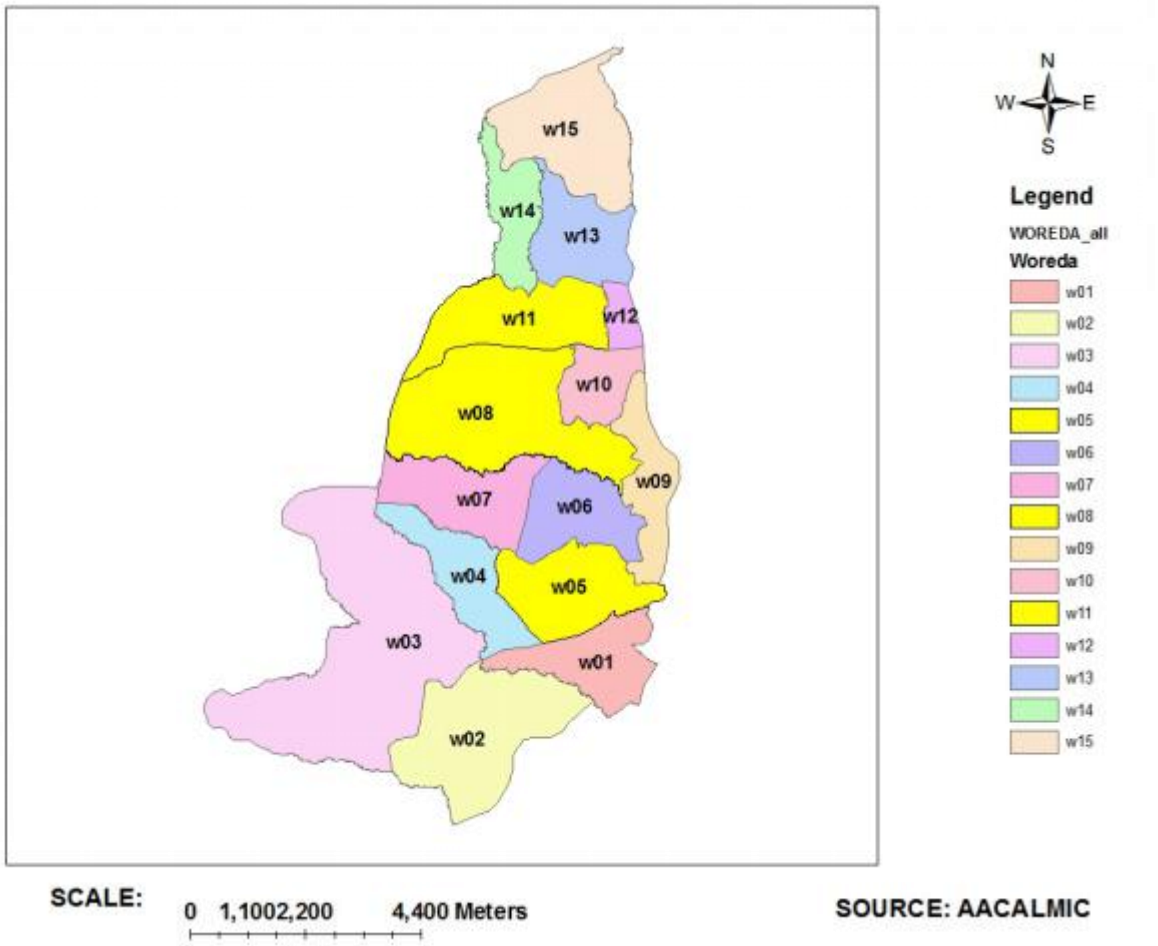

Figure 14 Diagram illustrate the map of kolfe keraniyo sub city, Addis Ababa town, Ethiopia, 2017

Study design

Descriptive record review was done to evaluate the surveillance system of kolfe keraniyo sub city in selected woredas and health centers.

Source population

The source populations for this study were all people living in the selected three woredas such as woreda 5,8,11 and kolfe keraniyo sub city health office.

Study unit

The study units were three woreda health offices such as woreda 5, 8, 11, sub city health office, and three health centers such as woreda 5, 8, 11, which are found in the kolfe keraniyo sub city.

Sampling technique and procedure Kolfe Keraniyo sub city has fifteen woredas and eleven public health centers which are currently implementing surveillance system. From these 15 woredas, three woredas and three health centers and sub city health office were selected purposively for this surveillance system evaluation. These thee woredas, one sub city health office and three health centers represented at least 46.7% of the total woredas of the kolfe keraniyo sub city.

Inclusion and exclusion criteria

Inclusion criteria

Governmental health facilities and health offices which are currently implementing surveillance system of the country are included in the study.

Exclusion criteria

Hospitals and private health facilities are excluded due to shortage of resource.

Data collection

Data collection was done by face to face interview using semi-structured questionnaire adopted from CDC and WHO standard questionnaire for surveillance system evaluation and record review was also one part of the data collection system.

Data processing and analysis

Data collected by interview and record review processed by using the Microsoft Excel 2007.

Ethical condition

Official letter was obtained from Addis Ababa University to kolfe keraniyo sub city and the sub city gave official letter to the selected woreda and health facilities.

Operational definition

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

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

Usefulness: Usefulness of the surveillance system is reflected by documented changes in policies and procedures as a result of information generated by the system.

Simplicity: Simplicity denotes the structure and ease of operation of the surveillance system.

Flexibility: Flexibility of a surveillance system is its capacity to adapt to changing information needs or operating systems within minimal additional time, personnel and funding.

Quality: The quality of data reflects the completeness and validity of the data recorded in the Zonal Health Department.

Acceptability: Acceptability is the willingness of persons, institutions or organizations to participate in the surveillance system.

Sensitivity: Sensitivity refers to the ability of the system to detect cases or outbreaks through trends in the surveillance data.

Positive predictive value: Positive predictive value refers to cases that actually have the health condition in question.

Representativeness: Representativeness refers to the extent to which the surveillance system accurately describes the occurrence of medical condition over time and their distribution in the population by place and person.

Stability: Stability will be assessed by questioning the surveillance officers on the consistency of the system.

Standard case definition of measles

- **Suspected:** - Any person with fever and maculopapular (non vesicular) generalized rash and one or more of the following symptoms: cough, coryza or conjunctivitis (red eyes); OR any person in whom a clinician suspects measles.
- **Confirmed: -** A suspected case with laboratory confirmation (positive IgM antibody) or epidemiological link to confirmed cases in an epidemic situation.
- **Epidemiologically linked case:** A case whose blood is not collected for laboratory investigation but has contact with another laboratory confirmed case and who is either a family member/school mate/neighbor/playmate or who has traveled to an area where a measles outbreak has been declared in the preceding 2weeks.
- **Community case definition: -** Any person with fever and rash.

Result

Involved stakeholders:

Woreda health office heads, PHEM officers, medical directors, Disease prevention and control process owners, EPI focal person, and surveillance focal person were involved during information gathering.

Population under surveillance:

There are an estimate of 135,202 populations with 48% male & and 9200(6.8%) less than five years population under the surveillance system in the selected five woredas.

The surveillance system in place

Sites vested

A total of seven health institutions were assessed for this surveillance system evaluation. These include three woreda health offices and three health centers and sub city health office. Those selected woredas were woreda 5, 8, and 11. All woredas have health centers

Existence of Measles National Guideline/Manual, case definitions, and case-based formats and line list

All assessed institutions have National PHEM and Measles Guideline in the form of soft copy and hard copy. During assessment, standard case definitions were available and posted on walls of each study unit. Standard case definitions were posted on the walls of in adult and less than five outpatient departments in the appropriate and visible places within the visited health centers. Case-based and line list format were available in all woredas .All woreda health office, health centers and cub city have printed case based form and line list.

Case detection

All assessed health centers tried to detect measles cases based on standard case definition.

Case Registration

Registration specific for measles cases not available either in health center or woreda health offices. Rumor logbooks were available in all visited woreda health offices. All assessed health centers tried to detect Measles cases based on standard case definition on time

Table 14 Number of Measles registered cases in kolfe keraniyo sub cities, woredas health centers, 2017

Woreda name	Registered measles cases in HC	Reported measles cases to WoHO	difference
Woreda 5	**5**	**5**	**0**
Woreda 8	**6**	**5**	**1**
Woreda 11	**2**	**2**	**0**
Total	**13**	**12**	**1**

Case confirmation

National Measles guideline supports to take 5 serum samples of suspected measles cases from each woreda/ health center per month with case-based form for confirmation in the accredited laboratory. Proportion of samples collected for laboratory confirmation by all woredas was 12(92.3%) of 13 detected measles cases from July 2016 to July 2017woreda 8 performed 100% from suspected measles cases. The remaining woredas and health centers under them were not take serum samples with case-based form for laboratory confirmation due to different reasons.

Lack of test tubes for sample collection, Lack of case-based format pads, inconvenience transportation and absence of focal person in the health centers were some of the reasons.

Reporting

The reporting system started at the health center level. There was some discrepancy between the health centers and woredas measles cases report in the study woredas shown on table 1.

Data analysis

Surveillance data analysis expected at all level of surveillance system units. Woreda 8, 11 and sub city health office tried to analyze the surveillance data focusing on cases by time, place and person. Woreda 5 no used computer for analysis purpose. The reason was absence of computer.

Community-based Surveillance

Community-based surveillance is basic and core area for effective surveillance system functioning. Each and individual cases could be identified in the community using women development army (WDA) and urban health extension workers (UHEWs). All woredas were not practiced the weekly community-based surveillance until this data collection takes place.

Outbreak investigation

In the study area almost all woredas detected and reported measles cases but no outbreak. The cases were investigated there were 13 total measles suspected cases in all woreda. All woredas know the threshold level of measles cases and there were written standard procedure for outbreak investigation during the assessment.

Epidemic preparedness and response

In the study area, all health centers form Rapid Response Team (RRT) and have emergency drug stocks. Composition of RRT includes: health officers, nurses, lab technologist/ technician, pharmacist/druggist, surveillance focal, medical directors. The RRT have regular meeting based on observed RRT minute. All visited study units didn't propose any emergency budget.

Supervision and feedback

All visited woreda health offices and health centers were supervised by higher level at least once in 2009 EFY. All 3 health centers were given written feedback concerning to case registration, reporting time and completeness from sub city PHEM officer. 13 serum samples collected from

suspected measles cases and sent to national laboratory from the study units but the result was not known because EPHI LAB not give the result and feedback .

Training

All 3 woredas have PHEM officer and trained on basic surveillance system for five consecutive days by EPHI and RHB PHEM staffs and coordinators. But in the visited health centers only 60% surveillance focal person were trained.

Resource

All assessed institutions had National PHEM and Measles guidelines only in the form of soft copy. Standard case definitions were available in each study unit. Printed case-based and line list format were available. There was a shortage of Test tubes for sample collection, case-based format pads in the HCs.

There was no telephone, computer and printer, internet or fax in the woreda health office particularly to the surveillance system.

Description of the attributes of surveillance system

Usefulness:

A public health surveillance system is useful if it contributes to the prevention and control of public health problems and understanding of the implications of such public health problems. Based on these concept all visited health institutions perceived as the importance of surveillance to prevent and control public health problems. Even though, they perceived it is as an important program, they didn't detect measles outbreak early on time, they didn't analyze the trend of the measles cases, they didn't assess the effect of the prevention and control measures, and they didn't exchange the information smoothly. As mentioned earlier, there were 8 out of the 13 suspected measles cases in the assessed health centers reported to the woreda health office.

Simplicity:

The following measures might be considered in evaluating the simplicity of a system: amount and type of information necessary to establish a diagnosis, number and type of data sources, methods of transmitting case information and data, method of distributing reports, and amount of time spent operating the system. In the study units the data source for the surveillance system was the health facilities. The case definition of measles was posted in clearly visible place in each department of the health facilities and easily understandable. The methods of communication for measles reporting purpose in the woreda were both on telephone and with hardcopy and spent 2 to 5 hours to reach the next level. A long time was spent for feedback mechanism especially for laboratory results.

The current surveillance information flow in the study woredas missed core surveillance units such as UHEWs and community. These two units expected to cover around 80% of a total surveillance system.

The flow of the measles cases reporting and response system in the study woreda was shown in the following figure. Even though the structure is simple and straight forward, due to lack of technological resources, the surveillance system in the assessed health institutions looked complex.

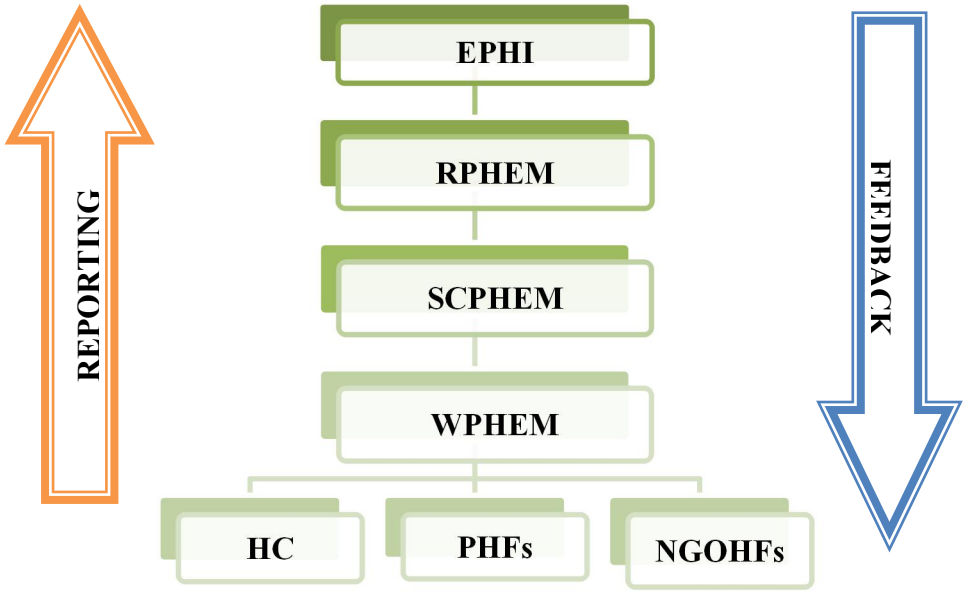

Figure 15 the flow of measles case reporting and response system in the kolfe keraniyo sub city, 5 woredas and 4 health centers Addis Ababa, Ethiopia, 2017

Flexibility:

The newly implemented PHEM system made the reporting format more flexible to report other new cases in the provided blank space if occurred without difficulty. It is easy and allows integrating with other health systems. Current surveillance formats are easily understood by all health professionals

Data quality:

Data quality was assessed in terms of completeness of variables and its validity in the case-based, line list, and weekly zero report formats. Missed variables on case-based formats were not seen at health center level but 70 to 80 percent of completed measles case-based formats did not tell the vaccination status of the cased patients (i.e. described by 9 or 99 which to represent unknown vaccination status). All recorded data were easily understood within the case-based formats.

Acceptability:

Acceptability was measured by the willingness of individuals, community, and institutions in involving and participating in the surveillance system. The assessed health institutions/ organization were accepted surveillance system but on the part of active participation it was limited to the few personnel (to the surveillance focal person and health workers in adult and under five year's department in health centers and PHEM officers in the woreda health office). Surveillance system acceptability at higher officials and leaders in the study area was remained low when it measured with their contribution to support, facilitating, and monitoring the system.

Sensitivity:

It was measured by the ability of the surveillance system to detect all Measles cases using provided standard case definitions and ability of communicating to the concerned body within the expected time, and ability of monitoring the trends/ changes of cases over time. To do this, every health workers at all level should know diseases under the surveillance , understand the importance of it, and adopt it as his/her day to day activity. Based on these concepts it is difficult to say the surveillance system is sensitive in the study area. Because there were detected suspected measles cases that were not reported and also were fulfilling the case definition of measles cases that were recorded but not detected in some woredas during observation. There was no change/ trend monitoring practice. So that some visited woredas more or less experienced such problems. **Sensitivity** =. Laboratory results not available to calculate the sensitivity of the surveillance system based on confirmation.

Positive predictive value: To calculate PPV, laboratory results were not found in any of the visited woredas.

Representativeness:

Representativeness is viewed in terms of accessibility and distribution of health facilities in the community, ability of health workers to detect and capture all actual measles cases in all departments of the HFs, their reporting rate, presence of strong community centered surveillance. More of less all these factors can increase or decrease the representativeness of surveillance system. The assessment in the study area indicated that public health facilities were distributed in all woredas. The measles cases source was outpatient department of adult and under five years within the health centers. The surveillance system was mainly focused on facility based and lacks majority/ community based surveillance. Based on this fact, the representativeness of the surveillance system in the assessed health institutions was less.

