

Compiled Body of Works

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



Ethiopia Field Epidemiology Training Program (EFETP)

Compiled Body of Works in Field Epidemiology

By

Ashenafi Ayalew

Submitted to the school of Graduate Studies of Addis Ababa University in partial fulfillment for Degree of Masters of Public Health in Field Epidemiology

May 1, 2015

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Field Epidemiology and Laboratory Training Program (EFELTP)

School of Public Health, College of Health Sciences

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List of abbreviations

AFENET	African Epidemiological Network
AFP	Acute Flaccid Paralysis
AIDS	Acquired immune-Deficiency Syndrome
ANC	Antenatal care
AR	Attack rate
ARSHB	Amhara Regional States Health Bureau
ART	Anti-Retroviral Therapy
ARV	Anti-retroviral Drug
BCG	Bcillus Calmette Gu'erin.
BGRHB	Benshangule Gumeze Regional Health Bureau
CAR	Contraceptive acceptance rate
CDR	Case detection Rate
CFR	Case Fatality Rate
CSV	Comma separated Values
DOR	Dropout rate
EDHS	Ethiopian Demographic and Health Survey
EFETP	Ethiopian Field Epidemiology Training Program
EFY	Ethiopian Fiscal Year
EPHA	Ethiopian Public Health Association
EPHI	Ethiopian Public Health Institution
EPI	Expanded Programme of Immunizations
EPRP	Epidemic Preparedness and Response Plan

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ESDP	Education Sector Development Program
ETB	Ethiopian Birr
ETF	Ebola Task Force
EVD	Ebola Virus Disease
FMOH	Federal Ministry of Health
GIS	Global Information System
HAD	Health Development Army
HC	Health Center
HEW	Health Extension Worker
HHs	House holds
HIV	Human immune deficiency virus
HMIS	health management information system
HSDP	Health Service Development Program
IgM	Immunoglobulin M
IMNCI	Integrated management of neonatal & childhood illnesses
IRC	International Rescue Committee/IRC
IRS	Indoor Residual Spray
LLINS	Long lasting Insecticide Nets
Maltra	Malaria and Trachoma
MDG	Millennium Development Goals
MIS	Malaria Indicator Survey
NGOs	Non-Governmental Organizations
NMR	Non measles rash
OPD	Out Patient Department
OPV	Oral Polio Vaccine
PHEM	Public Health Emergency Management
PHEMC	Public Health Emergency Management Committee
PHEMC	Public Health Emergency Management Committee
PIHTC	Provider Initiative HIV testing and Counseling
PMTCT	Prevention of Mother to Child Transmission
PNC	Post-natal care
PPE	Personal Protective Equipment
PPS	probability proportional
RDT	Rapid Diagnostic Test
RHB	Regional Health Bureau
RI	Routine Immunization
SAM	Severe Acute Malnutrition
SIAS	Supplementary Immunization activities
SOPs	Standard Operating Procedures
SPSS	Statistical package social sciences
TB	Tuberculosis

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TFP	Therapeutic Food Program
TOR	Term of Reference
TVET	Technical Vocational Education Training
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
VCT	Voluntary Counselling & Testing
VE	Vaccine Effectiveness
WHO	World Health Organization
WorHo	Woreda Health Office
yrs	Years
ZHD	Zonal Health Department

Executive Summary

Field Epidemiology training in Ethiopia was started in 2009 to produce competent and skillful Epidemiologists, cadres of PHEM officers who promote and assist evidence-based decision making.

The program is quite different from traditional epidemiology; unlike other public health students, the residents of field epidemiology spend 75% of the two year study period in different field sites so that they can practically apply what they learned in the class and become acquainted with how the system is functioning and what the existing gaps are that hamper the proper functioning of the system. In doing so, they have a chance to apply their knowledge and skill.

During my two year stay in the program I have accomplished a lot .Almost all of my outputs had been conducted in Amhara National Regional States.

My first measles outbreak investigation was conducted in Bugna Woreda, North Wollo zone .A total of 73 measles cases with equal number of neighborhood controls were enrolled in the study .The majority of the cases 67 (92%) were unvaccinated and most cases aged 15-44 years, who accounted for 47 (64%) of the total cases .The second outbreak was also measles which was conducted in Gonji Kolela Woreda, West Gojam zone .I similarly conducted a case control study.

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A total of 162 study subjects (54 cases and 108 controls) were enrolled; the highest proportion of cases were among those individuals aged 1-4 years, who accounted for 48 (87%) from the total.

The majority of the cases .The majority of the cases were unvaccinated; 40 (73%) of the total cases.

Surveillance data analysis was conducted in West Gojam Zone between 2009 and 2013; we also tried to map the risk for measles outbreak using the susceptible size .The median measles incidence was 5/1000 risk population. The proportion of susceptible in all woredas was found to be 3% and above .Four woredas (Yilma ena Densa, Mecha,Dega Damot and Jabitehna) accounted for for 45267 (41%) total susceptible in the zone .

Surveillance Evaluation was conducted in three woredas of Oromia Zone namely Artuma Fursi, Dewachefa and Jile Timuga .The AFP surveillance was evaluated as a proxy for the rest of the surveillance system .It was found that the surveillance was sensitive and also accepted by the workforce. The system lacked representativeness (facility based) and also suffered from absence of incessant supportive supervision which in turn affects the stability of the system.

I conducted health profile assessment in Artuma Fursi Woreda. Though the primary health coverage was good ,the performance of key interventions was not satisfactory regarding attaining what has set in Health Service Development program .Low skilled delivery, high dropout rate (measles and pentavalent) ,Antenatal care (four)and availability of human resource according to the standard were the critical ones .

The Belig Assessment was conducted in four woredas: Lasta, Guba Lafto, Wadila and Meket, North Wollo zone .Although there is prevailing food security problem the Woredas had neither Emergency preparedness plan nor functional Public Health Emergency Management Committee.

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I also prepared an Epidemiological research proposal entitled contributing factors for low IRS performance and the practice and perception of health workers on malaria surveillance. The study will be conducted in Jile Timuga Woreda Oromia Zone .The proposal will be submitted for funding.

Two abstracts: Measles outbreak investigation conducted in Bugna and surveillance data analysis were submitted to Epidemiology and Public Health Interventions Network (TEPHINET) conference the status is pending. Manuscript was also prepared though it has not yet been submitted to a publisher.

Apart from the above mentioned I was actively involved in supporting the EVD preparedness undertakings in one of the land ports in the country Kurmuk, Benshangule Gumeze Regional States and also involved in numerous tasks in my filed base these include: planning, coordinating and supporting measles vaccination campaigns (outbreak response), malaria trachoma campaign, and participating in different core functions of PHEM. The following body or work details all of the above activities.

Chapter I – Outbreak/Epidemic Investigations

1.1 Measles outbreak investigation -Bugna, Ethiopia, 2014

Abstract

Background: Measles is one of the most infectious human diseases. It caused millions of deaths worldwide, yearly in the pre-vaccination era. During this era more than 90% of the persons were infected at the age of 10 years. In January 2014 suspected measles outbreak was reported from Bugna Woreda. Our objective was to determine the existence of an outbreak, identify the risk factors and to propose containment measures.

Method: We conducted a descriptive and a case control study (unmatched); a case was defined as any person with fever, maculopapular rash, and one of the following: cough, coryza and conjunctivitis. All (73) cases were compared with equal number of neighbor controls. Five specimens were collected and sent to central laboratory. We interviewed the participants, reviewed reports and conducted rapid convenience survey to measure the immunization coverage in the kebele. We ascertained the vaccination status through history and card. We performed univariate and bivariate analysis. We computed odds ratio, attack rates and preventable fraction of vaccination. The chi-square test statistic was used.

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Result: From the total 73 cases; 57 (78%) aged greater than five years. Sixty-seven (92%) cases of total 73 were unvaccinated of whom three (4%) of total 67 unvaccinated cases were ineligible¹ for routine immunization. Four of five tested specimens were positive for measles IgM. Among 110 children (<5yrs) found during door to door survey, only 73 (66%) had a history of measles vaccination. The administrative coverage was >90%. Having contact with a measles cases (OR=2.3, 95% CI (1.18-4.48) and those traveled to places where measles cases reported (OR=12.5, 95%CI (2.7-113.5). Being vaccinated was a protective factor (OR =0.13; (95%CI (0.036-0.467). The vaccine efficacy was calculated to be 75%.

Conclusion: Unvaccinated people who made contact with measles cases and those who traveled to areas where the measles was reported had a higher risk of contracting the measles. The reported vaccination coverage may be different from the actual. We recommended improving measles vaccination and further immunization surveys.

¹ Measles vaccination(routine and SIAS) in Africa starts

Introduction

The measles virus is highly infectious and, in the pre vaccination period, >90% of individuals were infected by the age of 10. (1). In 2011, there were 158000 deaths globally, which is estimated to be 430 and 18 deaths in each day and hour respectively. More than 95% of the deaths occur in low income countries (2). Accelerated immunization activities have had a major impact on reducing measles deaths (3). Since 2000, more than one billion children in high risk countries were vaccinated against the disease through mass vaccination campaigns. Global measles deaths have decreased by 71% despite this global progress, some populations remain unprotected (3). Outbreaks can occur in populations in which fewer than 10% of people are susceptible (4). In 2011, an estimated 20 million children worldwide did not receive the first dose of vaccine (3). More than half of these children live in five countries: the Democratic Republic of the Congo, DRC) (0.8 million), Ethiopia (1 million), India (6.7 million), Nigeria (1.7 million) and Pakistan (0.9 million) (3).

In Africa before the introduction of measles vaccination, measles was primarily a disease affecting young children and one million cases were reported annually (5) It is estimated that about 28000

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measles- related deaths occur in Africa each year (6) several sub-Saharan African countries experienced measles outbreaks, with more than 199, 000 cases officially reported to WHO in 2010, and more than 194,000 in 2011 (7).

Measles is one of the communicable diseases that is still causing mortality and morbidity in Ethiopia (8). In 2010, the country was among the eleven World Health Organization (WHO) member nations which reported a measles incidence rate of 5-10/1000000 risk population which is the highest measles incidence rate in the horn of Africa (9). In 2011 there was a large outbreak in the country with a total of 3255 cases (3)

Measles is one of the priority diseases and events that are reportable in Public Health Emergency Management (PHEM) system of the country. It was on January 23, 2014 that Amhara Regional State Health Bureau PHEM core process received a suspected measles outbreak report from North Wollo Zonal Health Department PHEM case team through the routine weekly surveillance report. The Early warning officer called the Zonal Health Department to verify the report .He verified that all of the reported cases were from one kebele, Kuwaro of Bugna Woreda .On the next day we arrived at Bugna Town, the capital town of the woreda and began our investigation after we had made discussion with the Woreda Rapid Response Team.

General objective: To determine the existence of outbreak, identify the potential risk factors of measles outbreak and guide prompt containment actions.

Specific objectives:

- ✓ To confirm the existence of an outbreak
- ✓ To characterize the extent of the outbreak in terms of place, person and time
- ✓ To identify the cause and contributing factors

- ✓ To propose appropriate containment actions

Materials and Methods

Study area and Population ; Bugna woreda is one among 167 woredas in Amhara National Regional State .It is found in North Wollo Zone ,which is one of the five zones in the Eastern Amhara Region . The woreda is located in the Northwest corner of the North Wollo Zone, Bugna is bordered on the South by Meket Woreda , on the West by the South Gondar Zone, on the North by the Wag Hemra Zone, and on the East by the Lasta Woreda, which is the home of the most gorgeous and UNESCO registered church of Lalibela .The woreda capital town is Ayena .The woreda is 228 km away from the zonal capital., Wolidiya Town .It has a total population of 77,508 of whom about 11048(14.3%) are children less than five years of age and the sex ratio is one .

There are about 13 kebeles in the woreda; 12 of total 13 kebeles are rural. Kwaro is one among the 12 rural kebels found in the woreda. It has a total population of 6300 which accounts for 8.1% of the total population residing in the woreda. Likewise the reported measles vaccination coverage in the kebele in the first six months of this fiscal year and in the previous year was more than 90%.