Timeliness and completeness:

The data were assessed in terms of timeliness between surveillance steps and completeness of immediately and weekly report at woreda level. Average timeliness and completeness of weekly report for 3 assessed health centers was 89 and 100% respectively.

Table 15 timeliness and completeness of weekly and immediately (for measles) reports at woreda level in kolfe keraniyo sub city, Addis Ababa, Ethiopia, Jul, 2016-July, 2017

S. Nº		Weekly Report			Immediately Report(for Measles case)			
		No of reported facilities	Timeliness (%)	Completeness (%)	No of detected measles cases	Reported on time	Lately reported case	Cases not known by woreda
1	Woreda 5	5	80	100	5	4	1	0
2	Woreda 8	8	83.3	100	6	5	1	0
3	Woreda11	11	100	100	2	2	0	0
Total		14	89	100	13	11	2	1

Stability:

The stability expressed in terms of the existence of consistent and uninterrupted surveillance system in the study units. The current established structure of PHEM system in the woreda is expected to strengthen the surveillance system by facilitating and supporting the surveillance system in early case detection, timely report, properly registration, trends/ change analysis over time and effective feedback activities. In the evaluated health institutions the surveillance data collecting, notifying and reporting activity relied only on the surveillance focal persons and PHEM officers.

Discussion

Principal components: Case detection, case registration, case confirmation, reporting, data analysis, interpretation, and timely response are expected in each surveillance system units. Despite these activities are the key components for the national accelerated measles control strategy, in the visited woredas and health centers, it was not fully implemented. There was case detection, registration, reporting, and blood sample taking for laboratory investigation (even if the results not known) activities in some extent. But in the part of analysis, interpretation and timely response they were gap which is in line with the districts in Sidama zone (16) and health centers in Dawro Zone, but contrary to districts in Dawro zone, SNNP, Ethiopia where analysis took place (16)

The epidemic preparedness emphasizes standard nationwide preparation at all levels of the system. And the national public health emergency management (PHEM) guideline emphasis to have achievable and operational epidemic preparedness plan to prevent, protect against, and respond to epidemics [13]. However, here in the assessed woredas there was any of the following components: epidemic preparedness plan, emergency budgetary fund, emergency drug stock, established emergency response task force, technical RRT; while in the health centers, at least had established RRT even if it was not actively perform its expected activities. This was resulted from either due to less acceptability to the surveillance system or lack of awareness about the importance of preparedness to the effective and timely response for the emergency.

Support components of surveillance system: To ensure effective surveillance system in place and to maintain its functionality, human development and capacity building, adequate resource allocation and distribution, supervision and constructive feedback are key indicators in the surveillance system. Capacity building in training in the woreda was good but weak in the HCs.

Lack of resources starting from printed formats to computer, support and constructive feedback were the main problems of the surveillance system in the visited units.

Surveillance attributes: Attributes directly or indirectly determines the quality of surveillance system performance. Almost all surveillance attributes such as usefulness, simplicity, flexibility, sensitivity, and acceptability in all woreda and health center were weak compared to the health facilities and districts found in Nigerian where attributes more or less are used properly in the surveillance system. Timely and complete cases report helps to appropriately and timely response and to quantify the magnitude and distribution of the cases as well. The timeliness and completeness of measles surveillance report was below the Ethiopian MoH and WHO standards (which for both indicators is ³ 80%). The surveillance system in the study woredas lacked main part of surveillance data source which was community based-surveillance (from WDAs and UHEWs) except in one woreda. This was the reverse of the performance of the community based-surveillance in Amhara national regional state where more than 67% of suspected cases reported from those structures [17].

Limitation of the study

- This evaluation covered only for 9 months measles surveillance system performance in the assessed woredas and health centers since the woreda PHEM structure was newly established in the Addis Ababa. The result may not show the long term effect of the surveillance system in the assessed health facilities. Challenges

- Lack of electronic literatures previously done in the same topic in the study area as well in Addis Ababa
- Absence of any transportation facility during information collection and frequently support to the study units

- Inconvenience of office and office resources such as table and chairs, internet -connection, etc.

Conclusion

The Measles surveillance system in evaluated woredas and health centers was weak on the principal components of surveillance such as reporting, registration, confirmation, analysis, interpretation, and response. The main area for surveillance system which is community-based surveillance was missed. Emergency preparedness plan in the assessed woreda health offices and health centers was not exist. The support components of surveillance system including resource and feedback mechanisms was poor; and capacity building in health center was weak. Supervision was good but not addressed the whole surveillance components. In general, the surveillance system attributes in the study woredas were weak. Rumor log book were available, No written feedback system in the low level.

Recommendation

1. Addis Ababa Health Bureau and Kolfe keraniyo sub city health office should address training gaps particularly at the grass root (health center) level.
2. Woredas should started community based surveillance as early as possible to make the surveillance system complete.
3. Woreda level PHEM officers should adhere and committed to analyze and utilize the collected data in local level and to strengthen the grass root level surveillance system.
4. Continuous and comprehensive supervision, feedback mechanism and close support needs from the sub city to fill the gaps and to strengthen the lower level surveillance systems.

Reference

1. Preeta Kutty MD, MPH; Jennifer Rota MPH, William Bellini PhD, Susan B. Redd, Albert Barskey, MPH; Gregory Wallace, MD, MS, MPH : VPD Surveillance Manual, 6th edition, 2013, Measles chapter 7.1-7.21

2. EPHI: Guideline on Measles surveillance and outbreak management, *3rd* edition, January 2012: FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA

3. Jalal-Eddeen Abubakar Saleh: Department of Expanded Program on Immunization, World Health Organization, Bauchi Zonal Office, Bauchi, NigeriaTrends of measles in Nigeria: A systematic review, 22 Feberuary, 2017, 1-7 : [http://www.smjonline.org]

4. Center for Diseases Control and prevention (CDC): Measles data and stats slide set, Last updated 04-27-2016: www.cdc.gov/vaccines/pubs/surv-manual/chpt07-measles.html

5. Immune advisory Center: Measles fact sheet for parents and care givers: University of Auckland [www.immune.org.nz]

6. 1 Dr W. A. Orenstein, Dr A. Hinman, Dr B. Nkowane, Dr J.M. Olive, Dr A. Reingold : Measles and Rubella Global Strategic Plan 2012-2020 Midterm Review

7. World Health Organization (WHO) Ethiopia: Ethiopia Emergency Response Situation Report, 28 May- 3 June, 2016)

8. Habtamu Belete Akalu (MD,MPH), Addis Ababa, Ethiopia.:review-on-measles-situation-in-ethiopia-past-and-present; Journal of Tropical Diseases, [http://dx.doi.org/10.4172/2329-891X.1000193]

9. WHO: Communicable disease surveillance and response systems Guide to monitoring and evaluating, 2006.2

10. Francis Kasolo, Zabulon Yoti, Nathan Bakyaita, Peter Gaturuku, Rebecca Katz, Julie E. Fischer, and Helen N. Perry: IDSR as a Platform for Implementing IHR in African Countries

11. EPHI: Public Health Emergency Management (PHEM) guideline for Ethiopia, April 2012

12. CDC: Updated Guidelines for Evaluating Public Health Surveillance Systems, July 27, 2001 / Vol. 50 / No. RR-13

13. Jawad Mofleh and Jamil Ansari: evaluation of measles surveillance system in Afghanistan, 2010

14. Celestine A. Ameh, Muawiyyah B. Sufiyan, Matthew Jacob, Ndadilnasiya E. Waziri and Adebola T. Olayinka : Evaluation of the Measles Surveillance System in Kaduna State, Nigeria , 2010-2012

15. Habtamu Belete Akalu (MD, MPH): Review on Measles Situation in Ethiopia; Past and Present, Addis Ababa, Ethiopia, 2015.

16. Bayu Begashaw[1], Thomas Tesfaye[2]: Assessment of Integrated Disease Surveillance and Response Implementation in Special Health Facilities of Dawro Zone: *Journal of Anesthesiology*. Vol. 4, No. 3, 2016, 11-15.

17 Yumi Toyama,[a] Masaki Ota[a] and Belay Bezabih Beyene[b]: Event-based surveillance in north-western

Ethiopia: experience and lessons learnt in the field: Research Gate, 2015

Annex 4 Data collection tools for system evaluation

SUBCITY AND WOREDA QUESTIONNAIRE

_____

Identifiers _____ District_____

Assessment team _____ Date

region/province_____

Interviewer_____ Country_____

Respondent_____ Surveillance system _____

_____

PART ONE: General Surveillance system

I. Availability of a National Surveillance Manual

1. Did you have National Measles guide line? ¨Yes ¨No ¨NA

2. Did you have standard case definition for Measles diseases? ¨Yes ¨No ¨NA

3. Is the standard case definition posted on the appropriate place? ¨Yes ¨No

4. Do all professionals have awareness about the standard case definition? ¨Yes ¨No

5. If answer for Q2 is No, what is the reason/s for the absence of the case definition? _____

_____

_____

_____

6. Did you have case based reporting formats for Measles diseases? ¨Yes ¨No ¨NA

7. Is the guide line support for specimen collection, handling and transportation to the next level?

¨Yes ¨No ¨NA

9. Is a specimen collected from every identified Measles cases? ¨Yes ¨No ¨NA

10. Which sample type needed to collect for measles cases examination?

a) Stool b) whole blood c) CSF d) serum e) Throat swap f) others (specify) _____

11. What is the recommended temperature for measles sample storage?

a) < zero °C b) 4-8°C c) 9-15°C d) above 15°C e) others (specify)_____

12. List materials that needed for measles sample collection

_____

_____

_

13. Which time is best appropriate for sample collection to suspected measles cases?

a) Before the appearance of rash

b) At any time after the development of rash

c) Up to 28 day after the appearance of rash

d) Between at onset of rash appearance and disappearance

14. Is there a limit to the number of Measles cases that can be sampled on a monthly basis?

¨Yes ¨No ¨NA

15. If yes, what is that number? _____

16. How are laboratory specimens collected in this health center? (Please describe) _____

_____

_____

____

a. Who are responsible for specimen collection? _____

b. How frequently are these staffs trained on specimen collection, documentation, storage, and transportation methods? ———————————

17. How are laboratory specimens labeled and packaged in the health center? (Please describe) –

_____

_____

_____

18. How are laboratory specimens shipped/ transported to the confirmatory laboratory? (Please describe) ———————————————————————————

_____

_____

_____

19. When does the specimen is transported to the confirmatory laboratory after collected?

_____

20. Does the site have printed standard specimen collection forms and in use? ¨Yes ¨No ¨NA

21. Does the site have written standard operating procedures (SOP) for specimen collection, transportation, and storage and in use? ¨Yes ¨No ¨NA

22. From whom/where did you get the standard specimen collection form?

_____

23. Please indicate which of the following items are included on the specimen collection form:

a. Unique identifier Yes No Not Applicable

b. Health center name Yes No Not Applicable

c. Person collecting specimen Yes No Not Applicable

d. Age or date of birth Yes No Not Applicable

e. Sex Yes No Not Applicable

f. Date of symptom onset Yes No Not Applicable

g. Date of health facility arrival? Yes No Not Applicable

h. Date of specimen collection Yes No ¨ Not Applicable

i. Type of specimen collected Yes No Not Applicable

j. Vaccination status? Yes No Not Applicable

k. Other (please describe)_____

24. Are specimen collection materials readily available? ¨Yes ¨No ¨Not Applicable

25. If yes, for how many specimens materials are routinely available? _____

26. For how long are specimens stored before being sent for testing? _____

27. Is there a system in place for monitoring the temperature of the samples in storage? ¨Yes ¨No 28. If yes, please describe that system _____

29. Are total numbers of specimens collected and tested ¨Yes ¨No ¨Not Applicable

30. Are laboratory results reported back to clinicians? ¨Yes ¨No ¨Not Applicable

31. If yes, how often are laboratory results received at the site/reported to clinicians?

32. What is the typical lag time between specimen collection & reporting of results to clinicians?

_____

33. Are total numbers of positive and negative specimens reported to a surveillance focal point?

¨Yes ¨No ¨Not Applicable

34. If yes, how often are these results reported (e.g. weekly/monthly/quarter, etc)?

_____

35. Have you faced any outbreaks of Measles? ¨Yes ¨No ¨Not Applicable

36. Did you have line list for reporting Measles outbreaks? ¨Yes ¨No ¨Not Applicable

II. Case Detection and Registration

1. Do all suspected measles cases detected on time? ¨Yes ¨No

2. Is there measles cases registration log book in your facility? ¨Yes ¨No cNot applicable

3. Is there standard rumor registration log book in place? ¨Yes ¨No cNot applicable

III. COMMUNICATION:

Presence of recommended reporting forms in the woreda at all times over the past 6 months:

4. Is the Regional health bureau/ sub city health office responsible for providing surveillance forms to the health facilities? Yes c No c Unknown c

5. If yes, have you lacked appropriate surveillance forms at any time during the last 6 months?

Yes c No c Unknown c

6. What are the reporting entities for the surveillance system?

a. Public health facilities b. NGO health facilities c. Military health facilities

d. Private health facilities e. Others_____

7. Was there any reported measles cases in the past 1 month? Yes c No c

8. If yes, for Q#7, with in what time is the report received after detection of the diseases?

a) Less than 1 hour b) 2-24 hour c) 1- 2 days d) 3- 7 days e) after a week

9. Percent of health facilities that have means for reporting to next level by e-mail, telephone, fax or radio_____

10. How do you report weekly, monthly and other information to higher level? a. Mail b. Fax

c. Telephone d. Radio e. Electronic f. Other

11. Do you have regular contact address of sub city PHEM officers? Yes c No c

12. How frequently are you communicating with the sub city PHEM officers on emergencies and other daily activities? Daily Weekly Every 2 wks Monthly Quarterly Every 6 month Yearly Others----------

13 Did you have address of HC/HP PHEM focal persons? Yes c No c NAc

14 How frequently are you communicating with the HC/HP PHEM focal persons on emergencies and other daily activities? Daily Weekly Every 2 wks Monthly Quarterly Every 6 month Yearly Others----------

15 Did you have case based reporting formats for last 6 months? Yes c No c NAc

16 Was there guideline for specimen collection, handling and transportation to the next level? Yes c No c NA

17. Did you have line list for reporting outbreaks? Yes c No ¨ NAc

18. Did you face shortage of surveillance reporting and recording formats? Yes c No c

If yes, list them please_____

19. When are you expected to send weekly report to the sub city/ woreda PHEM unit?

Monday Tuesday Wednesday Thursday Friday Saturday Sunday I don't know

20. When are you expected to receive weekly surveillance report from health facilities?

Monday Tuesday Wednesday Thursday Friday Saturday Sunday

I don't know

21. How is the woreda communicating the health facilities' PHEM focal in case measles diseases?

by e-mail by phone by fax through regular weekly report others

22. Did you send summary or short report to the administrative /program leaders or other responsible organs on planning, prevention and control activities addressing important issues at community level that have arisen through the surveillance system? Yes No c

23. If answer for Q #24 is yes, to whom did you send? _____

_____

24. Did you face any problems on communicating and reporting? Yes No c

Please, list them_____

25. Please, mention the alternative solutions that you take to tackle the problems you listed on the above? _____

26. Does the woreda has assigned surveillance officer for PHEM activities and working on? Yes No

27. If the answer for Q#26 is No, who is responsible for PHEM activities? _____

28. If yes for Q#26, did he/she trained on basic surveillance system? Yes No

29. If the answer for Q#26 is yes, a) when _____ b) Topic of the training

_____ c) For how long_____

30. Did you conduct any onsite training / orientation about surveillance system for the health facility's PHEM focal persons in the last 6 months? Yes No c

31. Was the data compiled and kept appropriately? Yes c No c

32. Did computer available in your office? Yes c No c

33. Did you have computer on your department (particularly for PHEM unit)? Yes c No c

34. What is the data entry and compilation method? manual computer ¨other please, mention-

---

35. Did you have computer skill on MS word MS excel MS power point Epi-info

36. Did you analyze the data collected from surveillance system? Yes c No c

37. If the answer for Q #36 is yes, did you described data by, time ¨place ¨person

38. Did you have denominators for data analysis? Total population male female under five

39. How frequent your surveillance data analysis. ¨Weekly Every two week Monthly

Quarterly ¨Every 6 month ¨Annually ¨No regular time

40. Did you communicate the results of your analysis to the higher level PHEM officers? Yes c

No c

41. Did you communicate the results of your analysis to the lower level PHEM focal persons?

Yes c No c

42. If answer for Q 36 is No, what is the reason? Lack of knowledge Shortage of time

Less attention Shortage of materials Analysis is not familiar workload Other---------