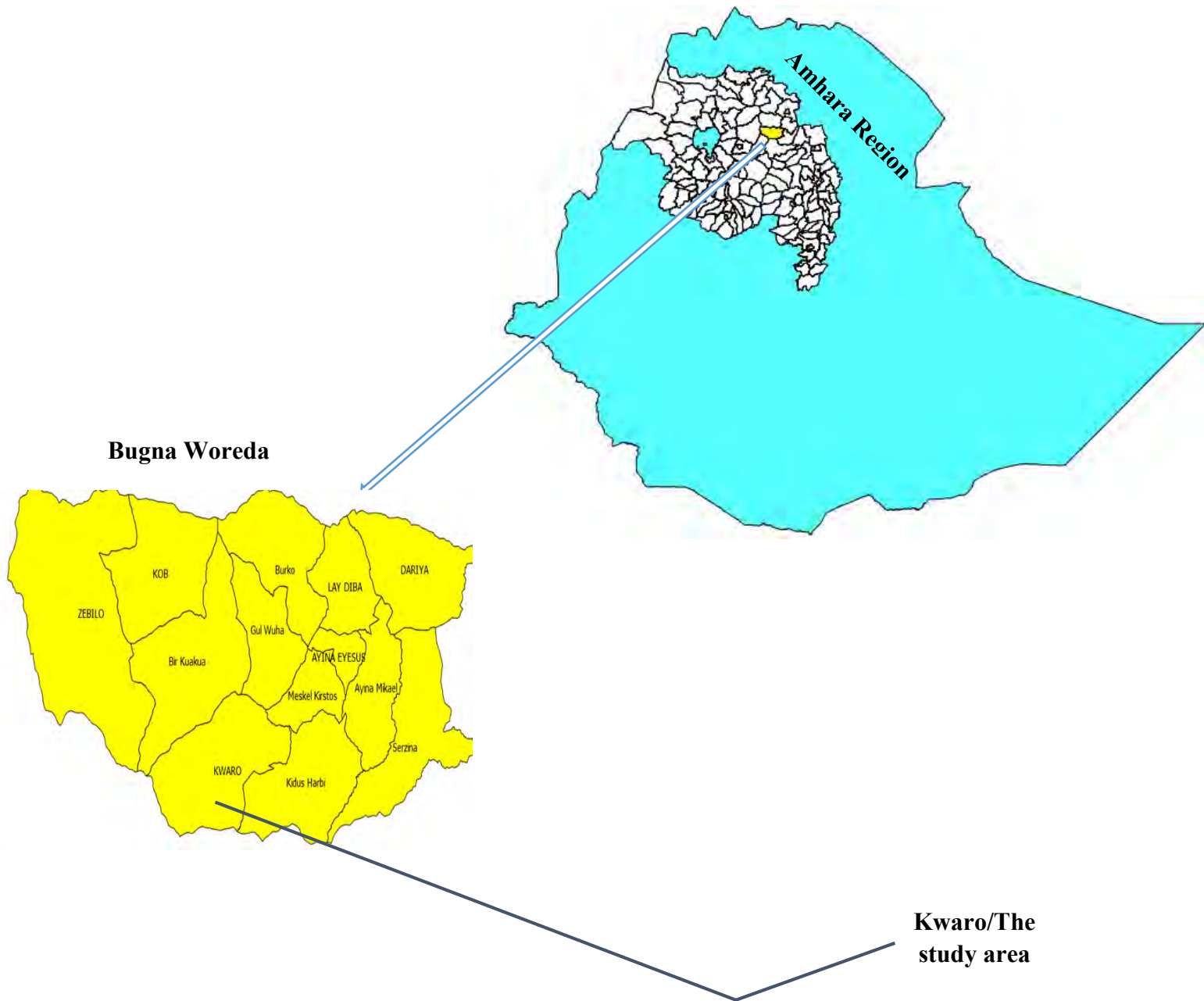


Figure 1: Map of Kuwaro Kebele, Bugna Woreda, Amhara Regional States, Ethiopia

Sampling and sample size: Total of 146 study participants were enrolled; all of the 73 cases, (whom were initially reported and identified by the investigation team) and an equal number of controls who are the neighbors of cases were recruited and got involved the in the study.

Data collection: we collected data using a structured questionnaire to interview both cases and controls; the data collected include: Identification, demographic, risk factors and clinical information. In addition, we used observation checklist and rapid convenience survey formats to collect data on PHEM activities undertaken in the woreda and to validate the reported vaccination coverage respectively.

Case finding and identification: We carried out door to door active case search to identify cases using the WHO stand ard case definition for measles: suspected case, any person with generalized maculo-papular rash and fever plus one of the following: cough or coryza (runny nose) or conjunctivitis (red eyes). We identified 50 additional cases during active case search.

Study design; we conducted an unmatched case-control study with ratio of 1:1 .Those neighbors who were not diseased during the study period were taken as controls irrespective of their demographic characteristics.

Data collection and analysis: We entered and analyzed the data using EPI Info version 7.3.3.1 and Microsoft Excel 2007. We used both Fisher`s Exact test and chi -square test to examine the significance of the association of risk factors in contracting measles. We estimated preventive fraction of those vaccinated which is proxy estimate for measles vaccine efficacy using the formula: $VE = [1 - (ARV / ARu)] \times 100$, where VE is vaccine effectiveness as a percent, ARV=measles attack rate among vaccinated and ARu= measles attack rate among unvaccinated. Specimens were collected prior to the arrival of the investigation team.

Result

The median age of the 73 cases and the controls were 17 years (range: 7 months to 50 yrs.) and 21 years (range: 2 -62 year) respectively .Most of the study participants were males 90(62%). More than half of the participants, 76(52%) were farmers; the remaining 70 (48%) were housewives, students and children, who were ineligible for school or those engaged in other activities to help their parents

Based on the case definition all 73 had the clinical features fever and rash during the time the study was conducted or had a history of both clinical features (See Table 1)

Table 1 Diagnostic criteria for measles, Kuaro, Bugna, Amhara Regional State, Ethiopia, 2014

Sr.no.	Criteria	Frequency	Percent
1	Rash	73	100%
2	Fever	73	100%
3	Conjunctivitis	73	100%
4	coryza (runny nose)	65	89%
5	Cough	70	96%

Specimens were collected from five cases of whom four were found to be IgM positive for measles.

Descriptive Analysis;

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The index case was 20 yrs. male with an onset of rash on 26/12/2013 (as indicated in **Error! Reference source not found.** below) and he had been in Lalibela for four days (17-21/12/2013) and in Ayina, the capital town of the woreda, from 22 to 23/2013. Most of the cases, 56 (77%) were with date of onset of rash 22(30%) and 34 (47%) in week four and five respectively.

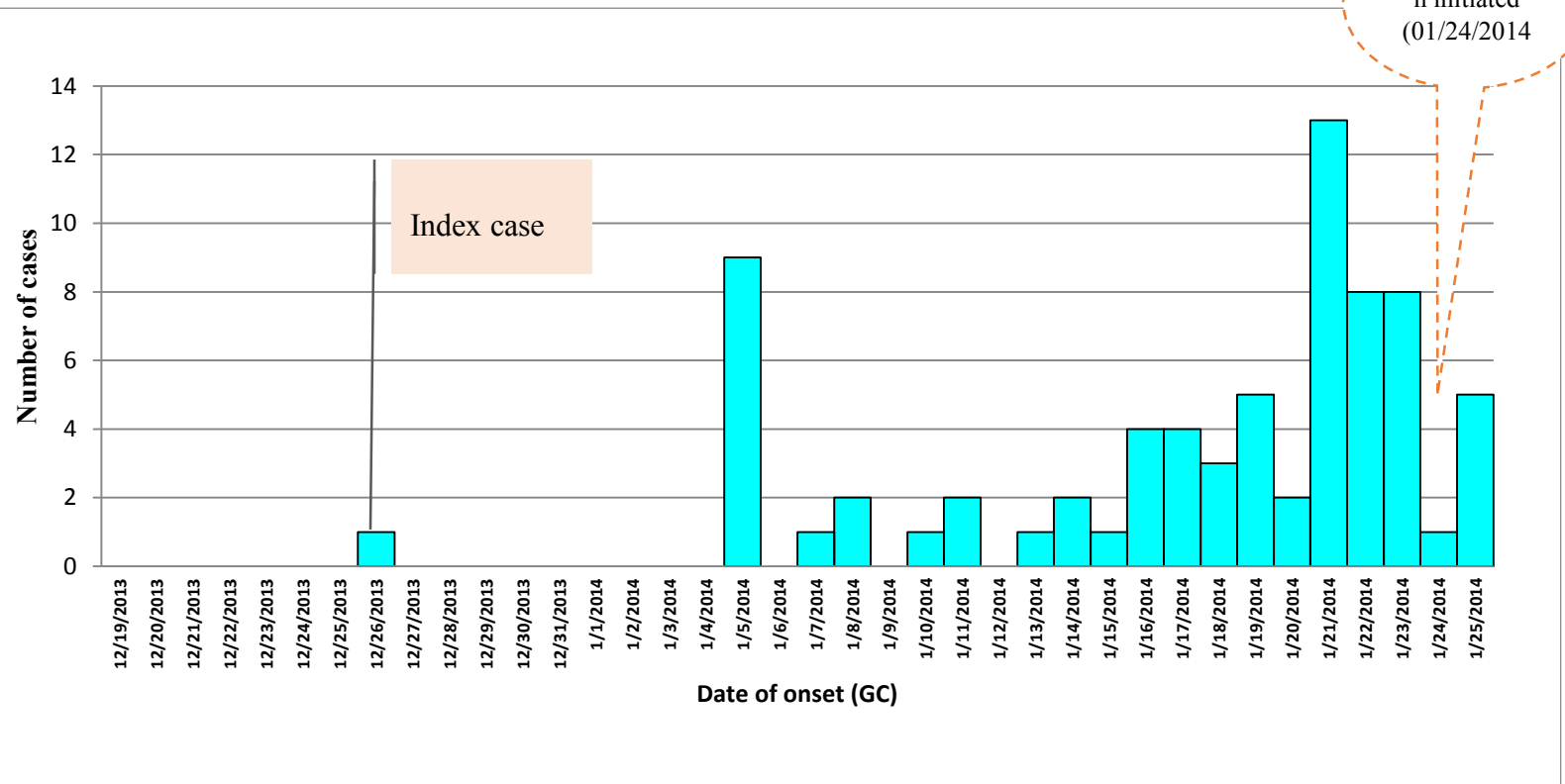


Figure 2: Reported measles cases by date of onset, Kuwaro, Bugna, Amhara, Ethiopia January 2014

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The outbreak had affected three villages: Workiazila, Bilagod and Workialiba of which Workiazila accounted for for 47(64%) of total reported cases. (See *Figure 3* below)



Figure 3: Measles cases and attack rates, Kuwaro, Bugna, Amhara, Ethiopia, January 2014

The majority of the cases, 47 (64%) were males. The attack rate in males and females were 15 and 8/1000 respectively. Approximately, about two-third of the cases, 47 (64%) were in the age group 15-44 yrs. Only about more than one-fifth 16 (22.9%) of the cases were children less than five years of age. (See *Table 2* below)

Table 2 Age-specific attack rate of measles in Kwaro, Bugna, Amhara, Ethiopia January 2014

Age category	Population	Reported measles case		Attack rate (%)
		Number	percent	
<5yrs	898	16	22.9	1.8
5-14	1732	9	12.3	0.5
15-44	2640	47	64.4	1.8
45+	1030	2	2.7	0.2
Total	6300	73	100	1.2

Only three (2%) of the study participants were vaccinated. The majority of cases 67 (92%) of were unvaccinated of whom only three (2%) of them were not old enough to get vaccinated. The highest percent of individuals were in the age group 15-44 yrs., who accounted for 47(64 %) of the total 73 cases (as shown in Figure 4 below)