43. How reporting system can be improved? _____

_____

_____

IV. Epidemic preparedness

44. Do you have plan for epidemic preparedness and response? Yes c No c

45. Do you have emergency stocks of drugs and supplies? Yes c No c

46. If answer for Q #44 is No, how did you control epidemics?

_____

_____

47. Had you experienced shortage of drugs, vaccines and supplies in 2009 EFY? Yes c No c

48. Was woreda epidemic management committee established? Yes c No c

49. Did the epidemic management committee have regularly scheduled meeting time? Yes c

No c, observe the documented minute_____

50. Was Woreda /HF Rapid response team established? Yes c No c. If Yes, list team composition

_____

_____

51. Did the Rapid response team have regularly scheduled meeting time with minute during epidemics? Yes c No c, observe the documented minute_____

52. Were personal protective equipment available in your office? Yes c No c. If No, why ____

_____

53. Did you have case management protocol for epidemic prone diseases? Yes c No c

54. Did your PHEM have multi sectoral emergency preparedness and response task force committee? Yes No c

55. In what frequency did the task force meet during outbreaks? _____

56. Were partners working together with your office on emergencies? Yes c No c

57. If answer for Q #56 is yes, what type of supports did they give to your office? _____

_____

58. Was there a planned budget for epidemic response? Yes c No c

59. Had you a car assigned for emergencies situation (PHEM)? Yes c No c Not functionalc

60. If answer for Q 58 is NO, how did you address emergencies? _____

_____

61. Had you faced any Challenges on epidemic response and preparedness in 2016/ 2017? Yes c No c

62. If answer for Q 61 is yes,

a) List the challenges_____

b) What measures did you take to tackle the challenges? _____

V. Outbreak investigation

63. Was there any Measles outbreak in your locality in 2016/ 2017? Yes c No c

64. Had you investigated any Measles outbreak in 2016/ 2017? Yes c No c

65. Did you have Measles outbreak investigation check list? Yes c No c

66. If answer for Q 65 is No, how did you know possible factors for the outbreak?

_____

_____

____

67. Where did you send specimens for laboratory confirmation? ¨Regional laboratory

Hospital EPHI Health center ¨Contracted private laboratory Other_____

68. Who was responsible to investigate an outbreak? Rapid response team HEWs

Staffs of woreda HO Experts organized randomly Health facility staffs

Other_____

69. If answer for Q 65 is yes, how many out breaks did you investigated in 2016/ 2017? _____

S.No	Name of out break	Place (sub woreda)	Total #of cases	No of deaths			Start date of the out break			Investigation date	Remark
				M	F	<5	M	F	<5		
1											

2											
3											
4											

70. Had you faced any challenge in outbreak investigation in 2016/ 2017? Yes c No

76. If answer for Q #70 is yes,

a) List the

challenges_____

_____

b) List the alternatives that you took to tackle the challenges._____

_____

VI. Responses

77. Has the district implemented prevention and control measures based on local data for at least one reportable disease or syndrome?

Yes c No c Unknown c Not applicable c

78. Does the district responded within 48 hours of notification of most recently reported outbreak (from written reports)

Yes c No c Unknown c Not applicable c

79. Does the district achieved an acceptable case fatality rate for most recent outbreak (Observe from outbreak report) Yes c No c Unknown c Not applicable c

80. Has epidemic management committee evaluated their preparedness and response activities during the past one year? Yes c No c Unknown c Not applicable c

(Observe written report to confirm)

VII. Supervision and Feedback

81. Do you have supervision plan to supervise health institutions under your woreda? Yes c

No c

82. If answer for Q#81 is No, how did you supervise?_____

_____

83. If answer for Q# 81 is yes, did you supervise the health facilities according to your plan in 2015/2016? Yes c No c

84. If answer for Q# 81 is No, what was the

reason?_____

_____

85. If answer for Q# 81 is yes, how many times did you supervise each health facilities in 2016/ 2017? Health center_____ other health facilities_____

86. Do you have supervision checklist? Yes c No c

87. If answer for Q# 86 is No, how did you supervise the health facilities?

_____

88. Did you send written feedback of your supervision to the health facilities commenting/indicating their strong and weak sides? Yes c No c (observe)

89. If answer for Q# 89 is No,

why_____

_____

90. If answer for Q#89 is yes, for how many health facilities did you send a feedback in 2016/ 2017? HC---------- and other health facilities----------

91. Had you reviewed about surveillance practice by higher level supervision? Yes c No c

92. Had you received feedback from higher level supervisors in 2016/ 2017? Yes c No c

93. If answer for Q 92 is yes how many feedbacks did you received in 2016/2017? _____

94. Had you faced any challenge on supervision and feedback in 2016/ 2017? Yes c No c

95. If answer for Q 94 is yes

a) List the challenges_____

b) List the measures that you took to tackle the challenges_____

VIII. Training

96. Have you been trained in Basic disease surveillance? Yes c No c NAc

97. If yes, specify when, where, how long, by whom?

_____

98. What percent of your personnel in the district/HF have been trained in surveillance and epidemic management? _____

IC. Resources

99. Percent of sites that have:

Logistics

a. Electricity _____

b. Motor cycles _____

c.Vehicles _____

Data management

a. Stationery _____

b. Calculator _____

c. Computer _____

d. Printer _____

e. Statistical package _____

100. Communication

a. Telephone service

b. Fax

c. Radio

d. Computers that have modems

101. Information education and communication materials

a. Posters

b. Megaphone

c. Flipcharts or Image box

d. VCR and TV set

e. Generator

f. Screen

g. Projector (Movie)

h. Other:

C. Satisfaction with surveillance system

102. Are you satisfied with the surveillance system?

Yes c No c Unknown c NA c If No, how can the surveillance system be improved?

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

_____

PART-TWO Describe Each System Attributes:

I. IS THE SURVEILLANCE SYSTEM USEFUL?

1. To detect outbreaks early on time to permit accurate diagnosis? ¨Yes ¨No

2. To estimate the magnitude of morbidity and mortality? ¨Yes ¨No

3. To assess the effect of prevention and control programs? ¨Yes ¨No

4.To allocate funds for the surveillance system management ¨Yes ¨No

5. To estimate research intended to lead to prevention and control? ¨Yes ¨No

II. Simplicity:

1. Is the measles case definition easy for case detection by all level health professionals? ¨Yes ¨No

2. Does the surveillance system allow all levels of professionals to fill data? ¨Yes ¨No

3. Does the surveillance system help to record and report data on time? ¨Yes ¨No

4. Does the surveillance system have necessary information for investigation? ¨Yes ¨No

5. Does the surveillance system allow updating data on the cases? ¨Yes ¨No

6. How long does it take to fill the reporting format? ¨<5 min ¨5 to 10 min ¨10 to15min ¨>15 min

7. How long does it take to have laboratory confirmation? ----------

III. Flexibility

1. Can the current reporting formats be used for other newly occurring health event (disease) without much difficulty? ¨Yes ¨No

2. Did you think that any change in the existing procedure of case detection and reporting formats will be difficult to implement? ¨Yes ¨No, Add your explanation ---------- ----------

3. Is the system easy to add new variables? ¨Yes ¨No

4. Is the surveillance system easy to integrate with other systems? ¨Yes ¨No

5. Is the surveillance system easy to add new disease on report? ¨Yes ¨No

IV. Data quality

1. Are all reported forms Complete? ¨Yes ¨No

2. If answer for Q1 is No, how many unfilled spaces are in 2016/ 2017 report? ----------

3. Percentage of unknown or blank responses to variables from the total reported measles cases in 2016/ 2017 _____

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

5. Is the recorded data clear to read and understandable? ¨Yes ¨No

6. If answer for Q5 is No, how many records are not clear/are difficult to understand in 2016/ 2017 report? _____

7. Percent of records which are difficult to read/ understand _____

V. Acceptability

1. Do you accept the priority diseases/events surveillance system? ¨Yes ¨No

2. Do higher officials in your office accept and support the measles surveillance system? ¨Yes ¨No

3. Do you think the reporting agents accept and well engaged in measles surveillance activities? ¨Yes ¨No

4. If yes, how many are active participants (of the expected)? ----------

6. 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: ----------

7. Are all reporting sites used the standard case definition to identify measles cases? ¨Yes ¨No

VI. Representativeness

1. What is the health service coverage of the district? _____%

2. Was the surveillance system enabled to follow the health and health related events in the whole community? ¨Yes ¨No

3. Did the surveillance system incorporate all health facilities and other sites expected to report? ¨Yes ¨No

4. Do you think the populations under surveillance have good health seeking behavior? Yes ¨ No ¨

5. Do you think that children and adult communities are equally benefited in surveillance system? Yes ¨ No ¨

6. If answer for Q 5 is no, who do you think is well benefited by the surveillance system? Children¨ Adults ¨ Both ¨. Why

_____

VII. Timeliness

1. Are all reporting sites/ health facilities reported on time in 2016/ 2017? Yes No

2. Average number of reporting sites that reported on time. ----------

3. Did you report immediately and weekly aggregated report on time to the next higher level? ¨Yes ¨No (Check the evidence) _____

4. Did you provide feedback to the reporting sites those not reported on time? ¨Yes ¨No

VIII. Completeness

1. Were all expected sites or health facilities reported weekly measles case zero report in 2016/2017? ¨Yes ¨No

2. Were all surveillance data completed in the reporting formats? ¨Yes ¨No

3. Average numbers of health facilities that send measles case zero report in each week in 2016/2017 ----------

4. If the answer for Q#2 is No, what was/ were the reason/s? _____

_____

_____

IX. Stability

1. Was any new restructuring affected the procedures and activities of the surveillance system? ¨Yes ¨No

2. Was there lack of resources that interrupt the surveillance system? ¨Yes ¨No

3. Was there any time /condition in which the surveillance system is not fully operating? ¨Yes ¨No

4. If the answer for Q3 is yes, explain why?

_____

_____

____

5. What mechanism do you suggest to fully operating the surveillance system? _____

_____

____

X. Sensitivity

1. Does the Measles standard case definition able to pick all cases? ¨Yes ¨No

Chapter IV: Health Profile Description report

4.1Description of Health Profile in Kolfe keraniyo sub city Woreda 9, Addis Ababa, Ethiopia

Executive summary

Introduction: Health profile is a detail description and presentation of health and health related data such as population socio-demographic, outbreaks/disasters, environmental sanitation, nutrition, human resources who serve in health, finance, logistic construction and maintenance, health facilities, health program administration, planning, monitoring and evaluation. Knowledge of leading cause of morbidity and mortality and their trends over time helps decision makers to identify strategies that are likely to contribute the greatest reduction in prevention and control efforts (1-4).

Objective: To describe health and health related profile of the woreda 09, kolfe keraniyo sub city from January, 24, 2017-February14, 2017 Gregorian calendar.

Methods: cross-sectional descriptive study of record review was conducted using structured and semi structured check list to collect health and health related data from kolfe kerenaniyo sub city woreda 09.data was collected by interviewing key informants in different sector offices such as woreda health office, woreda health center, and community representatives and review of documents in the same unit. Microsoft Excel version 2007 was used to analyze data.

Results: The total population of the woreda 09 was 32372. Male population accounts 16,078 (49.7%).Health center serve 34650 and 2630 less than five years of age population. The health center provides immunization service for 3927 population attains immunization. coverage of 70% for BCG, 128%for penta1, 132% for penta3, 148% for measles .A total of 455 individuals were screened for TB among which 86.4% were negative in the year of 2026/17.There is no

registered leprosy case in the woreda 09 k/k sub city in the year of 2016/17. There was no well organized woreda socio demographic data. Dry and liquid waste management of the woreda was poor. Staffs working in waste management were not using personal protective equipment. Acute upper respiratory tract infection was the leading cause of morbidity both in adult and children OPD visitors. Doctors to population ration were 1:34650 and nurses to population ratio were 1:2310 health center to population ratio was 1:34650

Conclusion The immunization coverage of woreda was more than 100% except BCG. Dry and liquid waste management system of the woreda was poor and no organized socio demographic data. Staffs working in waste management (those who are handling liquid and dry wastes) are not using proper personal protective equipments. Acute upper respiratory tract infection is the leading cause of morbidity both in adult and children OPD visitors. Doctor and nurses to population ratio were low. Government health facility coverage was low.

INTRODUCTION

Health profile is a detail description and presentation of health and health related data such as outbreaks/disasters, environmental sanitation, nutrition, human resources who serve in health, finance, logistic construction, health facilities, program administration, planning, monitoring and evaluation. Knowledge of leading causes of morbidity and mortality and their trends over time helps decision makers to identify gaps and make strategies that arelikely to contribute the greatest reduction and prevention Health profile is a quantitative description of the health of the citizens and the factors which influence their health and also support local authority members, officers and community partners to lead for health improvement (1-4). Health profile can be divided at woreda level in various section mentioned below that is general information of woreda; for example history, location, area, whether condition.

Accessibility: This might helps readers to know woreda administrative setup which will be presented in detail reporting

Demographic information: Description of the woreda population structure by age and sex is important from mother and newborn child health point of view .The information is used to predict the target population in upcoming years and plan intervention for improvement of health situation in the woreda.

Woreda health department: It provides basic information of woreda health department such as type of health facilities, human resource and budget information and selected health indicators.

Woreda Education sector: Sex wise information, number of educational institution in public sector is given in this section that can help in planning collaborative strategies for improvement of health status in the woreda. Woreda health profile is an invaluable tool for everyone in a healthy cities network. It provides a lively, scientific based account of health in the woreda and can initiate Public interest and political commitment and identify targets for the future and monitor the progress towards them. Indicators are measurement of health and the factors which influence health .Profile includes both indicators and other health related measures with analysis of the information. Health profile help cities in many ways: the information it contains can highlight health problems and brings health partners together for finding solution .It can also stimulate public and media interest to improve general understanding of health problems. This health profile objective is not to give a prescription or strict instruction for the preparations of profiles but for forwarding suggestions and idea which will give cities as a starting point. Every city will produce its own individual profile with contents that reflect the availability of the data and the local priority problem. The woreda health profile is a living

document which is filled in woreda health office in order to use by woreda health office, sub cities and regional and other concerned partners will create favorable environment for health department for planning, intervention of health events based on their priority to bring change on health of the community in kolfe sub city woreda 09. It is known that the health and socio-economic of people are fundamentally linked to their natural and built environment (5-6).

Rational of the study

Health profile is one of the basic components to a county's health policy in designing, planning and program implementation with structured and prioritized manner. Even though it is a core component of a health system, in our country, Ethiopia is not found as expected particularly at the grass root (woreda) level. In Addis Ababa, there are around 116 woredas with their catchment administrative area, population and different institutions. But their health profile capturing system looks not strong as compared to higher level within the country and other districts from neighboring countries. In general, health profile capturing system in the woreda 09, kolfe keraniyo sub city has gap which is difficult to make information based decision to officials and health care providers. So it needs to assess the health profile in the woreda 09, kolfe keraniyo sub city. Systematic assessment of health care facility performance based on accepted standard and norms may also help to improve health quality of the woreda.

OBTECTIVE

GENERAL OBJECTIVE

- To describe health and health related profile of the woreda 09, Kolfe keraniyo sub city from January, 24, 2017-February14, 2017 GC.

SPESFIC OBJECTIVE

- To asses socio-economic and demographic characteristics of the people of the woreda.
- To describe health and health related condition in the woreda
- To identify suggestion area for action to improve

METHODS AND MATERIALS

STUDY AREA AND PERIOD

The health profile description was conducted in woreda 09, in Kolfe keranyo sub city Addis Ababa, Ethiopia. The study was conducted from February1, 2017- February30, 2017

STUDY DESIGN

Descriptive cross sectional study was conducted by using secondary data.

STUDY POPULATION

The study population was the population of woreda 09, in the kolfe keraniyo sub city, Addis Ababa, Ethiopia.

DATTA COLLECTION AND PROCEDURE

This health profile information was collected by reviewing available data sources and by interviewing key informants from different woreda offices such as health, drug and regulation office, social affairs, education office finance and economic office. The data was collected by using semi structured and structured questionnaires from February 1, 2017 to February 15, 2017.

DATA ANLYSIS

Data were entered and analyzed by using Microsoft excel2007 and descriptive summary was done using frequency, percentage, and the main finding of the analysis was presented by figure, graphs and tables.

THE DATA QUALITY CONTROL

During data collection completeness of all possible variables was included that address the objective of the study.