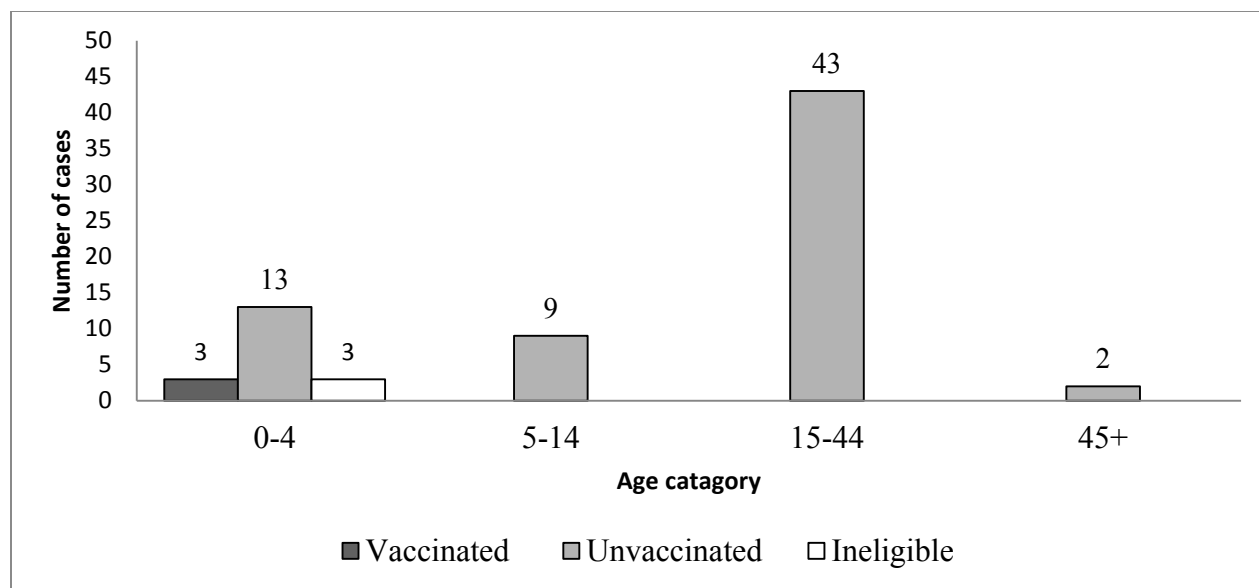


Figure 4 Distribution of measles cases by age and vaccination status, Kuwaro, Bugna, And Amhara, Ethiopia January 2014

Despite the reported administrative measles coverage of the area in the previous six months (July to December 2013) and in 2013 supplementary immunization activities (SIAS) were very high, (more than 90%), during rapid convince survey, we found that only 73(66%) of children less than five years of age had received at least one dose of measles vaccine. (From the total 110 children found during door to door visit)

More than half of the participants, 87 (53%) had had contact with suspected measles cases. 46 (63%) from total 73 cases had had contact history besides this 21 (14.4%) of the participants had a travel history; 19(26%) cases and two (3%) controls had travel history. Five (9%) females of total 56 (38%) female study participants and 16 (18%) males of total 90 male participants had traveled to villages where measles cases were reported.

We observed that the area where the measles broke out is hard to reach, which is far not only from the health center and but also from health post moreover it is impossible to access by any means

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of transportation apart from these; one Health Extension Worker (HEW) is serving 6000 population along with the fact the health post is located far from the community and difficult terrain may hamper the provision of immunization. The other key point is that HEWS are supposed to spend 75% of working days outside the health post (in the community) working on different primary health services including RI. Immunization services are given daily at health centers (HC). The five health posts in the catchment take their allotted vaccine every month from the HC.

We hypothesized that; perhaps, the higher the number of unvaccinated individuals in line with the fact that a number of cases had history of contact with suspected measles cases and travel to villages where cases were reported could be the risk factors for contracting measles. From total 73 cases; 14(30%) of the males and five (20%) of the females had travel history.

Analytical analysis

Using bivariate analysis we compared cases and controls with respect to contact with measles cases, travel history to places where suspected measles cases were reported and vaccination status. We found out that being vaccinated for measles is found to be significantly associated to be a protective factor against contracting measles with an odds ratio of 0.13 with 95% CI (0.024-0.49) and P-value of 0.00063)

The preventable fraction of vaccination (vaccine efficacy) was calculated to be approximately 75%. On the other hand, while examining the epidemiological risk factors, contact and travel history; we found that having contact with suspected measles cases and travelling to places where suspected cases were reported were significantly associated with contracting measles; OR= 2.3 with 95%CI (1.19-4.48), p value 0.02 and OR= 12.5, 95%CI(2.7-113.5) and with p-value 0.00016 respectively.

Containment activities

Case management: all cases visited were provided vitamin A to prevent complications; which is the principal goal of the intervention effort.

Health information: health information was given on the importance of vaccination and the advantage of taking the diseased to the nearby health facility; the complication that may be resulted from the disease if someone is left untreated.

Active case search: Despite the difficult land scape of the area, which was highly labor intensive, we had conducted door to door active case search to uncover more cases

Discussion

The measles outbreak was confirmed outbreak as four of the total cases investigated by laboratory were positive for measles IgM. Measles outbreak is said to be confirmed when three from total five cases are IgM positive (3). Workazila, the most affected village this could be fact that the index case resides as the reproductive rate of the disease is very high .It is documented that there may be 17-20 cases following the introduction of one case amongst the susceptible individuals.

As described in the Epi-curve most of the cases, 60 (82%) were with the month of rash onset in January this might have come about because of the fact that the seasonality nature of measles in tropics transmission intensifies in dry seasons and also the congregation of people around churches to celebrate Epiphany and other religious holidays celebrated in the Epiphany week. These social gatherings might have facilitated transmission .It is documented that measles transmission in tropics intensified in dry seasons (4)and it is also known that the potential to spread of the disease is influenced by social gatherings, holydays (5)

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High percent of cases were among adolescents and adults, this could be because of the fact that majority of children less than five years of age were vaccinated either during routine or SIAS. This is supported by the changing epidemiology of measles in African region following the introduction of immunization and also consistent with measles case-based surveillance data analysis conducted in few selected administrative zones in Ethiopia (6) those who were unvaccinated, remained susceptible for years. The same finding in outbreak investigation of measles in Zakar District, Zimbabwe revealed that the highest percent of cases were those who were unvaccinated. (7)

Having traveled to places where measles cases were reported had very strong association; the odds of contracting measles among those who traveled was 12 times higher than those had not yet traveled /prior to 7-18 days. Similar study in Northern Ethiopia revealed the same result (8) however the precision /the wider confidence interval was relatively lower which could have been because of the sample sizes was not large enough.

Calculating preventable fraction of vaccination as proxy indicator of vaccine efficacy the vaccine efficacy was found to be 75% .which indicate vaccination prevented 75 % of the cases that might have otherwise occurred among vaccinated children had they not been vaccinated. Similar study in Iran revealed consistent finding (9). The field efficacy of vaccine is less than what is theoretically expected in ideal world. This could be resulted from poor vaccine handling and management. The rapid convenience assessment of measles vaccination provide evidence on unreliability of the administrative vaccination coverage though the sample size is too small and the sampling method was non-probability sampling. Reported /administrative vaccine coverage in the country revealed that administrative coverage was by far less than the vaccine coverage estimated by Surveys. The

high administrative coverage may not help to identify and map areas with high percentage of susceptible population which in turn also a suggestive on the likelihood of outbreak occurrence.

Limitation

Our study has limitations in the following aspects: selection of controls as the controls who were enrolled in the study were those neighbors of cases who were at home during the investigation those who were outside in the house might have different characteristics Our work is not an exception in experiencing recall bias; not only controls but also few cases were doubtful to remember contact histories.

Conclusions

Contact with measles patients and traveling to areas where measles virus was circulated /where measles cases were detected and reported previously were along with being unvaccinated could have been the risk factor for contracting measles.

Recommendations

Strengthening routine EPI;-improve routine immunization, limit missed opportunities so that every children in the catchment is get vaccinated

Reinforce case management; cases should be detected early and get managed so that there will not be complication.

Intensify public health surveillance; identifying cases early to prevent complication and analyzing are the cornerstones in gearing the response activities. In addition ,risk mapping of Kebeles/villages should be prioritized based on monitoring the number of susceptibility individuals that enter in the susceptibility pool.

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Supplementary immunization: as most of the cases were age greater than five, whom are not addressed by routine immunization catch-up campaign for those aged 9 months to 15 years could be considered or mini campaigns should be conducted to

Initiation of community based surveillance: as the affected kebele is very far from health facilities in line with the fact that most of the cases, 50 (68%) were detected by the investigation team may reveal that the health workers were not capable enough to reach the community; the health facilities are located too far to from the community not only to uncover the occurrence of outbreak but also to provide Primary health services. Therefore, it is cost effective and rationale to get the community members /Health Development Armies/HDA involved in surveillance activities to ensure sensitivity of surveillance system in the area.

Moreover further studies and assessments on the probable factors for lower vaccine efficacy (<85%) and immunization survey should be in place.

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1.2 Measles outbreak in Gonji Kolela Woreda, West Gojam, Amhara, 2015

Abstract

Introduction: Measles is one of the most highly communicable diseases in man, with a basic reproductive rate of 17-20. It is among the top causes of death in children less than 5 years of age in many African countries. We received a report of measles outbreak from Gonji Kolelal Woreda; the aim of the investigation was to identify the determinant factors and to produce data for containment action.

Method: We conducted descriptive and unmatched case-control study. We ascertained cases those of who met the standard case definition for measles developed by WHO .Fifty four cases and two neighbors were selected for each cases were enrolled .We collected data using structured questionnaire downloaded on smart phones. The Chi-square test was used. The data were analyzed using Epi info and Microsoft Excel.

Result: The median age the cases and the controls was 7 and 17 years respectively. From total 54 cases the majority 40(73%) were unvaccinated; 26 (79%) among total of 33 female and 14 (67%) among 21 male cases were unvaccinated. The highest proportion of cases aged 1-14 years whom accounted for 48(87%) of the total cases .The highest incidence was in children 1- 4 years of age.

Conclusion: The most affected people by the outbreak were children less than five years old and the cause of the outbreak may be the accumulation of susceptible individuals in the previous five years back from now. Immunization should be improved.

Introduction

Measles is one of the most highly communicable diseases in man, with a basic reproductive rate of 17-20(i.e., the introduction of one case of measles in a completely susceptible community generates 17-20 new cases). (1) Infants become susceptible to measles virus infection when passively acquired maternal antibody wanes. (2) Infants born to women with vaccine-induced immunity become susceptible to measles at a younger age than those born to women with naturally acquired immunity (3) however it is rare in infants less than 3 months of age (4) .The world is becoming successful in managing the reduction of measles through immunization. Measles mortality worldwide decreased by 78% from 562 000 to 122 000 between 2000 and 2012 (5) Measles is among the top causes of death in children less than 5 years of age in many African countries. Several sub-Saharan African countries experienced measles outbreaks, with more than 199, 000 cases officially reported to WHO in 2010, and more than 194,000 in 2011.(6) Measles is one of the communicable diseases that is still causing mortality and morbidity in Ethiopia (7). Amhara Regional Health Bureau PHEM core process received a report of measles outbreak in March 2015 from Gonji Kolela Woreda, West Gojam Zone.

General objective: To identify the determinant factors of the outbreak and to produce data that guides containment action

Specific objectives

- To confirm the existence of outbreak
- To characterize the disease by time, place and person
- To identify the risk factors
- To guide /recommend the containment activities

Method

Study setting and population:

Gonji Woreda is one of the 15 woredas found in West Gojam Zone of Amhara Region. It has a total population size of 119861 of whom 16229(13.54%) are children less than five years of age .The woreda has six health centers and 26 health posts that are providing the health primary health care services.

The woreda is bounded by South Gondar Zone in the Northeast in the East by Huleti Ejunese and Mirab Estie in the West and Yilma Ena Densa Woreda in the South by Dega Damot and Quarut woredas. The report completeness in the woreda in the previous fiscal year was 85% it has a total of 26 kebeles (one urban).

Addis Alem, Yenache, Woyizazeret and Gunji kebeles are the four adjacent kebeles among the total 26 kebeles found in the woreda the three kebeles which had measles outbreak since March 2015 .(See Figure 5)All except Addis Alem are rural kebeles .

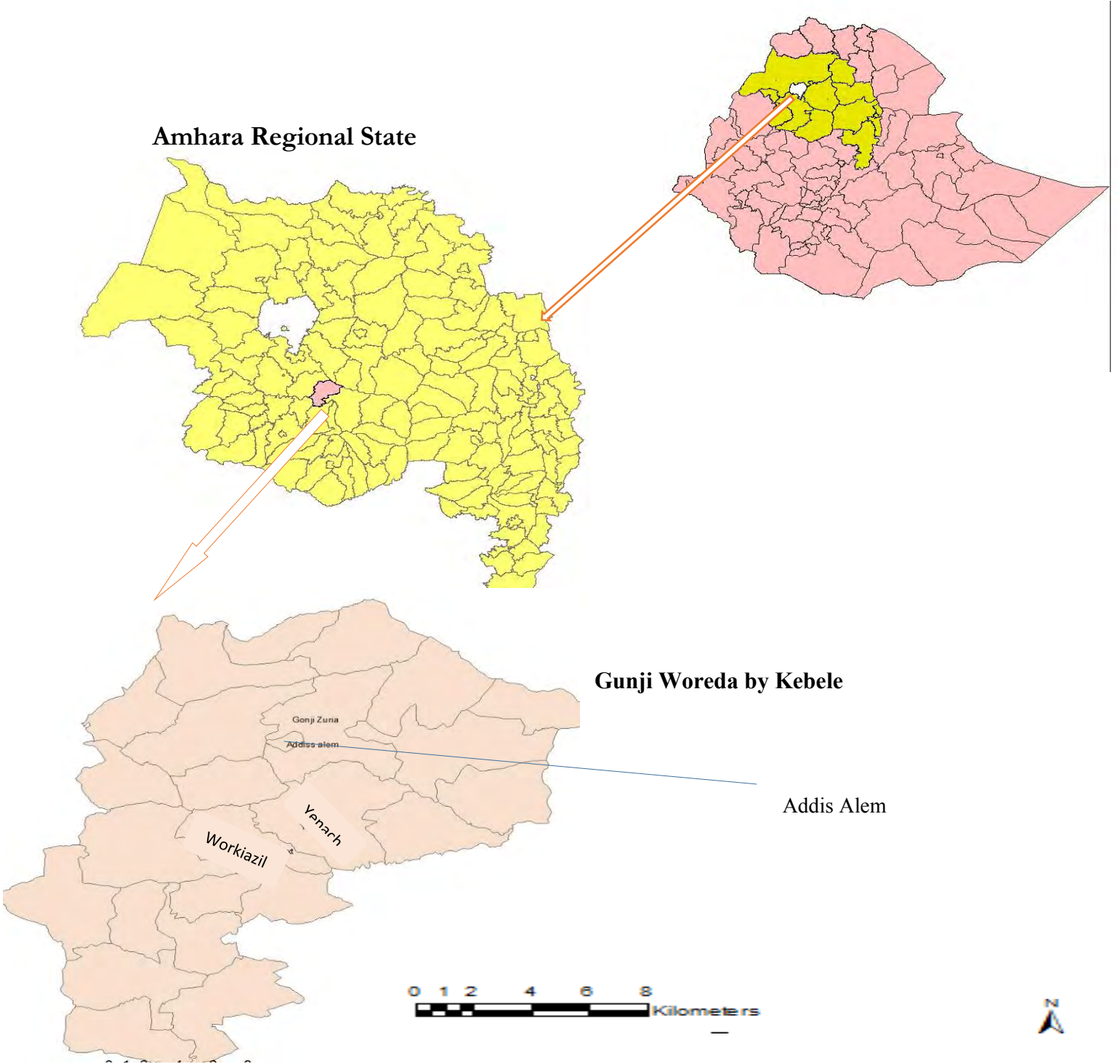


Figure 5 Map of Gonji Kolela Woreda, 2015

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Study Design: We conducted a descriptive and unmatched case- control study. A case was anyone from Gonji Woreda who met the WHO's stand ard case definition for measles with onset symptoms between February to April 2015 controls were selected from the same village and who are neighbors of a case and who didn't contract the disease .We identified cases though active case search (door to door) and from line lists at woreda health office and at health center.

Suspected case

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

Confirmed case

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

Sampling: A total of 162 subjects; all the 54 cases and 108 controls in the four kebeles with ongoing incidence of measles, were enrolled in the study .Two neighborhood controls for each case were recruited and get enrolled in the study

Data collection: We collected the following information: demographic characteristics, risk factor information, and clinical information. We also collected the vaccination status of children who are less than five years of age irrespective of the disease status .The collection was made using structured questionnaire designed on the special platform on smart phone known as Open Data kit Tool (ODK). Mothers or guardians gave responses for children less than 15 of yrs. of age. During the case search and data collection we were accompanied by health extension workers, Woreda PHEM officer and woreda malaria prevention and control officer these were also the key informants whom we interviewed using the checklist . We also reviewed records at Addis Alem health center and Gunji Woreda health office

Data management and analysis: The collected data were sent at the end of each day to the server where it get aggregated. We exported the data from the server using comma separated value formats (CSV) .We described the data by place, time and person, We saved the CSV format as Microsoft Excel and analyzed data using EPI Info version 7.1.4.8. We performed univariate and bivariate analysis .The Chi-square test was used to determine the statistically significant of the association of the risk factors.

Ethical consideration: All study participants were asked for their consent (verbal consent) to take part in the study; parents /guardians were asked for those children less than five years of age. The responses were confidential, all information was cleared at the end each data collection day on the phone and all the data were removed from the server after we had exported the data as CSV format and saved in the computer

Result

The median age of all of the subjects was 14 (range from 7 month to 68 years). The median age of the cases and the controls was 7 (range 7 month to 34 yr.) and 17 (range 1 year to 68 yrs.) respectively. The majority of the study participants 103 (64%) were females of whom 70(43%) were controls the remaining 33(20%) were cases. Half 81(50%) of the total 162 study participants had not attended education, 64(39%) and 18 (11%) of the study participants attended primary and secondary school respectively.

From total 162 subjects 96(59%) were not old enough for marriage; three (2%), 42 (26%) and 21(13%) were divorced, married, and never married respectively. More than a third 54(33%) of the study subjects were students. Fifteen (28%) of total 54 cases had attended elementary school.

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All cases had rash and fever or a history of both; only half 27(50%) had corayza or history of coryza. (See Table 3 below)

Table 3 Diagnostic criteria for measles cases, Gonji Woreda, West Gojam, Amhara with onset February to April 2015

Criteria	No	Percent (%)
Fever	54	100%
Rash	54	100
Conjunctivitis	49	91%
Corayza	27	50%
Cough	52	96%

The outbreak started in February, 2015. The cases reported in the successive months were five (9%), 11(24%) and 34 (63%) in February, March and April respectively. (As shown in

Figure 6 below)

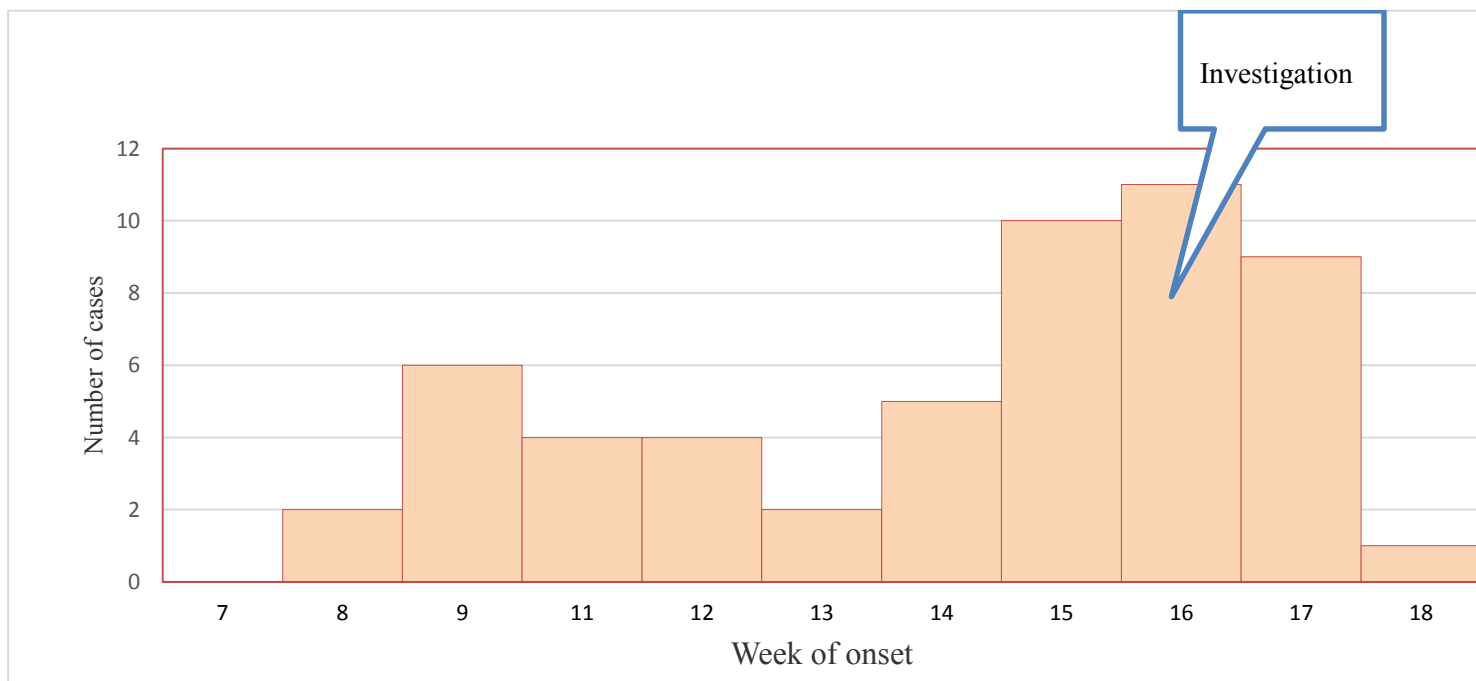


Figure 6 Outbreak of Measles Gonji Kolela, West Gojam, Amhara, 2015

From total 54 cases the majority 40(73%) were unvaccinated; 26 (79%) among total of 33 female and 14 (67%) from total 21 male cases were unvaccinated. The vaccination status for the majority of the study participants 147 (91%) was ascertained by verbally and the remaining 15 (9%) was ascertain using vaccination card. Moreover during our visit we found a total of 56 less than five children in the visited households of whom only 33(59%) had a history of measles vaccination.