ETHICAL CLERANCE

Health and health related information of Kolife Keraniyo sub city, woreda 09, was collected after getting official letter from Kolfe keraniyo sub city health office and Confidentiality was maintained.

Result

Historical background of kolfe keraniyo sub city woreda 9

There are different accounts of the origin of the naming of the area. Word of mouth suggests that the area got its name during the period of Menelik. There are many speculations as to who coined the name kolife. Some argue that the defense minister of Menelik, Fetawrari Habtegiorgis, was the founder of the area and the others argue that it was Menelik himself. The name kolife was believed to be derived from the Afan Oromo word kolfa, which literally ‘laughing’ geographically, the kolife area covers locations stretching from the Dutch Embassy to the general wingate high school area. The General Wingate in the north, the Mesalemiya area in the east and the Torr-Hayloch (armed force) area in the south border kolife.

Woreda brief: Woreda_09 is one of among largest in population and geographic area among fifteen woredas in Kolfe Keraniyo sub-city in Addis Ababa City Administration. The woreda is structured by 22 sector offices. The woreda headed by woreda executive administrative office. It is sub divided to number of former 27 (now

4) sub woreda/ketenas, 24 gott/sefers, 75blocks and 5,460 households. The area of woreda 09 in kolfe keraniyo sub-city is 251.7 hectares.

Transportation, telecommunication, water and Electricity: Each sub woredas connected with each other and with the woreda by coble stone and all asphalt roads. The woreda connected with other woreda and the sub-city head offices with main Asphalts and High Way Ring-Roads. The main transportation means of the woreda people is mini bus taxies and city bus. All sub woreda has access to telecommunication, pipe water supply but the distribution is not sustainable, and electricity with some sort interruptions.

Population: The total population of the woreda 09 was 32372. Male population accounts 16,078 (49.7%). Health center serves 34650 and 2630 less than 5 years of age population.

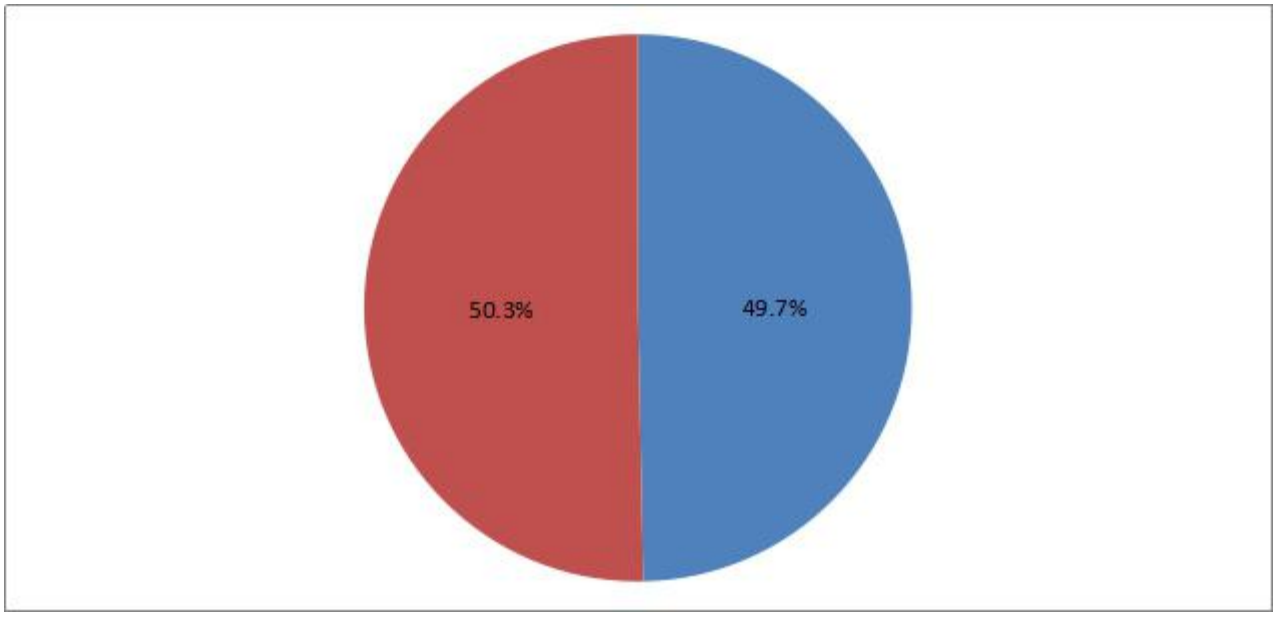

Figure 16 Woreda 9 kolfe keraniyo sub city Addis Ababa town, Ethiopia percentage of population by sex, 2017

Table 16 distribution of population by age group in kolfe keraniyo sub city, woreda 9, Addis Ababa town, 2017

s.no		Total population	%	Remark
1	Less than1years	7 62	2.2%	
2	Under 5years	2,495	7.2%	
3	Less than 15 years	8,306	23.9%	

4	15-59years	24563	70.9%	
5	Greater than 59 years	1,781	5.1%	
Total		34,650		

Religion and ethnicity

As known, Ethiopia is a country of diversified multi ethnic, religion and culture groups. Woreda 09 in kolfe keraniyo sub city is one of the residential areas of these diversified people. There is no data found in the woreda by religion and ethnicity in this woreda is essential but recent data is not available to describe which ethnic group in the woreda is dominant.

Economic status /occupational status; the main economic source of the population was small scales trade and other business. The small scale business includes restaurant, grocery, bar, coffee and tea, kiosk, wood and metal work, beauty and cosmetic salon, etc the annual health budget of the woreda of 2016 is 386,826 birr. The income status of the community depends on one's economic involvement in different work fields. There are 1,217 jobless in the woreda but data is not available for those who are on government, private and self employer.

Educational status; Education is the primary source of knowledge which has direct influence on health in the prevention of disease and risk reduction. The woreda 09 has a total of 21 schools, including 03, governmental and 18, private schools. The legal age of schooling in the woreda is 4 years for stage one kinder garden and seven years for primary school. Based on the woreda education office data there are 12 KG, 07, primary and 01 secondary- preparatory and 01, collage schools in the woreda. A total of 6,696 regular and 5, 60 night students were followed their education with ,3512 male and 3,744 female students with only 2.7% drop out rate in 2016GC. All schools have water and electric supply. All schools in the woreda have functional health related clubs except KG schools. When we come to latrine status in the school, the private schools are better in both quality and comfort than government. The following tables and figures show distribution of students and teachers by sex and organization in the woreda.

Table 17 Distribution of teachers and students by sex and organization in kolfe keraniyo, sub city, woreda, 9, 2017

Students	**Male**	**Female**	**Total**
Government	1,717	2.044	3,761
Private	1,795	1,700	3,495
Total	3,512	3,744	7256
Teachers	Male	Female	Total
	52	62	114
Government	48	122	170
Private	100	184	284
Total			

Health service coverage

Health facilities There are 20 different government and private health institution starting from health center to hospital; 7, pharmacies 1, nongovernmental hospital 5 specialty clinics, 6 medium clinics and one government health center. The health center has long time experience in delivering health service and the health center to population ratio is 1:34650

Human resource

Table 18 distribution human resource of woreda 9 k/k sub city in2016/17

Profession	Number				Total	HP; pop. Ratio
	Gov't		Private			
	Male	Female	Male	Female		
Gp doctor		1	1		2	1:34650

Ho	4	8	6		18	1:2888
Bsc nurse	2	9		2	13	1:3150
Clinical nurse	3	12	4	5	24	1:2310
Public nurse	2				2	1:17325
Bsc midwifes		2			2	1:17325
Diploma midwifes	2	8			10	1:3465
Lab technologist	1	2				1:17325
Lab technician	1	4	4	2	6	1:5775
Pharmacist	2	3				1:11550
Pharmacy technician		3			3	1:11550
Environmental ho	1	1			2	1:17325
Urban HEW	2				2	1:17325
Total					82	

Vital statics

Table 19vital statistics of kolfe keraniyo sub city woreda 9, 2016/17Table 11 Vital statistics of the woreda 09, k/k sub city 2016/17

Indicator	%
Child Mortality Rate	NA
Crude Birth Rate	NA
Maternal Mortality Rate zero	0
Contraceptive prevalence rate	39%
Contraceptive acceptance rate	39%
ANC rate (how many of the total expected pregnancies attended 1st ANC)	797(2.3%)
Percentage of deliveries attended by skilled birth attendants	797(2.3%)
ANC rate (how many of the total expected pregnancies attended 4th ANC)	>100%
Percentage of deliveries attended by HEWs	0
Percentage of deliveries attended by TBA	NA
Average family size	5.1
Crude Birth Rate (per 1000)	NA
Age dependency ratio (%working age population)	NA
Age dependency ratio; old	NA
Age dependency ratio in %; young	NA

NA* not applicable

Expanded program of immunization service: The health center provides immunization service for 3927 population attains immunization. Immunization coverage of 70% for BCG, 128%for penta1, 132% for penta3, and 148% for measles

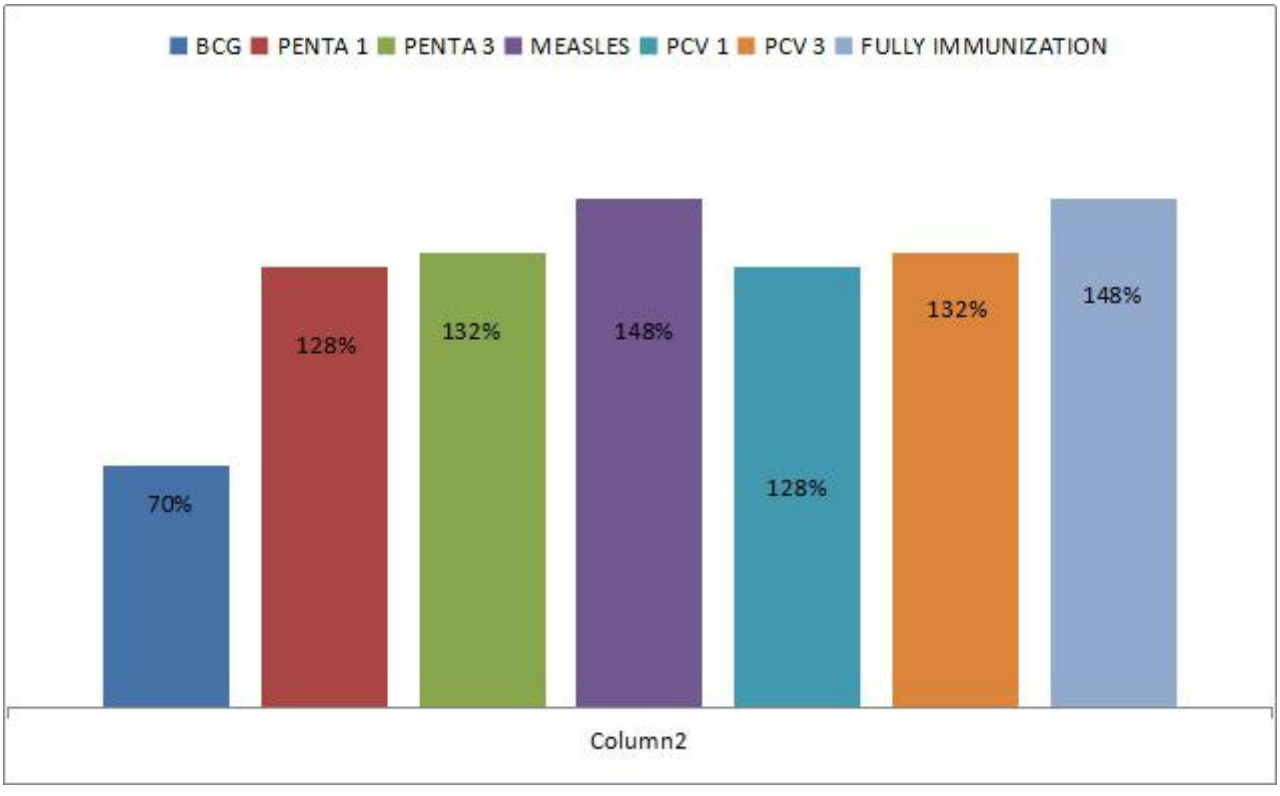

Figure 17 type of immunization

Table 20 Maternal Health service of kolfe keraniyo sub city woreda, 9, 2016/17

Indicator	Target	Achievement		Remark
		Number	%	
Number of ANC Cases Registered	667	1185	175	>100%
Pregnant women received at least first antenatal care visit	602	658	109	>100%
Pregnant women received antenatal care at least four visits	602	658	109	>100%
Number of pregnant women tested for HIV	667	706	104	>100%
pregnant women eligible for HIV	21	59	281	>100%
HIV positive pregnant women eligible for HAART	12	59	281	>100%
pregnant women tested for syphilis	667	1185	175	>100%
pregnant women provided at least TT2	693	1004	145	>100%

Pregnant women provided iron foliate	602	658	109	>100%
Post Natal Care visited	602	239	40	
Number of children <5 year treated for diarrhea at public HF	693	926	134	>100%
Number of children <5 year treated for pneumonia at public health facilities	7443	187	2.5	
Deliveries conducted by skilled attendants	602	398	66	
Number of live births	602	398	66	
Number of still births	0	0	0	
Total obstetrics/Maternal/deaths	0	0	0	
Total Newborn deaths		0		
Number of facilities reporting stock out of contraceptive commodities	0	0	0	
comprehensive abortion care services	68	161	237	>100%
Number of safe abortions performed	68	161	237	>100%

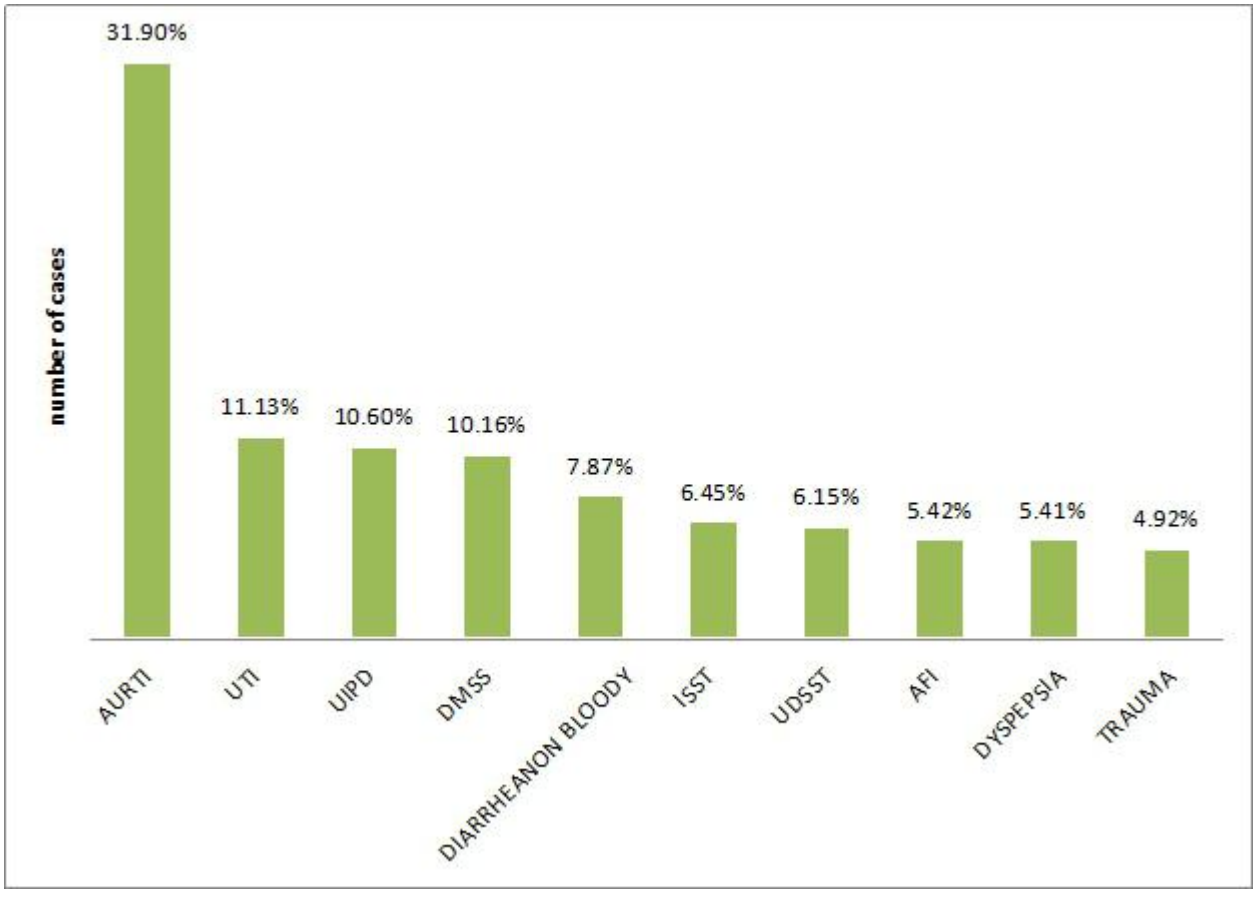

Figure 18 Top ten causes of morbidity of children less than 5 years old at OPD in 2016/17 of morbidity of adult in kolfe keraniyo sub city woreda 9, 2016/17