Only six (30%) of the total 20 cases among children less than five years of age were vaccinated for measles. Three of the total five cases who were aged less than one year were not old enough to get vaccinated. (See Figure 7 below)

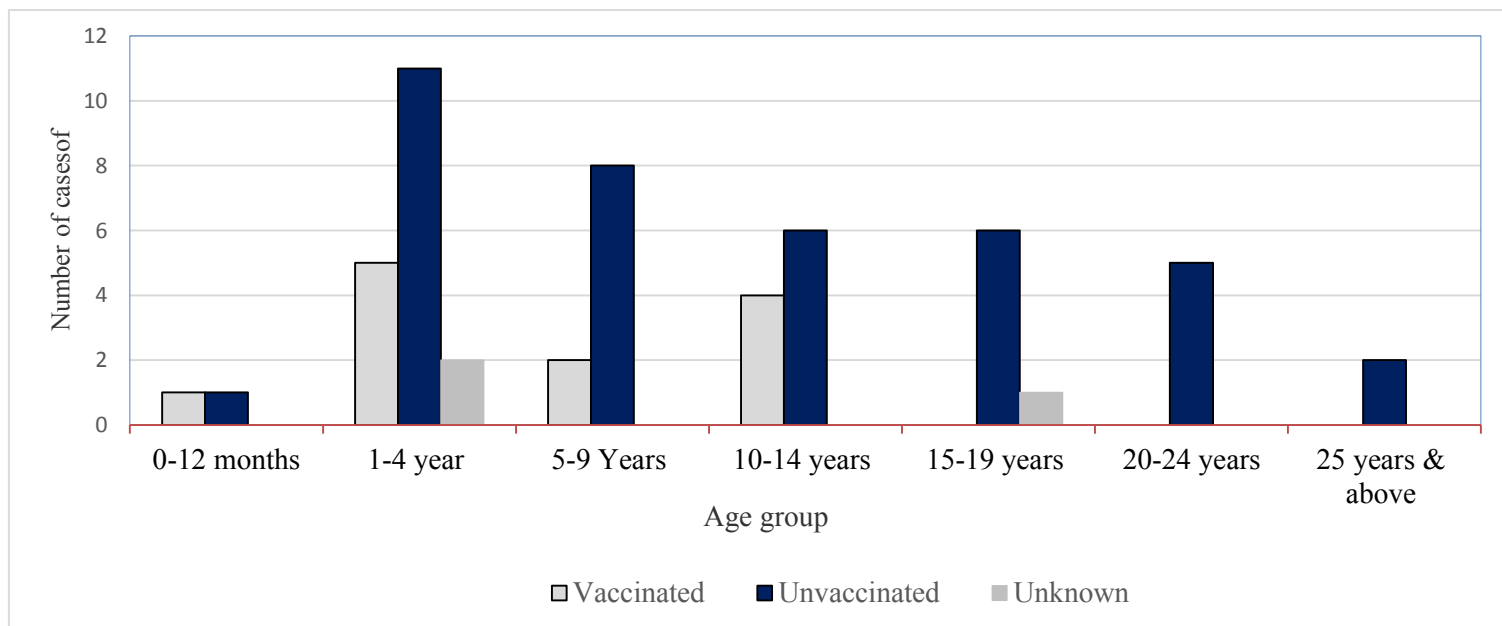


Figure 7 Vaccination status of measles cases, Gonji Kolela Woreda, West Gojam, Amhara, 2015

The highest percentage of cases were in the age group 1-14 years which accounted for 48(87%) of the total cases .The highest measles incidence was in children between 1- 4 years of age(See Table 4 below) .Ten among the total 18 (90%) cases in this age group were aged less than 3 years.

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Table 4 Measles age specific attack rate, Gonji Kolela, West Gojam, Amhara 2015

² Age group	No cases	AR(/10000)
0-12 months	2	6.6
1-4 years	18	20.0
5-9 years	10	6.6
10-14 years	10	6.7
15 -19 years	7	4.4
20-24 years	5	3.9
25 years and above	2	0.6
Total	54	0.5

The highest proportion of cases were reported from the two kebeles: Addiss Alem 19(35%) and Weyezazirit (44%) these two accounted for 43(80%) of the total reported cases Yinache and Gunji Zuria reported five (9%) and six (11%) respectively. (See *Figure 8* and *Table 3* below)

² Suggested core age group from WHO –Recommended standard for selected vaccine preventable diseases

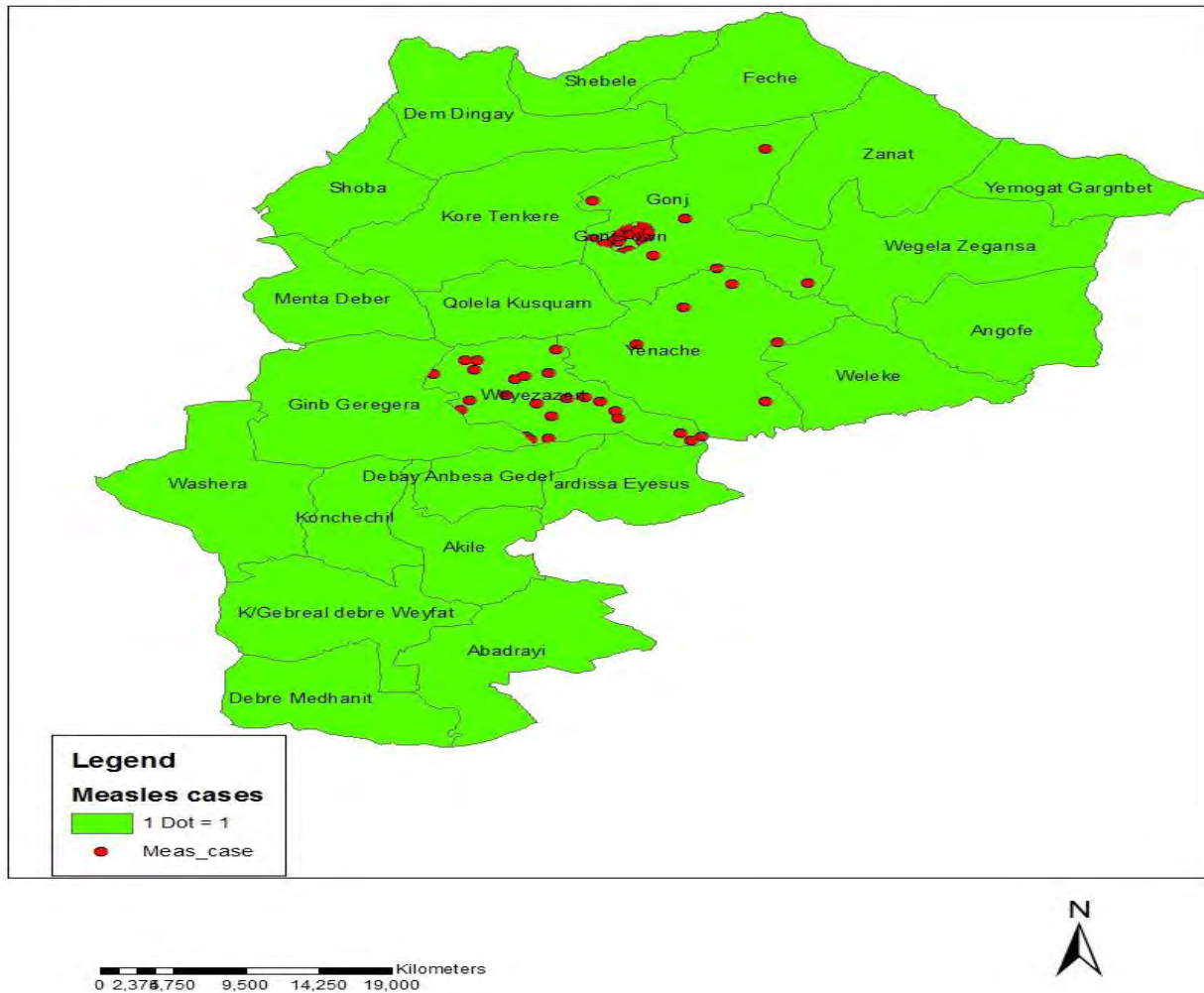


Figure 8 Measles cases spot map in Gonji Kolela Woreda, West Gojam, Amhara, 2015

The majority of the cases were those children less than 5 years of age. 43 (78%) among 54 cases were in this age group of whom only 11(26%) received at least one dose of measles vaccine.

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Table 5 *Measles attack rate by kebele, Gunji Kolela Woreda, West Gojam, Amhara*

Kebele	No	population	Attack rate(/10000)
Addiss Alem	19	5951	10
Yinache	5	9139	6.6
Guji Zuria	6	5155	11.6
Woyizazirit	24	5121	11.7

All eight specimens taken to the central laboratory between February 11 and March 23, 2015 were found to be IgM positive for measles.

Analytical analysis

We compared cases and controls with respect to contact, their contact history with measles cases, travel history to areas where there had been measles and vaccination status. It was found that being vaccinated for measles was significantly associated to be a protective factor against contracting measles with an odds ratio of 0.48 with 95% CI (0.023 -0.99) whereas the odds of contracting measles in those who traveled in the areas where the disease had been reported was 2.5 times higher than those who did not 95 % CI (0.75-8.86) but it was not found to be statistically significant on the other had the odds of having measles among those who had made contact with measles case was 1.6 times higher than those who had not had any contact 95% CI(0.6-4.1) but again it was not found to be statistically significant

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During our investigation we found out that there were improper recording of line list of the cases at woreda health office and at health center; the data were not analyzed and interpreted in way that can help to hypothesize the potential risk factors.

Interventions taken:

Case management: The cases were provided vitamin A and those cases who developed secondary infection were treated by health extension workers and health workers during active case search.

Technical support: We provided technical support for health workers and woreda officers on how the data should be managed and analyzed properly.

Health information: We gave health information by the time we collected the data we also gave brochures on measles.

Discussion: the highest proportion of cases was among those children less than 15 years of age which is similar epidemiology of measles in the pre vaccination era this might be because of the accumulation of susceptible in the previous years. The highest age specific rate in children less than five of whom the majority were less than three years of age this is consistent with what is known, children less than this age are usually affected most .

There were also a few cases among individuals who had taken measles vaccination this may because of the fact that the vaccine never give absolute protection and the fact that one dose is not sufficient to achieve the population immunity needed to interrupt the transmission (8).

The other cause for vaccine failure could be due to cold chain problem which we did not evaluate in our study .It is known that reconstitute vaccines lose their potency quickly when exposed to heat and sun light (9).

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The high proportion of cases were seen in April this could be resulted from the congregation of people in social events such as wedding ceremonies that are usually takes place at the end of the two months fasting era, lent, the increase in measles incidence were documented following gatherings of individuals a study in Wales, England revealed the seasonal increase of measles following the opening of schools(10)

Limitation

Recall bias: As the vaccination history for the majority of the study subjects was ascertained verbally; the mothers may not properly remember the vaccination history; in addition exposure histories of the controls may not have been remembered than the cases'.

Selection bias: as the controls were not selected randomly and the fact that neighbors who were at home during home visit were enrolled .

Strength: We applied electronic data collection, ODK which help to reduce interviewer bias it completely avoided the pertinent variables, particularly vaccination history from being left blank and skipping questions which are not appropriate for controls such as date of onset, clinical sign and symptoms.

Conclusion: there was measles outbreak in Gonji Woreda; the most affected people by the outbreak were children less than five years old along with the fact that only a few of the cases were vaccinated connotes that the accumulation of susceptible individuals in the previous five years back from now is the possible cause of the outbreak.

Recommendation:

- **Improve immunization:** routine vaccination should be intensified.
- **Improve data management:** data recording practice should be improved; woreda health office should ensure submission of line lists and should checkout for completeness and inconsistency.
- **Further Studies:** Studies should be conducted to figure out the reasons why the parents don't get their children vaccinated.

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Chapter II – Surveillance Data Analysis Report

Title: Measles case-based surveillance data analysis and outbreak risk mapping West

Gojam Zone, Amhara Region, Ethiopia 2009 – 2013

Background: Measles is highly contagious and remains a leading cause of childhood mortality. Outbreaks can occur in populations in which fewer than 10% of people are susceptible. Our objective was to describe surveillance data, to identify risk of outbreaks and to produce data on the status of disease control strategies for measles.

Method: We reviewed case-based surveillance data and routine immunization data from all 15 woredas in West Gojam Zone between 2009 and 2013. Susceptible people were those who were left out from immunization or failed to develop immunity after vaccination. We did a descriptive univariate analysis to characterize the disease and to measure surveillance indicators. A WHO outbreak analysis tool was used to calculate the susceptible people over successive birth cohorts.

Result: Most 275 (56%) of the total 492 cases of measles reported were among people aged less than five years. The median incidence rate in West Gojam Zone was five per 1000 population. The highest median incidence rate was in Sekela Woreda, 11 per 1000 populations. The month of onset of rash of 335 (68.1%) cases was from January to June. The median vaccination coverage was 83%. Six woredas among 15 had median non-measles rash illness rate below two per 100000 population. The proportion of susceptible among the current population was 5 % (111005). Four woredas accounted for 45267(41%) of the susceptible: Yima ena Densa 13413(12%), Mecha 11887(11%), Dega Damot 10729(10%) and Jabitehna 9237(8%)

Conclusion: The large percentage of cases in under five children connotes that it may arise from low measles vaccination coverage; moreover the weak measles surveillance system along with accumulation of susceptible individuals in some woredas increases the risk of outbreaks. Actions need to be taken to improve immunization coverage and to intensify measles case-based surveillance.

Key words: measles, West Gojam Zone, risk analysis.

Introduction

The measles virus is one of the most highly contagious, directly transmitted pathogens, and outbreaks can occur in populations in which fewer than 10% of people are susceptible (1) Due to the high transmission efficiency of measles, outbreaks have been reported in populations where only 3% to 7% of the individuals were susceptible. (2) The average age at which people contract measles depends on the rate of decline of protective maternal antibodies, the amount of contact with infected people, and the level of measles vaccine coverage. (3)

An estimated 10.7 million deaths were averted from 2000 to 2011 due to immunizations against measles. (4) Measles vaccination rates have increased in most regions, particularly in Sub-Saharan Africa and Southern Asia, where the disease has taken its harshest toll. Nevertheless, outbreaks in these two regions continue. This is due in part to weak routine immunization systems and delayed implementation of accelerated disease control, which have contributed to stalled momentum towards regional and global measles control and elimination targets. (4)

It is known that the accumulation of a critical number of individuals without immunity to measles infection, as well as seasonality, population density, and other factors are associated with a higher risk for measles outbreaks, and a higher risk of spread following the introduction of measles infection into a community. (5)

In 2008 measles cases and mortality decreased by 93% and 92% respectively compared with 2000 globally. Ethiopia has been implementing measles control strategies since 2002, where measles is targeted to be eliminated by 2020. The strategies include immunization (routine and supplementary

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vaccination) case based measles surveillance and improved case management including provision of vitamin A. Measles case-based surveillance system is part of the national Public Health Emergency Management system and key component of the measles control program. It is the system whereby suspected measles cases should be detected, reported and undergo laboratory investigation (for the first five cases) in the case of outbreaks. Measles is one of the immediately reportable diseases under the National Public Health Emergency Management. Suspected cases should be investigated with serum specimen collection at first contact (within 28 days of onset of rash. The data flow in measles case based surveillance in the country starts from a health facility.

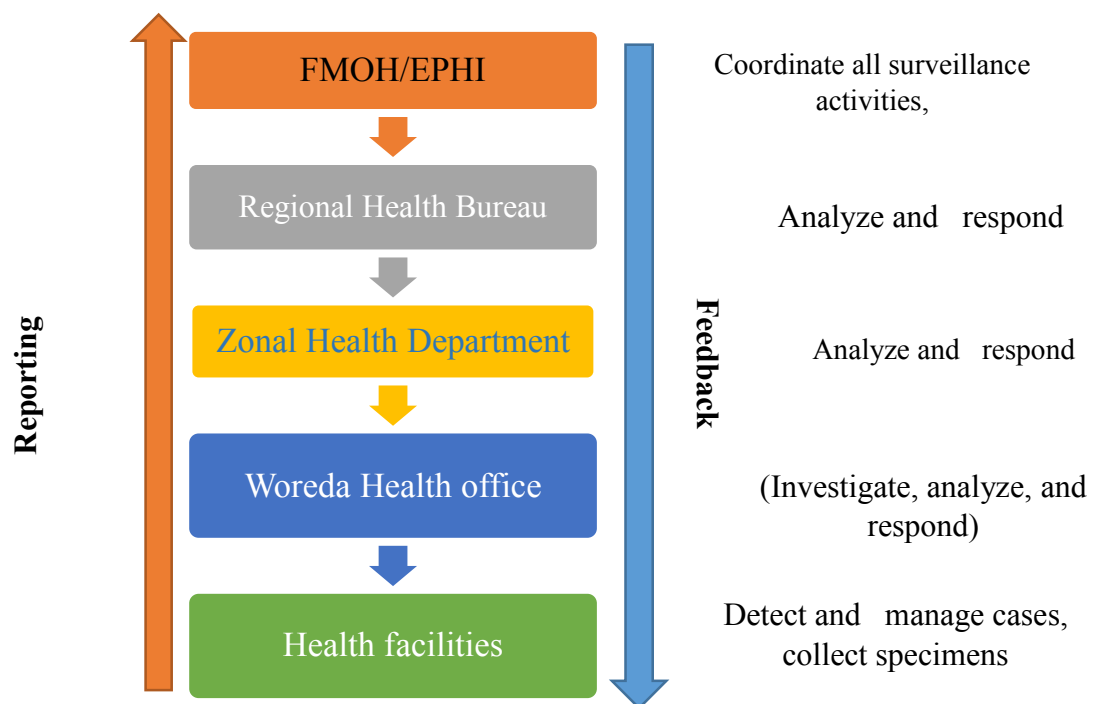


Figure 9: *Public health surveillance information flow in Ethiopia*

West Gojam is one of the zones in the Amhara region of Ethiopia. It is bordered on the south by the Abay River which separates the region from Oromia and Benshangule Gumeze Region, on the West by Awi Zone, on the North West by North Gondar, on the North by Lake Tana and the Abay

River which separates it from South Gondar and on the East by East Gojam Zone. A few years ago the capital of the zone was Bahir Dar city, which is the capital of Amhara Regional State, however currently the capital is Finote Selam Town which is located on the main road from Addis Ababa to Bahir Dar.

General Objective: To characterize the disease, measure measles surveillance indicators and identify the risks of outbreaks in order to produce doable recommendations.

Specific Objectives

- To describe measles cases by place, person and time.
- To monitor measles case-based surveillance
- To identify woredas that are at risk of measles outbreaks, with poor measles vaccination and surveillance performance

Materials and Methods

Data collection and analysis: We had secondary data on measles case-based surveillance from Amhara Regional Health Bureau and five years data on routine immunization from West Gojam Zone Health Department. We conducted descriptive analysis. Median incidence, vaccination status, measles vaccination coverage and dropout rates were calculated. We used WHO AFRO measles analysis tool for risk mapping moreover, we calculated the main measles case based surveillance indicators; median non-measles rash illness rate and compared with WHO measles case based surveillance performance targets. We calculated the median incidence of measles in each using population size projections by Central Statistics Agency. We analyzed the data using Epi-Info7. 3.3.1 and Microsoft Excel

Study area and population: The zone has a total population of 2,382,497 of whom 1,196,695 (50.2%) are men and 1,185,802 (49.8%) women. and 247, 831 (10.4%) are urban inhabitants. About 330699 (14%) were children less than five years of age. The individuals who are less than fifteen years of age is estimated to be 1038081 (44%).The zone is divided into fifteen woredas. The entire population is supposed to be under surveillance. There are 100 health centers, 370 health posts and one hospital which are currently providing health service

Result

There were 492 suspected measles cases reported by case based between 2009 and 2013 .The cases who were IgM positive for measles and rubella were equal ,45(9%) . More than half, 287(58%) were negative for measles IgM. The mean measles cases reported per annum and per month in the specified period were about 98 and 8 cases respectively. The median age of cases was 4 years with range (1 month to 29 years) the highest percentage of the cases 275(56%) were less than five years of age of whom 67 (24%) were less than one year old. There were nine cases (2%) whose age was missed. (See *Table 6* below)

Table 6: Suspected measles cases by age distribution, West Gojam, Amhara 2009 -2013

Age Group	Number	Percentage
< 9 months	34	7%
9-11 Months	33	7%
1- 4years	208	42%
5-9 years	105	22%
10-14years	59	12%
15+ years	43	9%

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Age Group	Number	Percentage
Missed	9	2%
Total	492	100%

From total 492 measles cases about a quarter 121 (25%) had not yet been vaccinated for measles and all were aged less than five years. Among the total 183 (37%) vaccinated cases the majority 149 (81%) received only one dose of measles vaccine of whom 116 (78%) were five years and younger. The vaccination status for more than one third 161 (33%) of the cases was recorded as unknown of whom 84 (52%) aged above five years and the vaccination status for 27 (5%) cases had been missed. Moreover vaccination history had not been recorded properly; those who were ineligible for routine vaccination were reported as if they got vaccinated: in 2009 three cases, in 2012 one case were reported as if they had received one and three doses of measles vaccine, respectively despite they aged less than nine months. Similarly in 2011 a case who was five months of age was also reported as his vaccination status was “unknown “ Three woredas accounted for for for more than half 70 (58%) of the total 121 unvaccinated cases; Bahir Dar Zuria 41 (34%) Sekela 16 (13%) and Gongi Kolela 13(11%).

In spite of the fact that there were about 32 (7%) cases who were not eligible for measles vaccine (age below 9 months) five (1%) were reported as if they were vaccinated and an equal number (five cases) were also reported as if their vaccination status had not yet been known

Higher percentage of the total cases were reported by two woredas; Bahira Dar Zuria and Sekela which reported 121 (25%) and 87 (18%) cases respectively. Three woredas accounted for more than half of the total measles IgM positive cases; Bahir Dar Zuria 11 (24.4%), Sekela 9(20%) and Yilma ena Densa 6 (13.3%). The median measles incidence in the zone during the five year period

was about 5/100,000 population; Sekela Woreda was the highest median incidence Sekela with an incidence of 11/100000 which was about twice as large as the zonal median incidence.(Figure 10 below)

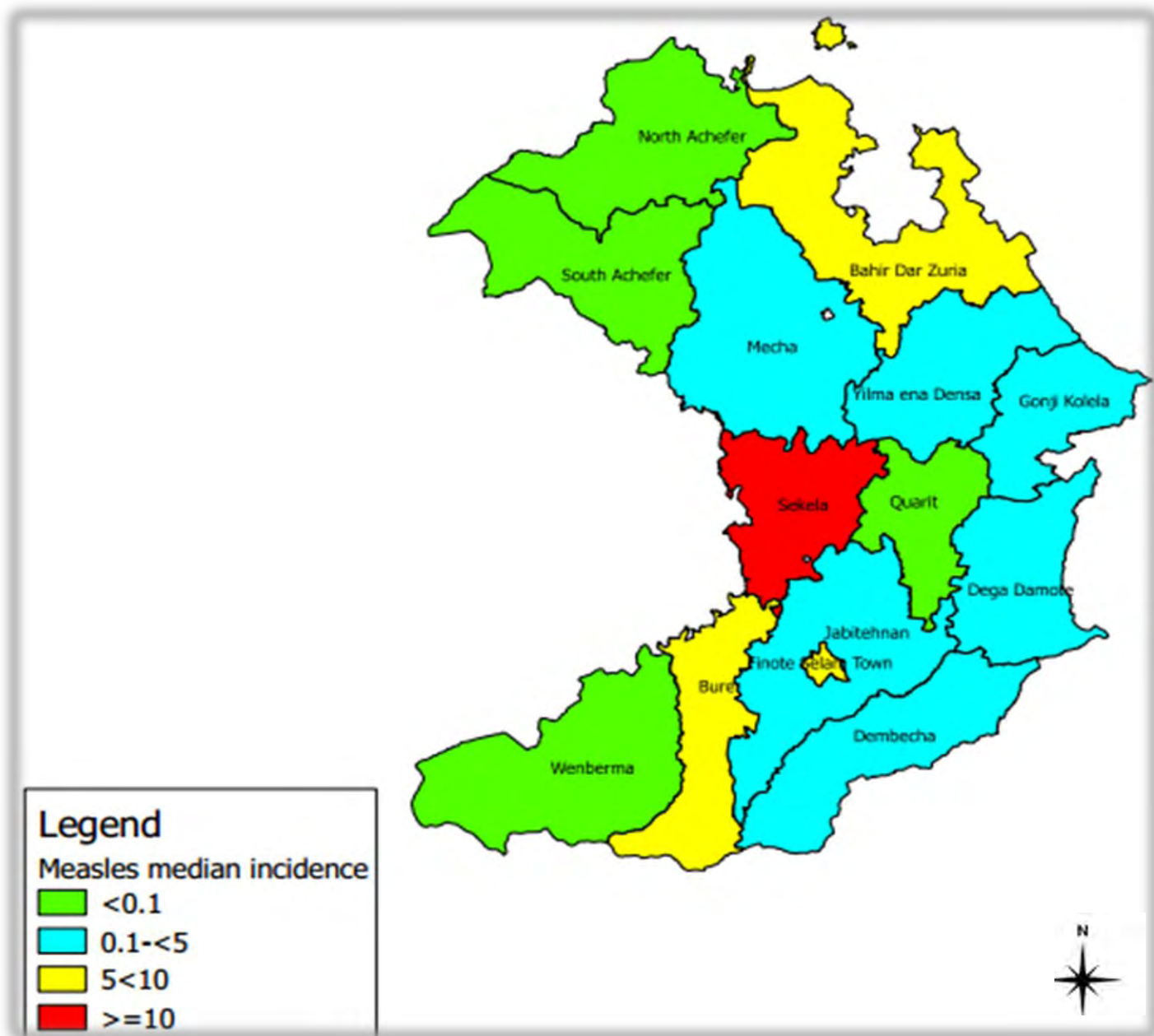


Figure 10: Median incidence of reported measles cases per 100,000 population, West Gojam Zone, Amhara, Ethiopia, 2009 - 2013

Between 2009 and 2013, the highest cases were reported in 2010; from total 140 cases reported by case based more than half of the cases were reported from two woredas; Bahir Dar Zuria 46(33%) and Sekela 27 (19%).