*AURTI-Acute upper respiratory tract infection *UIPD-unspecified infectious &parasitic disease

*UTI-Urinary tract infection * DMSS-disease of musculoskeletal system

*ISST-Infections of skin &subcutaneous tissue *UDSST-Unspecified disease of skin &subcutaneous tissue

*AFI-Acute febrile illness

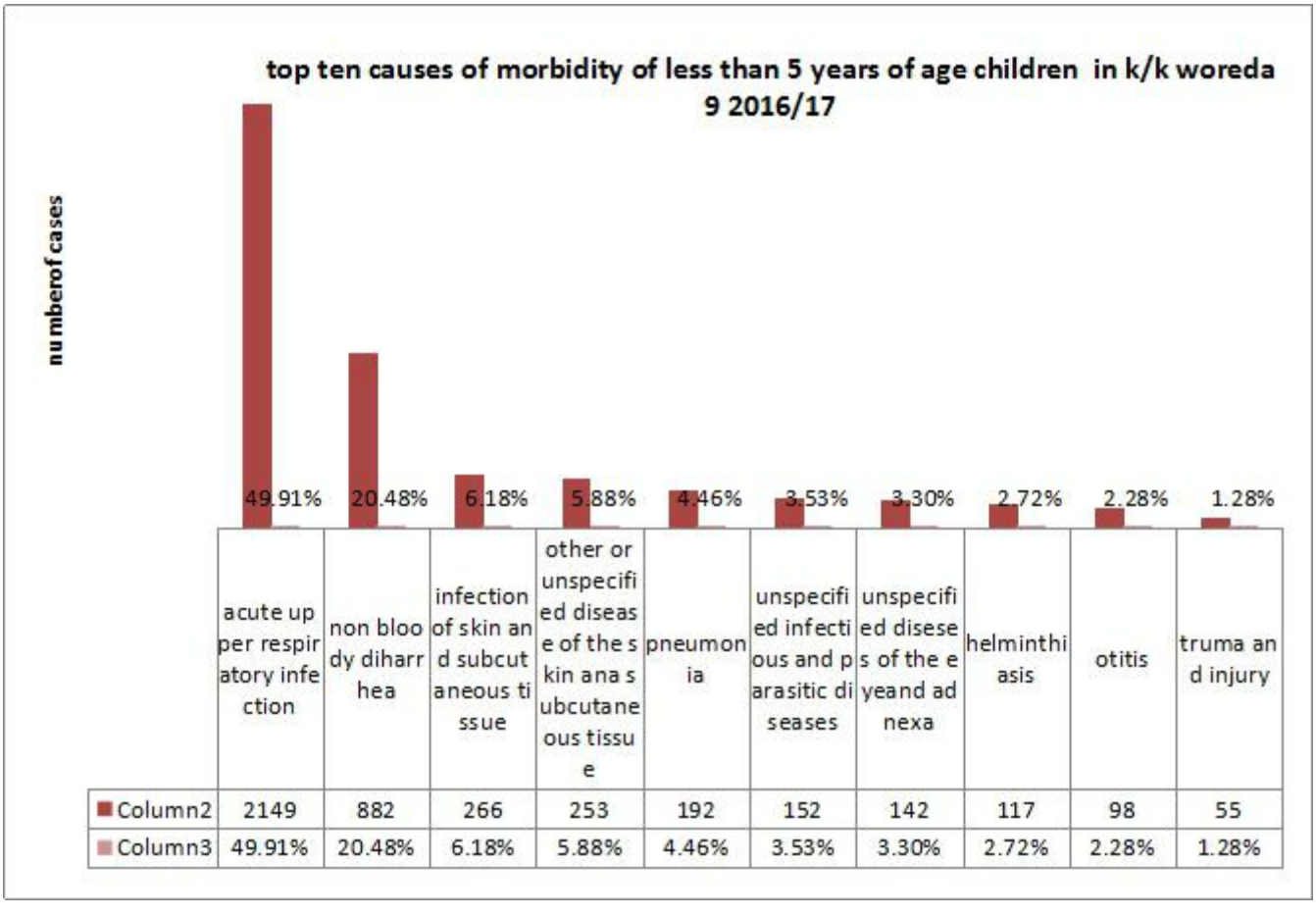

Figure 19 top ten causes of morbidity of children less than 5 years old at OPD in 2016/17.

Maternal and child health coverage: There was a plan to give family planning service for 7,275 for those women found in the Reproductive age group (15-49 age) and 2,830 (39%) were given .women attended first and fourth A.N.C were more than expected of the woreda plan which was 602 but the achievement was 658(109%).the number of deliveries attended by skilled birth attendants was 398(66%) and women have got PNC were 239(40%) at health center.

Endemic diseases: acute upper respiratory disease was endemic in the woreda 09.

TB/LEPROSY

A total of 455 individuals were screened for TB among which 393(86.4%)were found to be negative 34(7.5%) positive for PTB in the year of 2026/17.there is no registered leprosy case in the woreda 09 k/k sub city in the year of 2016/17.

HIV/AIDS

Table 21 the status of HIV/AIDS by age group in kolfe keraniyo sub city woreda 9 ,2016/17

Activities	Plan	Achieved	Percent
Total HIV tested	5020	967	19.3%
VCT	1772	47	2.7%
PICT	3248	920	28%
PMTCT	677	706	104%
Tested positive for HIV	5020	26	0.56%
Newly enrolled in per ART adult	137	60	44%
Newly enrolled pre ART children	3	0	0
Pre ART	140	60	43%
Currently on ART total adult and children	1294	1276	99%
CPT uptake	500	546	109%

Essential drugs: There were no shortage /out stock of essential drugs in the health centers of the woreda. Essential drugs are drug should be available in the health center such as anti biotic drugs, analgesics, anti helmets, ART and emergency drugs.

Nutrition There is supplementary care (SC) sites in the woreda which is given for severely malnourished children and for HIV patients by prescription that is dispensing “Plumpy nuts. **Emergency situation in the woreda**: There was no any natural or manmade disaster and feature of an outbreak/epidemic in the woreda by 2016/17

Community Health Services: Health Services Integration with community is vital to diseases prevention and health promotion as well as services expansion and quality assurance. To facilitate this integration, organizing women development army and strengthening 1 to 5 networking system is a key factor in government health policy. Urban health extension workers have tremendous role in the community both in health service integration and awareness creation within the community.. Urban health extension workers have

responsibility to educate and demonstrate the residents of the woreda about these health packages thoroughly. Some of the major activities of UHEWs are: provision of health education about prevention of communicable and non communicable diseases, how to manage solid and liquid wastes; how to handle personal, household and surrounding hygiene; assisting and facilitating mothers and care givers to take their children to the health institutions for vaccination; assisting and facilitating pregnant mothers to attend and get ANC, delivery and PNC service in the health facilities; screening and referring malnourished and any health conditions to the health facility; training model households and networking them to other community members; collecting and recording the health profile of the community .

Environmental Health and Sanitation

Solid waste management

Clean environment is vital to reduce diseases causing pathogens and to improve the health of the community. Addis Ababa City Administration efforts is setting strong objectives to expand free waste, clean and green woreda and sub woreda in the city. Woreda 9 solid waste management office tried to accomplish the objective of the City Administration around 56 road cleaner, 93 and more members of (in 6 groups) household solid waste collectors assigned in the woreda.

Liquid waste management and housing situation

There was no woreda reflective tangible data about liquid waste management in the woreda but the following table showed us that some households with liquid waste management and housing condition.

There were still open defecation habit in the in some households in the woreda. Those households 7 in number (source: solid waste management office, w.9) were owned by kebele and had no latrine nearby them and unable to construct by themselves otherwise construction permission given to them by Sub City land resource management office. It needs the woreda 9 executive office attention to execute and construct communal latrine for those household

Table 22 status of liquid and dry waste management in kolfe keraniyo sub city woreda 9,2016/17

	satisfactory	Not satisfactory	Total	Remark
Private latrine	2141	409	2550	
Communal latrine	1148	594	1642	
Households who have private bathing room	No data	No data	No data	
Households who have communal bathing room	No data	No data	No data	
Households with liquid waste disposal	2010	2890	4900	
Households with solid waste disposal	2141	409	2550	

*Satisfactory means those latrine clean and have drainage system

Discussion

In Ethiopia about 75%of causes of OPD visits are largely due to the lack of basic sanitation provision, study conducted in Ethiopia revealed that risk factor for acute upper respiratory tract infection is socio economic status ,low educational level ,type of toilet facility and source drinking water(7). This health profile description show that low coverage of latrine, poor dry and liquid waste management, unsustainable water distribution in woreda 9 k/k sub city. Because of these reasons peoples are affected by AURTI especially children. in addition to this a large proportion maternal and neonatal death occurs during the 48 hours after delivery and the these first two days following delivery are critical for monitoring complication arising from the delivery .the level of post natal coverage is extremely low in Ethiopia, only 13% of women received post natal care within two days (8) in woreda 9 kolfe keranio sub city there is no data for post natal care at home and 239(40%) women were get PNC service in health center. Education is the primary source of knowledge which has direct influence on health in the prevention of disease and risk reduction. School dropout rate of woreda 9 k/k sub city by the year 2007 ETC was 3.6% but in 2008 ETC2.7% .the reason of school dropout was socio economic factor and poor awareness. According to Addis Ababa city administration report in 2007ETY the number of health facility and service coverage has increased significantly in Addis Ababa (9) similarly in kolfe kerananiyo sub city woreda 9 number of health facility has increased especially private sectors there was 20 health institutions, but the government health facility is not enough as expected, only 1 governmental health center serves for 34650 populations. The health center population ratio was 1:34650. The adequacy of the number of skilled human recourse at all level of the health system is very important (9) Addis Ababa city administration 2007 report showed that doctors population ratio 1:6203, nurse to population ratio1:886 but in kolfe keraniyo sub city doctor to population ratio is 1:34650 and nurse to population ratio was1:2310, so woreda 9 k/k sub city needs more doctors and nurses and additional health facility to achieve health sustainable goal of the country. According to EDHS 2011,the coverage of pentavalent 3, which is the main indicator to evaluate immunization increased from 80.5% in 2000 to reach 89.2 in 2011 the coverage is now 96% as per the 2007EFY annual report(9) where as in k/k sub city woreda 9 the immunization of pentavalent 3, was more than 100% in 2008 EFY. It should be encouraged to achieve sustainable millennium development goal. In Addis Ababa 2007 EFY the proportion of pregnant women counseled and tested to prevent mother to child transmitting of HIV reached 96 %(9) likely in k/k sub city woreda 9 PMTCT service was more than 100% but voluntary counseling and testing for general population was dropped off. Service

plan was 5420 but the achievement was 947which is 19.3% similar to the Addis Ababa city administration showed low coverage. The main reason was strategy change which is the service has become targeted to perceived most at risk population and the presence of drastic shortage of HIV test kits which forced facilities to prioritize(9)

Major gaps

1. There is no updated socio demographic information, health and health related data of the woreda.
2. There is no data showing mortality in the woreda.
3. There is an office handling vital statistics but there is no data by sex and there sex of birth and death which can show the woreda figure properly.
4. Poor liquid and dry waste management system and there is no PPE for cleaners.
5. Urban health extension worker are in the woreda but not working as expected for example have no complete data of woreda health profile even in their ketenes.
6. No data for home post natal care.

Challenges

Lack of budget for farther investigation, the information was incomplete because most of the data were secondary that was already prepared data's by different woreda offices.

The study conducted only in at a single woreda so this study may not represent the general population.

Conclusion

From the above mentioned we can observe that woreda 9 k/k sub city lucks very important data like socio demographic and mortality data.

The waste management system of the woreda was poor. Staffs working in waste management (those who are handling liquid and dry wastes) are not using proper personal protective equipments while handling west management

Acute upper respiratory tract infection is the leading cause of morbidity both in adult and children OPD visitors.

ANC and EPI coverage of the woreda is more than 100% except BCG. The BCG coverage of the woreda is70% .Voluntary counseling and testing for HIV service coverage and health professionals to population ratio was low.

Recommendation

Woreda has to improve the data management which will be important in the future health planning policy and decision making and improve health action .

- The woreda west management system should be strength and the staffs involved in waste management has to be given training on the advantage of personal protective equipments as they are at high risk of different diseases resulting from lack of sanitation.
- Vaccine for BCG has to be given on the day of delivery before the mothers go home by EPI givers and HEW should give health education during their home visiting time.
- Woreda health office has to set collaborative strategy to strengthen HEW to achieve targeted goals within the community.
- AURTI was the leading cause of morbidity and it became strong challenge and increased year to year in the woreda as well as in the Sub-City so that it needs respect sector offices attention to closely monitor the pattern of transmission to set minimizing strategy.
- Sub-city health office should strengthen continuous and regular supportive supervision to both woreda health office and health centers.
- home and facility post natal care should strengthen by sub city health and woreda office

Table 15 Action plan on gaps of woreda 9 k/k sub city

s.no	Activities	Responsible person	Time
1	**Improving data management system**	**Woreda9 health office**	
2	**Improving woreda waste management system**	**Woreda 9 health office and kolfe keraniyo sub city health office.**	
3	**Improving BCG immunization coverage**	**Woreda 9 health center**	
4	**Minimizing AURTI the leading cause of morbidity**	**K/k sub city health office, woreda 9 health center health personnel's.**	
5	**Strengthen woreda H EW**	**Woreda health office and sub city health office**	
6	**Increase home post natal care**	**Woreda HEW**	

Reference

1. Melaku K, S. Y, A. H. Factors Associated With Incomplete Childhood Vaccination among Children 12-23 Months of Age in Machakel Woreda, East Gojjam Zone: A Case Control Study. Journal of Pregnancy and Child Health. 2015.

2. Coverage WUEoNI. Progress and Challenges with Achieving Universal Immunization Coverage: 2016 Estimates of Immunization Coverage. 2017:1-9.

3. IMMUNIZATION ENEPO. COMPREHENSIVE MULTI-YEAR PLAN 2016 - 2020 Federal Ministry of Health, Addis Ababa. 2015:1-10COMPREHENSIVE MULTI-YEAR PLAN 2016 - 20 Federal Ministry of Health, Addis Ababa.

4. Central Statistical Agency (CSA) [Ethiopia] and ICF EDaHS, Addis Ababa E, and Rockville, Maryland, USA: CSA and ICF. Ethiopia Demographic and Health Survey 2016. 2016.

5. M. RT. Assessment of Factors Associated with Incomplete Immunization among Children. 2015.

6. A. A. Compiled Body of Works in Field Epidemiology. 2013:149.

7. Melaku K, A. H. Factors Associated With Incomplete Childhood Vaccination amongChildren 12-23 Months of Age in Machakel Woreda, East Gojjam Zone: ACase Control Study. Journal of Pregnancy and Child Health. 2015.

8. UNICEF Wa. Ethiopia: WHO and UNICEF estimates of immunization coverage. 2016.

Annex 5 health profile data collection tools

10.1.1. Historical Aspects of the area (Culture and tourism office).

Woreda Name_____

When the woreda was formed_____

Any other historical aspect_____

10.1.2 Geography and Climate (including map, altitudes, agro ecological zones etc…)

Woreda map_____

Location (distance and direction) _____ _____

Altitude _____

Geographical coordinate

Latitude _____ longitude _____

Annual rain fall (average) _____, annual temp (average) _____

Climatic zones_____ (%) _____ (%) _____ (%)

Area of woreda_____SqKm

10.1.3. Facilities

Accessibility (main roads) _____

Type of road by size _____

Transportation access _____

How many people have access to fixed telephone? _____

How many people satisfied with the telephone service? _____

How many people have access to mobile phone? (Coverage)_____

How many people get power supply_____?

How many people satisfied power supply?

10.1.4. Woreda setup

Total number of Mender (village)_____ Block(got)|_____

Woreda boundaries North_____South_____

East_____ West_____

10.1.5. Demographic information

Population: Total_____ Male_____ Female_____

Sex ratio_____

Under1yr_____1-4yrs_____5-15Yrs_____16-49yrs----------50-64yrs----------≥65years_____

Population pyramid type _____

Age category (year)	Sex (No.)			Remark
	Male	Female	total	
<1				
1-5				
6-14				
15-24				
25-34				
35-49				
50-64				
> 65				

Age distribution

Women 15_49 years of age_____ Total population by Kebele (each Kebele pop) _____

10.1.6. Ethnic

Oromo_____ (_____ %), Amhara_____ (_____ %),

Tigre_____ (_____ %), Garage_____(____%) Others_____ (_____ %)

Religion

Orthodox _____(_____ %), Muslim_____ (_____ %),

Protestant_____(_____ %) Other _____ (_____ %)

10.1.8. Economy (mainstay of the economy, average income levels etc.)

Main income sources

Different business_____(No.), Employee_____ (No.) Jobless_____ (No.)

Average income per HH/year_____

Education and school Health

Number of educational institution

College/ TVET_____, High school_____, Medium _____Elementary ___K.G.___ not attended formal education

School health activities:

Water supply: schools with water supply_____

Toilets: schools with functional latrines (male and female)_____

Schools with HIV/other Health clubs_____

	Government		Private			Remark
	Male	Female	Male	Female	Total	
Master and above						
Degree						
Diploma						
Certificate						
Supportive staffs						

Infrastructure for health Facilities (Transport, Telecommunication, Power supply, water supply…)

How many of the health centers have access to:

Transportation_____ (____ %), Telecommunication_____ (____%),

Electric power_____ (____ %), Water supply _____ (____%)

Character tics Frequency Percentage

Transport

Accessibility main road

Type of road

How many ketena access to transport

Flow of the transport per day

Telecommunication

How many people accessed to fixed telephone

How many people accessed mobile phone?(coverage)

How many satisfied with the telephone service?

Safe water coverage

Woreda getting safe water_____ (_____ %)

Population getting safe water_____(_____%)

Main source of water_____

Sanitation

Latrine coverage----------latrine utilization rate----------

Solid waste management----------liquid waste management----------

Other----------

Health delivery system

s.n	Type of Health facility	Government	Private	NGO	Total	Remark
1.	Health post					
2.	Health center					
3.	Medium clinic					
4.	Higher clinic					
5.	lower clinic					
6.	General Hospital					
7.	Referral Hospital					
8	Special clinic					
9	Cultural clinic					
10	Diagnostic laboratory					
11	Pharmacy					
12	Drug store					
	Total					

Health institution to population ratio:

Hospital: Pop_____ HC: Pop_____

Human recourse for health sector

S.n	Type of professional	Government	Private	Remark
1.	Specialist doctor			
2.	General practitioner			
3.	Health officer			
4.	Professional Nurse			
5.	Clinical Nurse			
6.	Public nurse			
7.	Laboratory technician/technologist			
8.	Pharmacist/Druggist			
9	Midwifery			
10	Radiologist			
11	Dentist			
12	Urban HEWs			
13	HEW supervisor			
14	Anesthetist			
total				

Nurse: pop. ratio Mid. Wife: pop. Ratio _____ Urban HEWs: pop. ratio_____

10.2.5. Top 10 causes of morbidity

S.N	Adult	# of cases	%	Pediatrics/ < 5 years	# of cases	%
1						
2						
3						
4						

5						
6						
7						
8						
9						
10						
	Total					

Top ten pediatrics causes of morbidity at OPD level

S.N	Adu lt	# of cases	%	Pediatrics/ < 5 years	# of cases	%
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
	Total					

Top ten of mortality table

S.N	Adu lt	# of cases	%	Pediatrics/ < 5 years	# of cases	%
1						
2						
3						

4						
5						
6						
7						
8						
9						
10						
	Total					

Vital Statistics and Health Indicators

Infant Mortality Rate (IMR) _____(total <1 yr deaths this 2016 yr_____)

Child Mortality Rate_____(this year's total <15 yr deaths_____)

Crude Birth Rate_____

Crude Death Rate_____ (total deaths 2016 yr____)

Maternal Mortality Rate_____ (2016 total maternal deaths_____)

Contraceptive Prevalence rate_____

Contraceptive acceptance rate _____

ANC rate (how many of the total expected pregnancies attended 1st ANC) _____

ANC rate (how many of the total expected pregnancies attended 4th ANC) _____

Percentage of deliveries attended by skilled birth attendants_____

How many post natal cares done----------

How many PNC done at facility level and home_____

10.2.7. Immunization Coverage (for children and Women);

BCG _____ (__ %). OPV0____ (____ %), OPV1_____(___%), OPV3_____(___%)

Measles _____ (___ %). Penta1_____(___%). penta2 _____(___%) penta 3_____(___%)

PCV-1_____(__%),PCV-3_____(___%),TT2+P.W_____(__%),TT2+ N.P.W_____(___%)

SIAs_____

10.2.8. Health budget allocation:

Government

Total budget allocated for the woreda _____

Total budget allocated for health _____(____%)

Funds from NGO

Total _____ (purpose/programs)_____

Emergency situation in the woreda

Was there any emergency (natural or manmade) in the woreda in the last one year?_____

Any recent disease outbreak/other public health emergency_____

If yes, cases_____ and deaths_____

Community Health Services;

Status of services provided by community health workers namely

No. of WDA _____

No. of 1to 25 WDA_____

No. of 1to 5 WDA_____

Status of Primary Health Care Components – with focus on the eight PHC elements and MDG.

MCH (Delivery, ANC, PNC)

_____

FP (Methods) _____

EPI (outreach service, cold chain, vaccine):

_____

_____

Environmental Health and sanitation

Latrine coverage_____ and utilization rate_____

Safe water supply coverage_____

others_____

Health Education (what, when, where, how and who conducted health education)

On what_____ When

_____

Where_____

How_____

Who conducted_____

Endemic diseases;

Malaria:

Total cases/yr_____ deaths/yr_____,<5yr cases_____ deaths_____

Malaria supplies (Coartem, RDT, etc) shortage _____

Other issues_____

TB/Leprosy

Total TB cases_____ PTB negative_____ PTB positive_____ Extra PTB _____

TB detection rate _____

TB Rx completion rate _____ TB cure rate _____

TB Rx success rate _____

TB defaulter_____

Death on TB Rx_____

Total TB patients screened for HIV_____

Total Leprosy cases_____ on Rx_____

HIV/AIDS;

Total people screened for HIV (HCT)(last one year)_____

HIV prevalence_____

HIV Incidence (new cases/yr)_____

Total PLHA_____

On ART_____ on Pre-ART_____

10.2.13. Nutrition (malnutrition related OTPs, SC, TSF activities)/HO and Early warning

Total OTP sites_____, total admissions to OTP/yr_____

Total SC sites,_____, newly opened/yr_____, total admissions to SC/yr_____

Is there TSF (targeted supplementary feeding) program in the woreda_____?

Essential drugs (shortage):-_____

Chapter v: Scientific Manuscript for peer reviewed journals

5.1 Surveillance Data Analysis on Measles in Kolfe keraniyo Sub city Addis Ababa city, Ethiopia from January, 2012-March, 2017

ABSTRACT

Title: SURVEILLANCE DATA ANALYSIS ON MEASLES IN KOLFE KERANIYO SUB CITY ADDIS ABABA TOWN, ETHIOPIA FROM JANUARY, 2012-MARCH, 2017.

Authors:

[1]Mideksa k., [2]Abiy G and[3] Ayele B

[1]resident at Ethiopia field epidemiology program, school of public health, Addis Ababa University

2. Emergency Technical officer, health security and emergency programme

Email/ abiygirmay@gmail.com/ girmaya@Who.int/

3. School of public health, collage of health science, Addis Ababa University, Ethiopia

Introduction: Analyses of surveillance data is important for detecting outbreaks and monitoring disease trends and evaluating the effectiveness of disease control programs and policies. Measles is one of the public health importance's among reportable disease under surveillance. We described measles by time, place and person to propose recommendation.

Method: Measles surveillance data was conducted in Kolfe keraniyo sub-city, Addis Ababa. We conducted the study in March 2017 by reviewing measles case based surveillance data recorded from January, 2012 to March 2017. Microsoft Excel version 2007 was used to analyze and summarize the data

Result from January, 2012 to March, 2017 a total of 294 measles cases were reported from 15 woredas. One to four years of age accounted for 89(30.3%), 165(56.12%) were 5-14 years of age and 40(13.6%) were 15-44 years of age. The median age of cases was 6 years while the youngest and the oldest suspected measles cases investigated were a 1 year child and 30 years old man. The most affected age group is 5-14 years (56.12%) followed by 1-4 years (30.3%). The leading woredas with large number of measles suspected incidence rate were woreda 9 (90.1), woreda 4(84.7) and woreda3 (48.5) respectively. Out of 294 reported measles cases only 8 %(23) cases were confirmed measles IgM, 22 %(64) were probable case and 70 %(207) were suspected cases. Female and male affected 51% and 49% respectively. High number of Measles cases was

reported in the year of 2012 and 2015. Regarding the vaccination status of the cases 110(37%) received one dose, two dose 45(15%), three dose 43(15%), unvaccinated 47(16%) and 49(17%) were unknown.

Conclusion: Higher number of measles cases was reported in 2012 and 2015, woreda 9 and woreda 4 were recorded higher cases. One to four ages group predominates among the reported cases. More case was seen among unknown vaccination status, unvaccinated and vaccinates only one dose.

Key words: description, measles, surveillance, data, kolfe keraniyo, Ethiopia.

INTODUCTION

Analyses of surveillance data is important for detecting outbreaks and unexpected increase or decreases in disease occurrence, monitoring disease trends and evaluating the effectiveness of disease control programs and policies. This information is also needed to determine the most appropriate and efficient allocation of public health resources and personnel. Analyses of surveillance data begins with characterizing the pattern of disease reports by person, place, and time. (1) Measles is one of the public health importance's among reportable disease under surveillance

Measles is a highly contagious and serious respiratory viral disease leads to serious illness, for lifelong complication and death(1)Measles vaccination programmes have contributed to a steep decline in the number of infections and deaths, but in 2014 measles still caused an estimated 114,900 death worldwide, mostly in low income countries. Case fatality is reported to be up to 6% in developing countries and especially high in infants and young children (3).

Method:

Study area: Measles surveillance data was conducted in Kolfe keraniyo sub-city, Addis Ababa. The study is conducted in Kolfe Keraniyo sub-city. Kolfe Keraniyo sub city is one of the ten sub city in Addis Ababa city administration.The sub city is bounded by Gulele and Addis ketema in the north, Lideta sub city in the east , Nifasilk –Lafto sub city in the south and Oromiya regional state of government the west . The sub city has 15 Weredas'. Kolfe keraniyo sub city in 2016 has a total population of 537023 from which 48% are males.

Study design: We conducted the study in March 2017 by reviewing measles case based surveillance data recorded from January, 2012 to March 2017. Microsoft Excel version 2007 was used to analyze and summarize the data

Data analysis: A descriptive record review analysis was made .All suspected measles cases that filled in case based reporting format obtained from all woreda and reported to sub city for laboratory confirmation and those epidemiologically linked from January, 2012 to March, 2017 GC, was used for analysis. Data was entered and analyzed using Excel Microsoft 7. Descriptive summary was used and presented by graphs.

Result: During the period of January, 2012 to March, 2017 a total of 294 measles cases were reported from 15 woredas of Kolfe Keraniyo sub cities out of which 89(30.3%) were 1year to 4 years of age. The median age of cases was 6 years and range between one and 30 years. The most affected age group is 5-14 years (56%) followed by 1-4 years (30.3%).

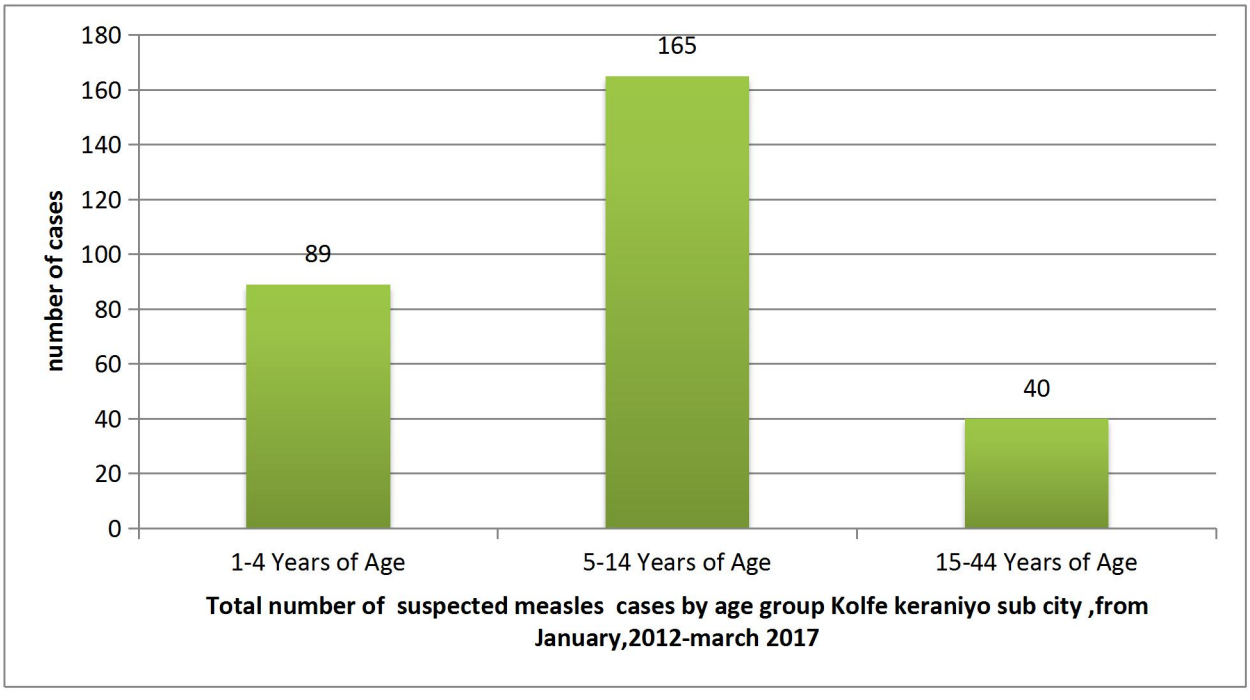

Figure 20 Total number of measles suspected cases by age group in kolfe keraniyo sub city from, Addis Ababa, 2012-2017.