The mean percentage increment of measles cases in successive years during the study period was about 14%. Measles cases had revealed a tremendous increase between 2012 and 2013. The cases increased by 87%. (*Figure 11* below)

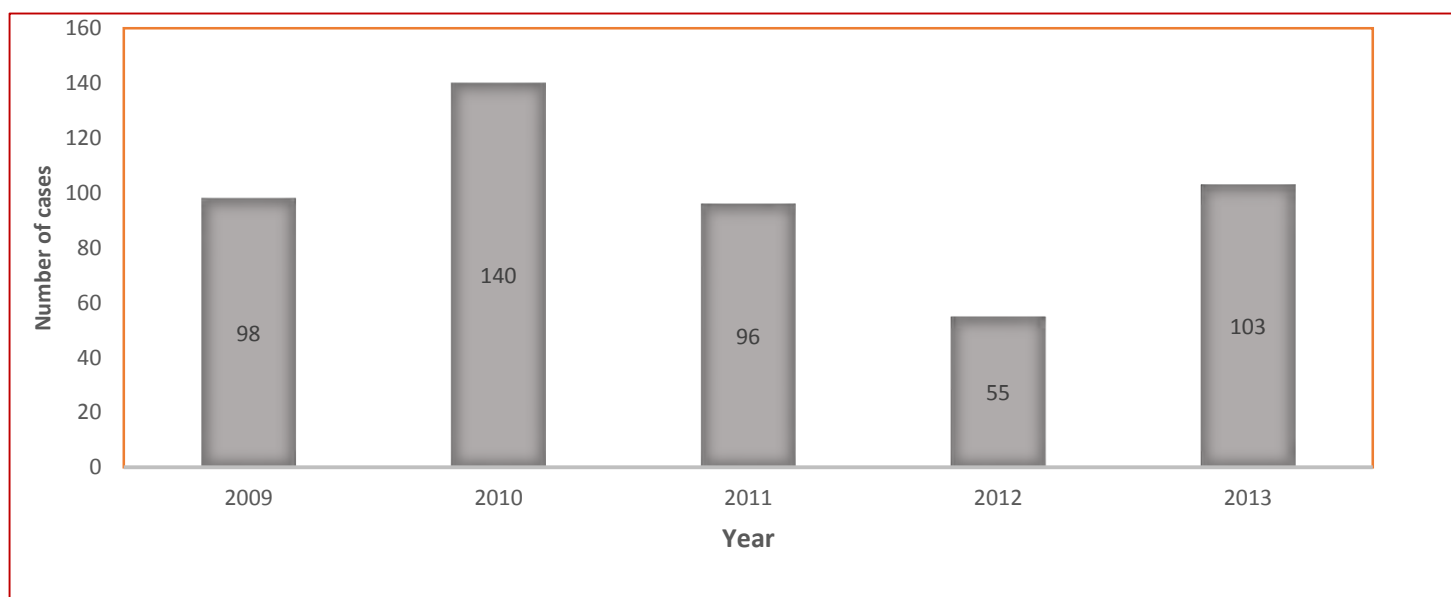


Figure 11: Reported measles cases, West Gojam Zone, Amhara Region Ethiopia, 2009 -2013

More than two third 335(68.1%) cases reported between 2009 and 2010 were with onset during the third and fourth quarter of fiscal year (January to June); 171(35%) in third (January -March) and 161 (33%) in fourth quarter (April to June). On the other hand 83 (17%) and 74 (15%) of the reported cases were with onset during first (July to September) and second quarter (October to December) respectively.

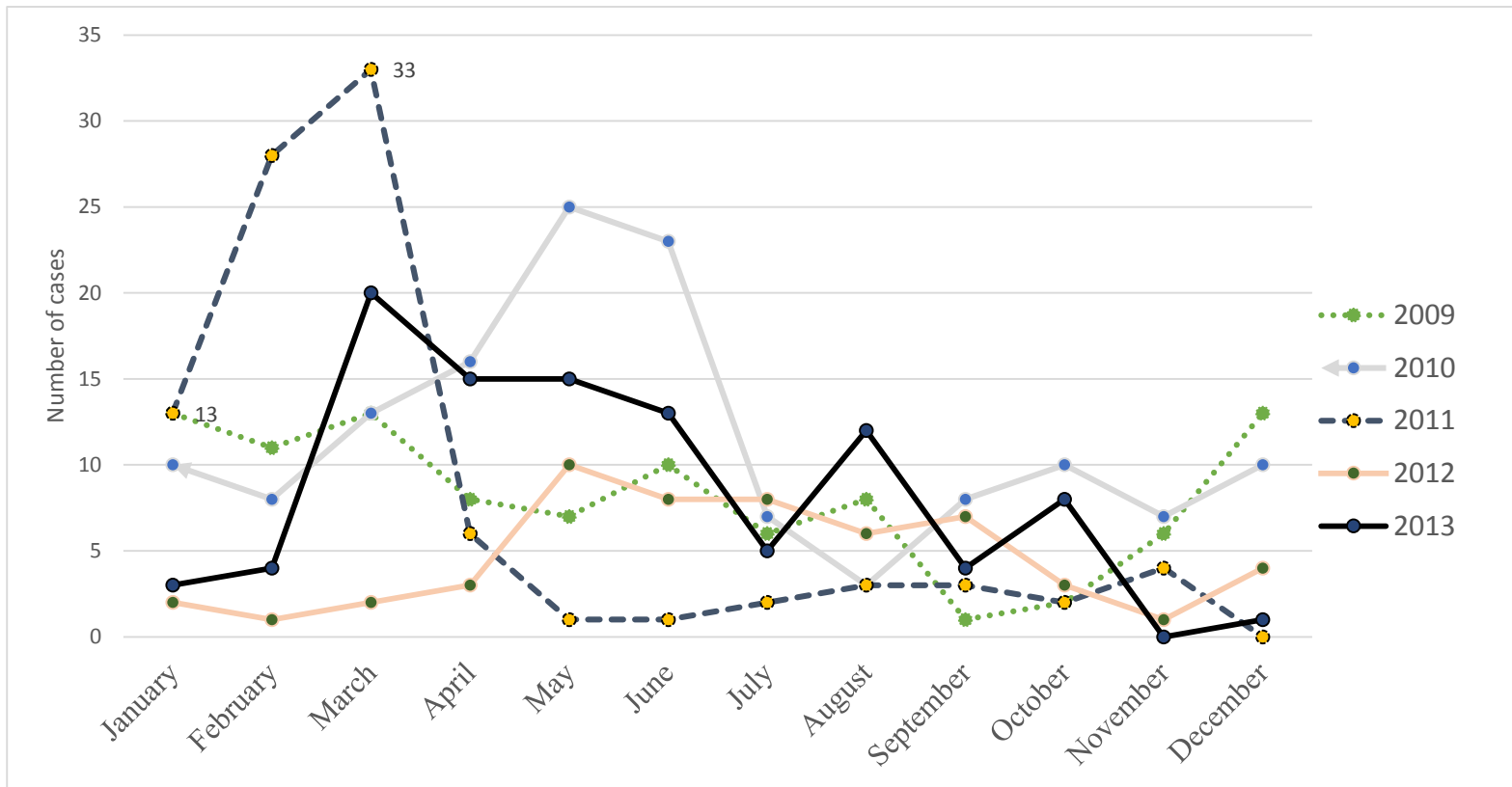


Figure 12: Reported suspected measles cases by months of onset, West Gojam, Amhara 2009 - 2013

The zone had experienced measles outbreaks between 2009 and 2013 in different woredas. In 2010 six of total measles outbreak had occurred in four Woredas; Bahir Dar Zuria, Bure, Yilma ena Densa and Gonji Kolela. Bahir Dar Zuria and Bure were with two outbreaks; Bahir Dar Zuria (March –April), Bure (April-May), Yilma Ena Densa (April) and Gonji Kolela (October). Bahir Dar Zuria in February, and Sekela in December have experienced confirmed measles outbreak in 2011 and 2013 respectively. (Figure 12 above)

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The median non measles rash illness rate in the zone between 2009 and 2013 was found to be 3 per 100000 population. Six of total 15 Woredas were with average non measles rash illness rate below the target i.e. 2/100,000. These were Quarit, South Achefer, North Achefer, Wonberma, Bure Zuria, Dembecha and Dega Damot

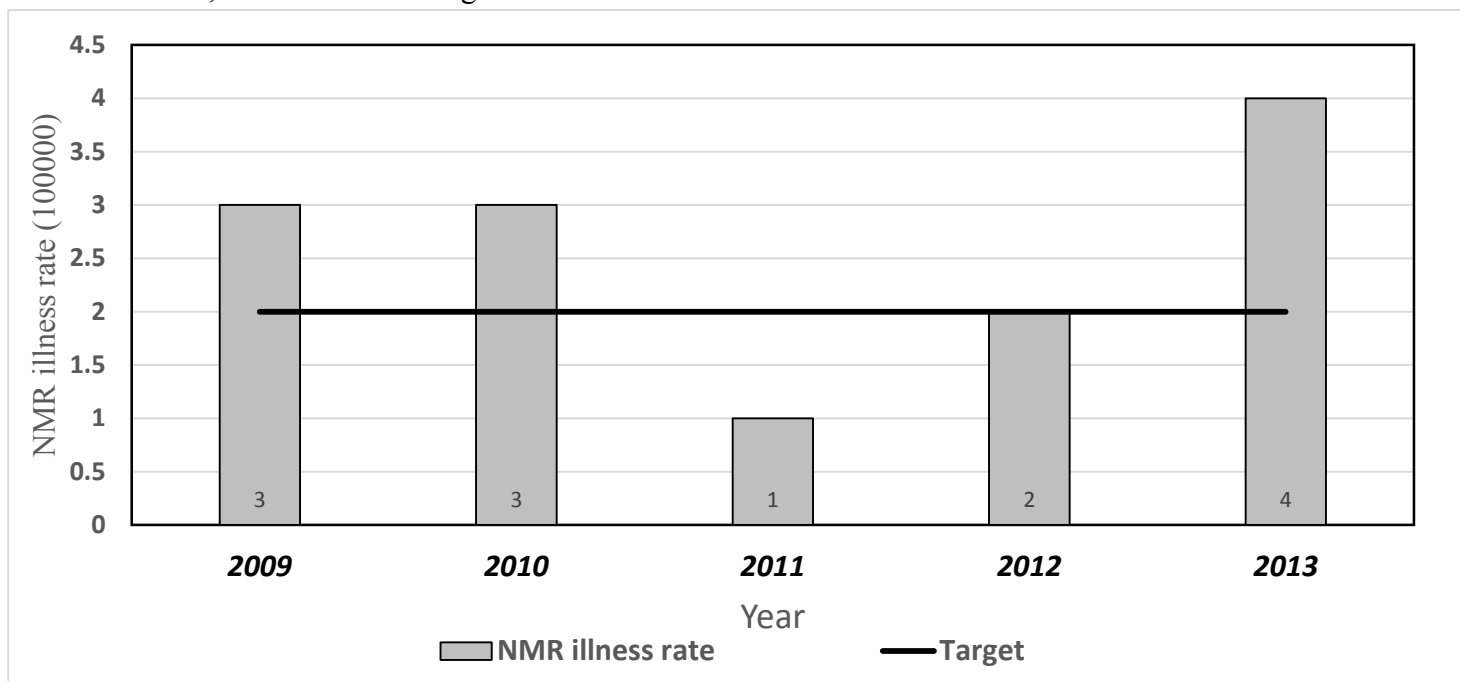


Figure 13: Non measles rash illness rate, West Gojam Zone, Amhara 2009 -2013:

The mean proportion of woredas that reported at least one measles case with blood specimen per annum were 11 (73%). Except in 2010 the proportion of woredas that had reported at least one suspected measles case with blood specimen per annum between 2009 and 2013 were only five (33%).