The leading woredas with large number of measles suspected incidence rate were woreda 4 (90.1) with the age group of 5-14 years, woreda 9(77.8) with the age group 1-4 years

Table 23 total measles incidence per 100,000 populations by age group kolfe keraniyo sub city 2012-2017

Name of woreda	1-4 years	5-14 years	15-44 years	Total
Woreda 1	2.4	9.7	24.1	24.1
Woreda 2	12.3	9.2	-	2.3
Woreda 3	3.0	48.5	11.1	89.5
Woreda 4	33.3	84.7	36.3	72.6
Woreda 5	8.6	43.2	8.6	60.4
Woreda 6	21.0	27.9	10.5	59.4
Woreda 7	17.5	35.1	-	52.6
Woreda 8	33.6	52.1	6.1	90.2
Woreda 9	77.8	90.1	9.0	153.3
Woreda 10	6.7	6.7	3.4	16.8
Woreda 11	7.0	0	3.5	10.5
Woreda 12	0	44.6	4.5	49.0
Woreda 13	34.0	44.4	7.8	86.3
Woreda 14	18.7	37.4	-	56.1
Woreda 15	10.6	17.7	14.1	42.3

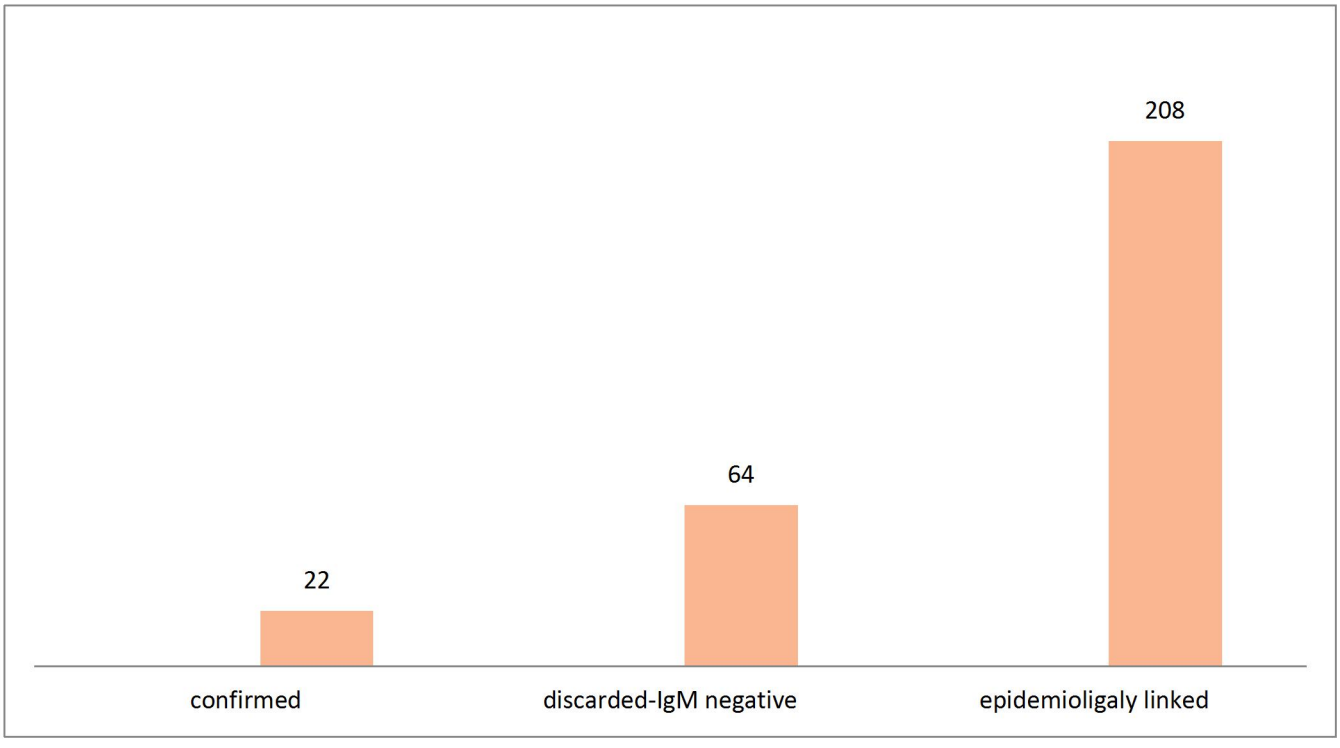

Figure 21 Measles cases by final classification

Female and males were nearly equally affected by measles in kolfe keraniyo sub city.

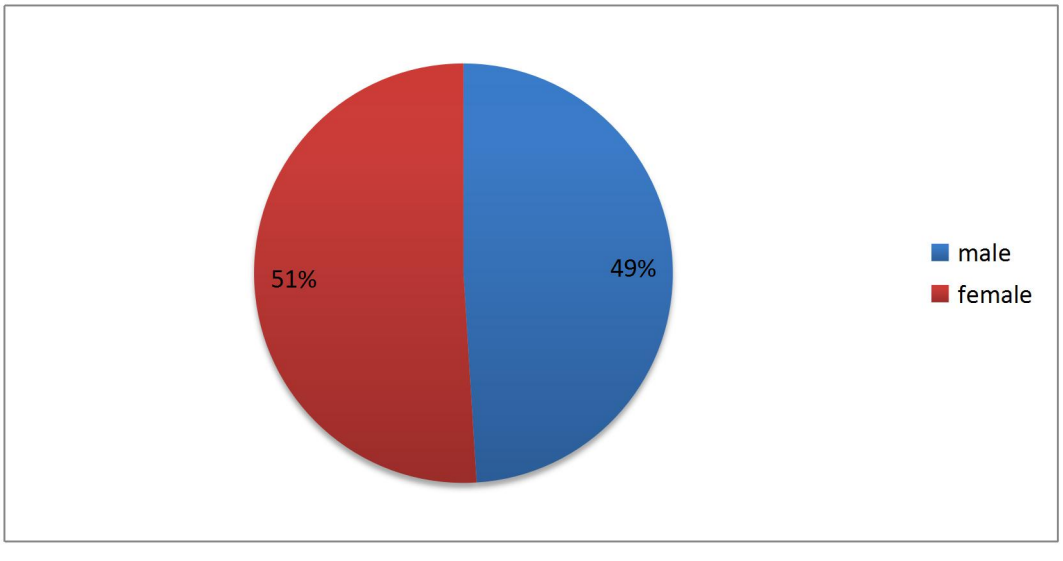

Figure 22 Distribution of measles cases by sex from January 2012-March 2017.

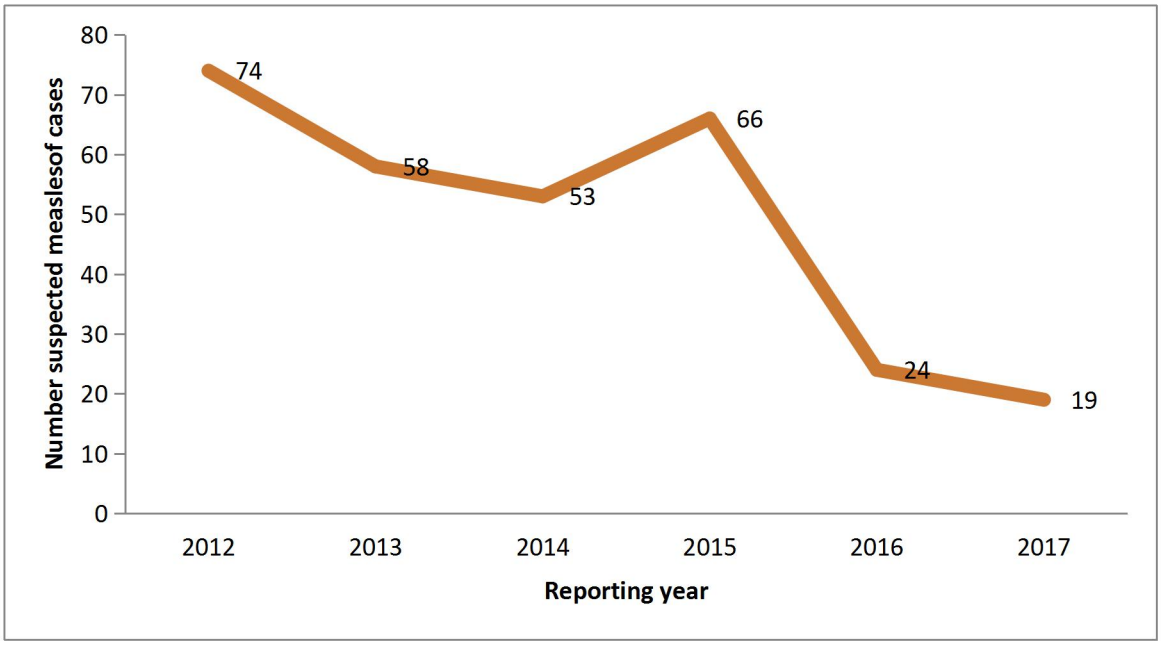

Figure 23 Trend of suspected measles cases, Kolfe Keraniyo sub city, from January 2012-March, 2017

Regarding the vaccination status of the cases 110(37%) of them vaccinated one dose, two dose 45(15%), three dose 43(15%), unvaccinated 47(16%) and 49(17%) were unknown.

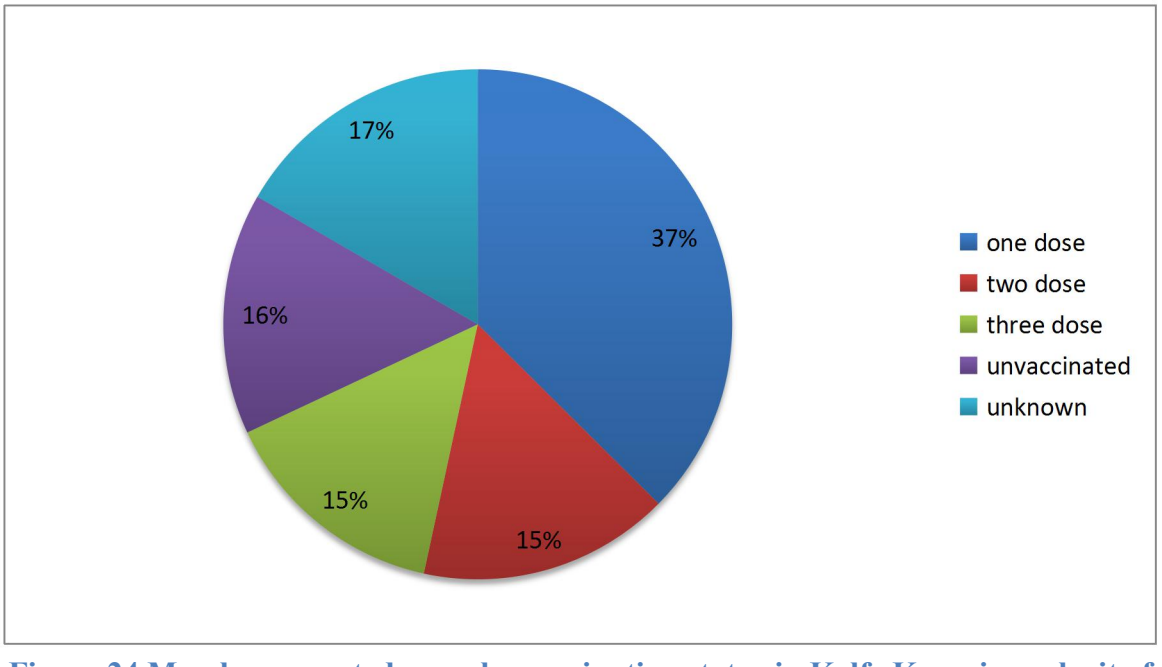

Figure 24 Measles suspected cases by vaccination status in Kolfe Keraniyo sub city from January, 2012-mar2017

Discussion

The suspected measles cases and incidence was varies from years to years, during the year of 2012 and 2015 there were an increment of measles suspected cases than the other years that are 2013,2014, 2016. The increment was seen on children 5-14 years and 1-4 years old children respectively. The increment might be due to unvaccinated status and one dose vaccination is because of no herd immunity developed. According study conducted in Ethiopia 2015 on review of Measles situation in Ethiopia; past and present a seasonal patterns of occurrence of measles has been observed over the years with increased number of cases during the late early part of the year (December to February) which is similar with our study (6).The analysis shows that male and female were almost equally affected and all age groups were affected having median age of 6 years. The study conducted in Malawi on measles outbreak indicates that male and females were equally affected which is supported my finding (7). The incidence is increase lower age group and decreasing in older age group children 1-4 years(42.1/100,000),5-14(18.7/100,1000),15-44 years (5.3/100,1000) in my study there is also 1-4 years of age (16.9/100,000),5-14 years(31.5/100,0000) and 15-30 years were(7.6/100,000) which shows as age increase the incidence decrease. Among the 294 suspected measles cases 110(37%) were took one dose of measles vaccine, 47(16%) were took two measles vaccine dose, 43(15%) were took three measles vaccine dose, 45(15%) were unvaccinated and 49(17%) were unknown vaccination status, in addition to this highest number of cases were reported from Woreda 9 and the least were from 12.

Conclusion

Higher number of measles cases was reported in 2012. Woreda 9 and Woreda 4 were the highest cases. Measles affected mostly children between 1 to 14 years old. Children unknown vaccination status, unvaccinated and vaccinated only one dose are mostly affected by measles.

Recommendation

- Routine immunization should be strengthened especially the age group under 15 years of should be targeted for SIA campaign by woredas and kolf keraniyo sub city.
- All variables should be filled properly in order to analyze surveillance indicators properly.
- A farther study is needed why the reporting is not sending timely and incompleteness
- Soft copy report format must have important variables which is very important for meaningful data analysis.

Acknowledgment

I would like to thank the assistance of many helping hands. I would like to express my deep gratitude to Kolfe keraniyo sub city health office staffs for their valuable cooperation and magnanimous hospitality. Special thanks go to my mentors Dr. Ayele Belachew and Dr.Aabiy Girmay for every support.

Reference

1.T Woudenberg 1 2 RvB, EAM Sanders 1 2 , J Wallinga 1 3 , HE de Melker , WLM Ruijs 1 , SJM Hahné . Large measles epidemic in the Netherlands. 1 National Institute for Public Health and the Environment (RIVM), Bilthoven, the Netherlands

2 University Medical Center Utrecht, Utrecht, the Netherlands

3 Leiden University Medical Center, Leiden, the Netherlands. May 2013 to March 2014: changing epidemiology;2014: changing epidemiology. Euro Surveill. 2017;22(3):pii=30443. DOI

4 . world health orginazation .measles fact sheets data.http://**www.measlesrubellainitiative.org, 2015.**

5 . Alberta Health Public Health Notifiable Disease Management Guidelines November 2013

6. Habtamu Belete Akalu Review on Measles Situation in Ethiopia; Past and Present 2015

7. Minetti A, Kagoli M, Katsulukuta A, Huerga H, Featherstone A, Chiotcha H, et al. Lessons and challenges for measles control from unexpected large outbreak, Malawi. Emerg Infect Dis. 2013;19(2):202–9.

Chapter VI: Abstract for Scientific Presentation

6.1 Description of Five Years Measles facility report in Kolfe Keraniyo Sub city from January, 2012-March, 2017

[1]Mideksa k.[2]Abiy G. [3]Ayele B.

1. School of public health, collage of health science, Addis Ababa University, Ethiopia.

2. Emergency Technical officer, health security and emergency programme

Email/ abiygirmay@gmail.com/ girmaya@Who.int/

3. School of public health, collage of health science, Addis Ababa University, Ethiopia

ABSTRACT

Background: Analyses of surveillance data is important for detecting outbreaks and monitoring disease trends and evaluating the effectiveness of disease control programs and policies. Measles is one of the public health importance's among reportable disease under surveillance. We described measles by time, place and person to propose recommendation.

Method: Measles surveillance data was conducted in Kolfe keraniyo sub-city, Addis Ababa. We conducted the study in March 2017 by reviewing measles case based surveillance data recorded from January, 2012 to March 2017. Microsoft Excel version 2007 was used to analyze and summarize the data

.**Result** from January, 2012 to March, 2017 a total of 294 measles cases were reported from 15 woredas. One to four years of age accounted for 89(30.3%), 165(56.12%) were 5-14 years of age and 40(13.6%) were 15-44 years of age. The median age of cases was 6 years while the youngest and the oldest suspected measles cases investigated were a 1 year child and 30 years old man. The most affected age group is 5-14 years (56.12%) followed by 1-4 years (30.3%). The leading woredas with large number of measles suspected incidence rate were woreda 9 (212.9), woreda 4(147) and woreda14 (57.2) respectively. Out of 294 reported measles cases only 8 %(23) cases were confirmed measles IgM, 22 %(64) were probable case and 70 %(207) were suspected cases. Measles cases were almost equally distributed between female and male51% and 49% respectively. High number of Measles cases was reported in the year of 2012 and 2015. Cases were reported in all months in the specified period with the highest peaks in the first quarters (January to March) of each year. During the 5 years period suspected measles cases were reported in almost every months of the years and seasonal variation observed with peaks in the first quarter (January to March second quarter May and last

quarter (October to December).Regarding the vaccination status of the cases 110(37%) received one dose, two dose 45(15%), three dose 43(15%), unvaccinated 47(16%) and 49(17%) were unknown.

Conclusion: Higher number of measles cases was reported in 2012 and 2015, Woreda 9 and Woreda 4 were higher cases. One to four ages predominates among the reported cases. More cases were Children with unknown vaccination status, unvaccinated and vaccinated only one dose. All suspected cases of measles were not reported with case based. Important variable were missed

Key words: description, measles, surveillance, data, kolfe keraniyo, Ethiopia.

Chapter VII- Protocol/Proposal for Epidemiologic Research Project

7.1 Assessment of Incomplete Immunization and associated factors among Children age 12-23 month in Kolfe-keraniyo sub city Health centers, Addis Ababa, Ethiopia, 2018

Introduction

Background

Immunization is an effective public health intervention to reduce morbidity and mortality among children and it will become more effective if the child can receive the full course of the recommended immunization doses (1).

All countries have national immunization programmes, and in most developing countries, children less than five years old are immunized with the standard WHO recommended vaccines that protect against tuberculosis, diphtheria, and tetanus ,pertussis, polio, measles, hepatitis B(HepB) and homophiles influenza(Hib) rotavirus , pneumococcal conjugate vaccine(PCV) . These vaccines are preventing more than 2.5 million child deaths each year(2).

Thus in Ethiopia expanded program on immunization (EPI) was initiated in 1980. The objective of national immunization policy was to reduce mortality and morbidity in children from EPI target disease through the immunization of all children less than the age two in the first five year. But later after 1986 it was revised to focus children under one year of age in order to the child exposure time to natural infection. The program had been planned to make immunization service available to 10% each year and reach to 100% coverage and also Ethiopian immunization implementation guideline has been revised in 2015.Children of under –one year of age and women of reproductive age group (15-49 years age) are the targets for currently available EPI vaccine in Ethiopia(BCG, Measles, DPT-HepB-Hib or penta-valent , Rota virus, Pneumococcus vaccine (PCV), OPV and TT)(3).

Ethiopia achieved the MDG4 of reducing under –five mortality by 2/3 from the 1990 baseline in 2012 before 2015 target year. The under –five and infant mortality rate in 2014 were 64 and 44 per 1000 live birth respectively(3). Children are the most vulnerable segment of the population but many of the ailments that cause death in this population can be avoided by completion of routine child hood vaccination.

Statement of the problem

According to the national health and demographic survey of Ethiopia 2016, the total penta3and measles coverage was 53% and 54% respectively. Regionally, children with full vaccination coverage range from a high of 89% in Addis Ababa and 76% Diredawa to a low of 15% in Afar and Somali 22 %(4).

In Ethiopia, low access to immunization service, in adequate awareness of caregivers, and high dropout rate are major factor contributing to low immunization coverage (5)

In kolfe keraniyo immunization coverage from routine reports showed that higher in woreda 9 than other - woredas. According to 2017 annual immunization report 90% of children were fully immunized and dropout rate was 5% but fully immunized children were 88% for kolfe keraniyo sub city and dropout rate was5% and 20% for pental1 to penta3 and measles respectively.

Therefore the aim of this study will be to assess level of incomplete immunization & associated factors among children 12-23 months of age in kolfe keraniyo sub city Addis Ababa town and to generate data that could be used for better planning and strengthening immunization service(6)

Significance of the study:

Kolfe keraniyo sub city is one of the largest sub cities in terms of the highest number of population as compared to other sub cities. Hence, it has a high reliability of data collection which a general population of other sub cities can be inferred from.

Un described population immunization status maybe exists when there is insufficient data available to make a decision on potential health problems. Hence, the importance of this study can be seen in diverse ways. Provide guidance of establishing evidence-based decision making for effective immunization status programme & what action would be required. Also, provides up to date information important to formulating immunization policies & strengthening existing a regulatory frame work aimed at protecting the health of children as well population.

Besides, serving as important references by adding value of existing literature on expanded programmed on immunization & assist teaching learning process of in development related discipline like field epidemiology. It could also provide bases of other regions in Ethiopia to adopt the recommendations information of effective immunization measure in their institutions as well. This study also helps for children, health institutions, educational centers, policy maker & ministry of health to see the gap & to address the problem & reduce vaccine preventable disease.

Literature review

Childhood vaccination is one of the most cost effective public health interventions to reduce child morbidity and mortality. Globally it is estimated that about 22.6 million children under one years of age were partially protected. One out of five infants worldwide does not receive three life-saving doses of the diphtheria, tetanus and pertussis vaccine (7)

EPI target disease

The EPI has 10 most common vaccine preventable disease which greatly affects the children .these include tuberculosis , measles , poliomyelitis(OPV), whooping cough, diphtheria and tetanus(DPT), HepB, invasive Hib disease(HepB), Rotavirus, pneumococcal conjugate vaccine(PCV)(4)

Ethiopia, vaccination is given on routine and outreach bases. Routine vaccinations services are given starting from birth, should be completed one year of life by all children.BCG and OPV0 are administered at birth, while three doses of OPV and pentavalent vaccine are given at interval of four week of duration; at 6, 10, and 14 weeks, and measles vaccine is given at the age of nine months. If the children did not start immunization at birth the first dose will be give at the 6^{th} week and the child will not take OPV0 vaccine(8)

Immunization coverage in Ethiopia

Data sources for immunization coverage in Ethiopia are obtained from the ministry of health and surveys. According to the national demographic and health survey of Ethiopia 2016, the total penta3 and measles coverage was 53% and 54% respectively. Close to two in every five children age 12-23 months (39%) received basic vaccination at some time and 22% were vaccinated at the appropriate age.

Factors affecting immunization status of children

Various socioeconomic and demographic factors may influence immunization coverage of children .Maternal characteristics, sex of child and birth order of the child, place of delivery and antenatal care (ANC) follow up, household income /economic status, knowledge about immunization and residence are the main factors associated with immunization coverage among children(6)

Objectives

General objective: To assess level of incomplete immunization and associated factors among children aged 12-23 month in kolfe keraniyo sub city, Addis Ababa town Ethiopia.

Specific objective:

To determine the magnitude of incomplete vaccination among children aged 12-23 months

To asses factors associated with incomplete vaccination among children aged 12-23 months

To give recommendation based on finding

Method and materials

Study area

The study is conducted in Kolfe keraniyo sub-city. Kolfe keraniyo sub city is one of the ten sub city in Addis Ababa city administration. the sub city is bounded by Gulele and Addis ketema in the north, lideta sub city in the east , Nifasilk –Lafto sub city in the south and Oromiya regional state of government the west . The sub city has 15 Weredas'. Kolfe keraniyo sub city in 2017(estimated from 2009 population census) has a total population of 544200 from which 48% are males and 52%females

Study period: study will be conducted from July 1, 2018-20, 2018.

Study design: Two stages Epi cluster survey method will be used .woredas are the sampling units for the first stage and households are the sampling units for the second unit. To perform PPS sampling, first we need a listing of every woreda and estimate of its population size then cumulate the population size from woreda to woreda. Calculate sampling interval by dividing the total population by the numbers of woredas to survey. Use random number between one to sampling interval by using a random number table. Continue to select woredas by adding the sampling interval cumulatively to identify 2nd, 3rd and …..n

Source population: All household with children of 12-23 moths residing in kolfe keraniyo sub city.

Study population: The study population of this will be all children in the age group of 12-23 months of age living within eligible household in randomly selected woreda in the sub city mother's /care givers will be also studied about their knowledge on the child immunization.

Sample size determination:

Sample size was determined using single population proportion formula with an assumption of incomplete immunization among children 12-23 month revealed that 30% used, with 5% degree of precision, Zα/2 was a standard Z score & 1.96 corresponding to 95% CI the sample size was calculated.

$$ni = \frac{(Z\alpha/2)2\ p\ (1-p)}{d2}$$

$ni = (1.96)^2\ 0.3(1-0.3)/(0.05)^2 = 322$

$$n\ f = \frac{ni}{1 + (ni/N)}$$

$= 322/1+322/12{,}029 = 314$

Note: p= prevalence of incomplete immunization (from previous findings)

nf= final sample size

ni= initial sample size

N= Total population

Sampling procedures:

In order to create a sampling frame: all 15 woreda will be registered .households in each woreda will be registered. No inaccessible areas in the sub city. So all listed woreda will be included in the study. We will take each woreda as a unit from which each woreda will be selected based on the probability population size. Based on this calculate the sampling interval; and each cluster will have chance on the calculate cumulative population. We will divide the total population of the woredas12029 by the 15 woreda to be selected to obtain the sampling interval. To select the starting household, the initial house hold will be selected randomly. For each household if there is more than one eligible child in the household, we will collect data on the youngest eligible child only. To collect data we will use the child immunization card, history from mothers/caregivers and BCG scar.

Study variables

Dependent variable

Immunization status of children aged between 12-23 months

Independent variables

Socio demographic characteristics of mothers/caretakers: age, sex, religion, educational status, income, marital status, occupational status, residence

Sex of child

Knowledge of mothers/care takers

Family size

Number of child ever born

Experience of child death

Time of travel to reach the nearest health facility

Place of delivery

Maternal tetanus toxoid immunization

ANC follow up

Data collection

Data on immunization history will be collected in two ways based on the availability of immunization card and mothers/care takers verbal report. After a child age between 12-23 months will be identified from the house hold. Mothers/care takers of the child will be asked for the presence of child immunization card. For the child with immunization card the information on the doses and types vaccine received by the child will copied from the card. If immunization card will not available for the child the mothers/care takers will be asked for immunization history. The number of doses the child took and how (the route of vaccine administered) will be asked. Information on other variables asked directly from child mothers or care givers.

Training of data collectors and pre-testing:-five data collectors and one supervisor will be recruited and give two days training before data collection. Pre-test will be given before data collation.

Data quality control

The questionnaire for the study will be adopted from prior researches and developed according to local context. Both data collectors and supervisor will be checked whether fill data properly ever day for data completeness.

Operational definition

Incomplete immunization- the child immunization status if the child missed at least one EPI target disease that can be prevented by immunization

Complete (full) immunization – children are considered as fully vaccinated when they have received a immunization against tuberculosis (BCG), three doses of each of the DPT and polio vaccines and measles vaccination by the age of 12 months.

Dropout rate –the percent of children who received the initial vaccine BCG or pentavalent1 but not final vaccine (pentavalent3 or measles.

Literate: mother's with formal education or able to read and write.

Penta1 to penta3 defaulter rate: the percent of children vaccinated for pental who defaulted for penta3.

Penta1 to Measles defaulter rate: the percent of children vaccinated for pental who defaulted for measles.

Inclusion and exclusion criteria

Inclusion criteria

Households with at least one living children of age between 12-23 months will be eligible for the study.

in case of two or more children the youngest child by age will be selected and in case of twin both children will be included.

Exclusion criteria: households without children between 12-23 months will be not included.

Data processing and analysis

Data will be coded and entered in to computer by using EPI Info version 7.2 for analysis**.**

Ethical clearance

Ethical clearance for the study will be obtained from Addis Ababa University School of public health review board. And official support letter from the school of public health will be written to kolfe keraniyo sub city health biro. Data collection will be undertaken after permission is obtained

Dissemination of the results

The finding of the study will be submitted to school of public health at Addis Ababa University**.** The study will also be submitted to the kolfe keraniyo sub city health office. The finding will also be presented for different work shop and seminars.

WORK PLAN

No	**Activities**	**February 1-30**	**march**	**April**	**May**	**Jun**	**July**	**august**
1	Final proposal writing and submission for the EFELTP coordinator.							
2	Ethical clearance							
3	Recruitment and training of data collectors							
4	Pre testing							
5	Data collection							
6	Data entry and cleaning							
7	Data analysis							
8	Report writing							
9	Presenting report to kolfe keraniyo sub city health office.							
10	Presenting abstract to sub city health office, FMOH and AFENET conference							

BUDGET PROPOSAL

Activities	Quantity	Rate pay/day ETB	Duration of work day	PRICE(ETB)	
				EACH	TOTAL
personnel(predim) Training and pre test					
1.Trainees	6	200	10	200	1200
2.pricipal investigator	1	300	3	300	900
3.supervisors	1	300	3	300	900
4Tea/Coffee for trainee	8	50	3	50	1200
Data collection					
1.Data collectors	6	200	10	200	12000
2.Pricipal investigator	1	300	10	300	3000
3.Superviser	1	300	10	300	3000
4. Transport cost	8	100	10	100	8000
Personnel total					**19,400**
C .Equipment and supplies					
Item	**Unit**	**Quantity**		**Price**	**Total**
Pen	Each 8			5	40

2 .Pencil	Each	8		3	24
Eraser	Each	8		5	40
Sharper	Each	8		10	80
Note book	Each	8		12	60
6 .CD recorder	Each	8		10	80
7. Mobile card	Each	8		100	800
8.Paper	box	6		120	720
9.Stepilor	Each	1		100	100
Total					1,744
Grand total					21,144

References

1. Melaku K, S. Y, A. H. Factors Associated With Incomplete Childhood Vaccination among Children 12-23 Months of Age in Machakel Woreda, East Gojjam Zone: A Case Control Study. Journal of Pregnancy and Child Health. 2015.

2. Coverage WUEoNI. Progress and Challenges with Achieving Universal Immunization Coverage: 2016 Estimates of Immunization Coverage. 2017:1-9.

3. IMMUNIZATION ENEPO. COMPREHENSIVE MULTI-YEAR PLAN 2016 - 2020 Federal Ministry of Health, Addis Ababa. 2015:1-10COMPREHENSIVE MULTI-YEAR PLAN 2016 – 20 Federal Ministry of Health, Addis Ababa.

4.Central Statistical Agency (CSA) [Ethiopia] and ICF EDaHS, Addis Ababa E, and Rockville, Maryland, USA: CSA and ICF. Ethiopia Demographic and Health Survey 2016. 2016.

5. M. RT. Assessment of Factors Associated with Incomplete Immunization among Children. 2015.

6. A. A. Compiled Body of Works in Field Epidemiology. 2013:149.

7. Melaku K, A. H. Factors Associated With Incomplete Childhood Vaccination amongChildren 12-23 Months of Age in Machakel Woreda, East Gojjam Zone: ACase Control Study. Journal of Pregnancy and Child Health. 2015.

8. UNICEF Wa. Ethiopia: WHO and UNICEF estimates of immunization coverage. 2016.

Annex 6 data collection tools for Immunization assessment

1. Child birth date day month year/

Or Age of child in months_____

2. Sex of the child 1= male 2= female

3. Number of children's older siblings_____

4. Family size_____

5. Mother's age _____

6. Mother's marital status

1= single 2= married 3= separated 4= divorced

5= widowed

7. Mothers educational status

1=illiterate 2=read and write 3= grade 1-8 4= grade 9-12

5=college/university

8. Number of children ever born by the mother_____

9. Number of children alive _____

10. What is occupation of the mother?

1= House wife

2=government employee

3=merchant

4= daily laborer

5= others, specify_____

11. What is your family monthly income per month? _____

12. Ethnicity

1=Oromo

2=Amhara

3=Tigre

4=Others

13. What is your religion?

1=orthodox

2= protestant

3=catholic

4= Muslim

5= other specify_____

14. Have you attended antenatal care during your last pregnancy?

1= Yes 2= No

15. If yes, how many times did you attend? _____

16. Have you received tetanus vaccination during your last pregnancy?

2=Yes 2= No

17. If yes, how many injections did you received? _____

18. Where did you deliver your last baby?

1= at home

2= at health institution

3=other_____

Access to vaccination service

19. Is there any health facility which vaccination service near to you?

1=Yes 2=No

20. If yes to above question which health facility is near to you?

A. health center

B. hospital

C. health post

D. private clinic

21. 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

22. Do you heard about vaccination and vaccine preventable disease?

2=Yes 3=No

23. If yes to above question, from where do you heard about the vaccination and vaccine preventable Disease?

1=Radio

2=Television

3= from friends/peers

4=from school

5=Health personnel

6=other, specify _____

24. Do you mention the objective of vaccinating a child?

1=to prevent the disease

2=for specific disease

3=for child health

4=don't know

5=other, specify _____

25. How many vaccine preventable diseases do you know?_____

a. Measles

b. Tetanus

c. Pertusis

d. Tuberculosis

e. Diphtheria

f. Polio

g. Hepatitis b

h. Homophiles influenza b

26. How many vaccination sessions are needed for a child to be fully protected?

2= one

3= repeated

4= five

5= don't know

27. Do you tell me the age at which the child begins immunization?

1= just after birth

2= one month after a birth

3=any time

4=after one year

5= I don' know

6=other specify_____

28. At what age the child should complete immunization? _____

29. Do you think vaccination will make your child sick?

1= Yes 2=No 3= don't know

30. Do you bring a sick child for vaccination?

1=Yes 2=No

31. Does your child take any vaccination?

1=Yes 2=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		
Penata valent 1		
Pentavalent2		
Pentavalent3		
Measles		
Rota virus		

PCV		

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 63

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?

1= Yes 2=No 3= don't know

36. Please tell me if the child had any of the following vaccinations

a. A BCG vaccination against tuberculosis, that is, an injection in the arm or shoulder that usually causes a Scar

Yes____ No_____

b. Polio vaccine, that is, drops in the mouth?

Yes_____ No_____

c. Was the first polio vaccine given in the first two weeks after birth or later?

Yes_____ No_____

How many times was the polio vaccine given _____

d. A pentavalent vaccination, that is, an injection given in the thigh or buttocks?

Yes_____ No_____

How many times pentavalent vaccination is given? _____

e. 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? Yes_____ No_____

f. Does the child have a BCG scare on his/her upper left arm? Observe Yes__ No ___

If the child does not receive any vaccination ask the following

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

f. Not knowing whether to come back for second and third vaccination

g. Others