The mean measles vaccination coverage between 2009 and 2013 was about 83%, only four woredas: Quarit (99%), South Achefer (95%), North Achefer (95%) and Mecha had mean measles vaccination coverage greater than or equal to 90%. Measles coverage had shown tremendous

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progress since 2009. The lowest measles vaccination coverage was in Finote Selam and highest measles vaccination coverage and the smallest number measles cases were reported in 2012. (

FIGURE 14 below)

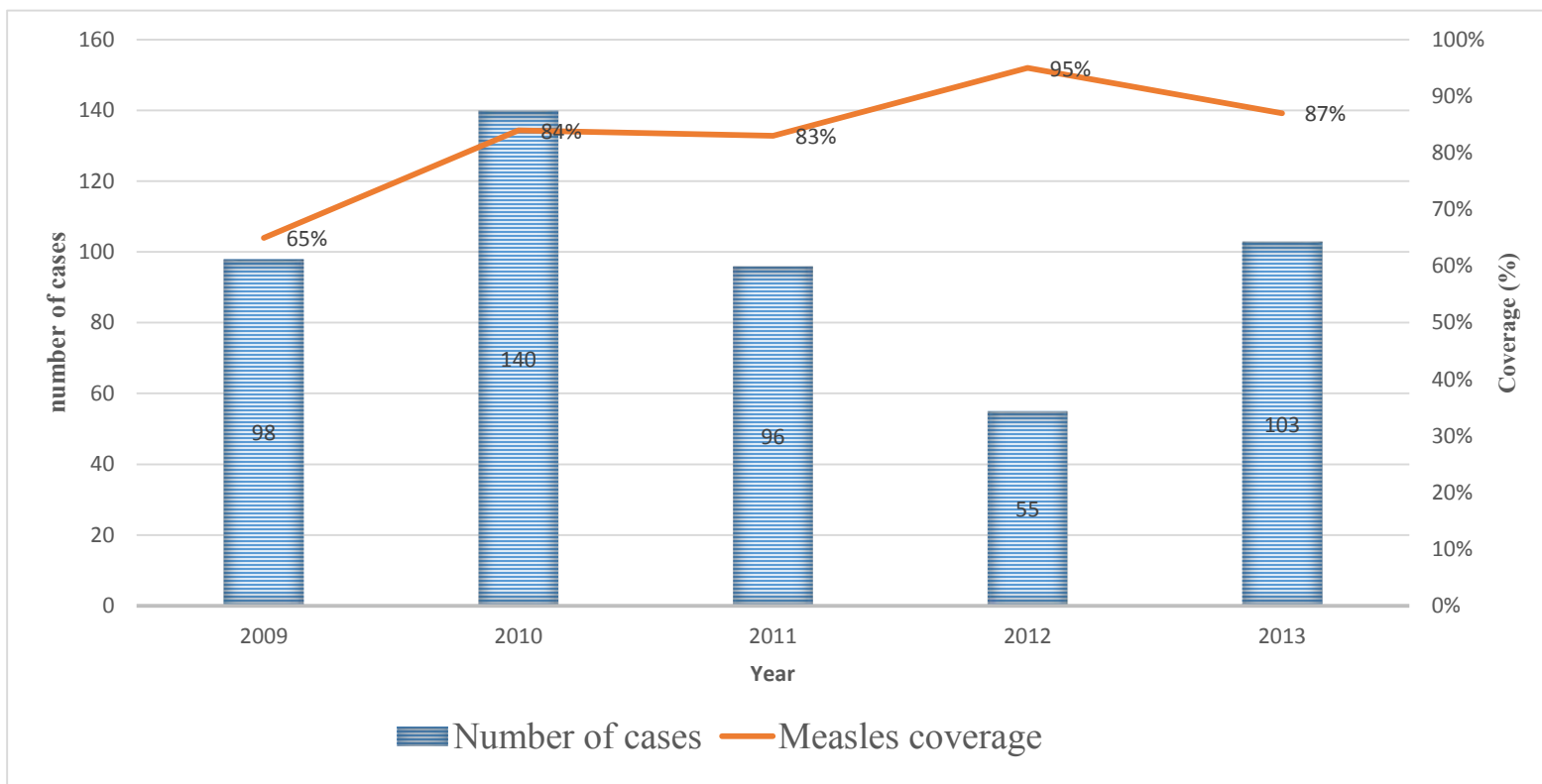


Figure 14: Measles cases reported and administrative vaccine coverage, West Gojam Zone, Amhara, Ethiopia

The mean proportion of children who had received pentavalent one, but not measles vaccine (Measles dropout rate) in the analysis period was 12%. Only three woredas were with mean measles dropout rate less than 10%: Quarit (2%), Finote Selam Town (9%), Wonberma (7%), Yilma ena Densa (7%) and Dembecha (9%).

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Despite annual population growth, the total number of children who had been vaccinated for measles in 2013 less than those vaccinated in 2009 by 4%. The inconsistency, the number of children vaccinated for measles in 2013 were less than the number of children vaccinated in 2009, had been observed in about seven woredas. The inconsistency was highest in Yilma ena Densa Woreda, the children vaccinated for measles in 2009 by far higher than those vaccinated in 2013 which had showed decline of 41% which was the highest decline among fifteen woredas.

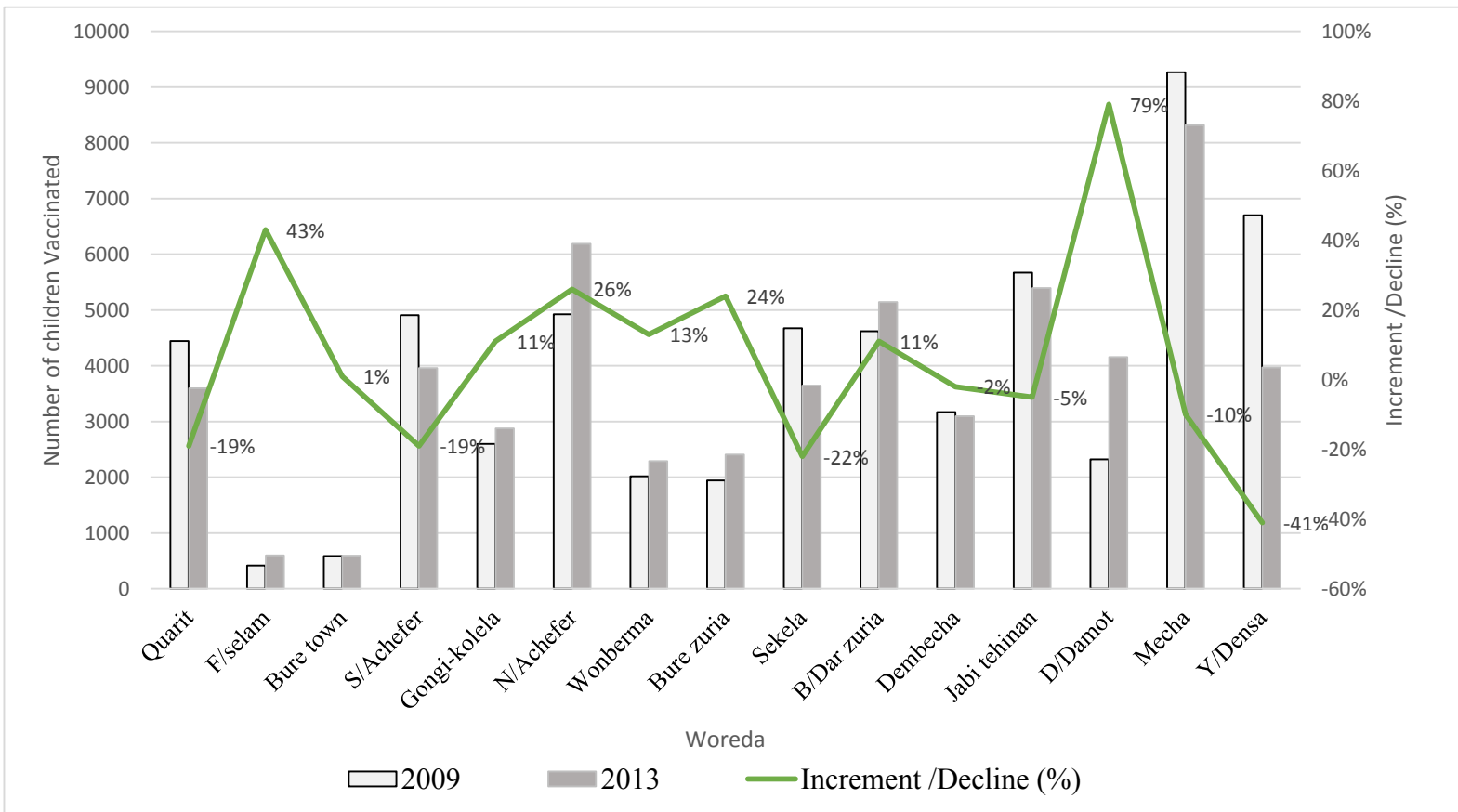


Figure 15: children vaccinated for measles and percentage of increment / decline, West Gojam, Amhara 2009 and 2013

There have been 111,005 susceptible individuals between 2009 and 2013. More than a third 45267 (41%) susceptible individuals in the zone were contributed by four woredas; Yilma ena Densa 13413(12%), Mecha 11887(11%), Dega Damot 10729 (10%) and Jabitehna 9237(8%).

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Table 7: Number and proportion of susceptible individuals by woreda, West Gojam Zone, Amhara 2009-2013

Woreda	Susceptible individuals	
	Number	Percent
Quarit	3549	3%
Finote Selam Town	3553	3%
Bure town	4338	4%
South Achefer	5178	5%
Gongi-Kolela	5705	5%
North Achefer	5821	5%
Wonberma	6138	6%
Bure Zuria	7480	7%
Sekela	7934	7%
Bahir Dar Zuria	8021	7%
Dembecha	8022	7%
Jabi Tehinan	9237	8%
Dega Damot	10729	10%
Mecha	11887	11%
Yilma ena Densa	13413	12%
Total	111005	100%

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The susceptible individuals accounted for 5% of the current year's (2014) population. The percentage of susceptible individuals from current year's total a population of the woredas ranges from 3 to 10%. The highest percentage of susceptible individuals were in Finote Selam Town which accounted for about 10% of current year's (2014) population. The accumulative susceptible individuals in the zone was by far exceeds the two thirds of current year's(2014) estimated birth cohort ;It has been found to be as high as two to six fold of the estimated birth cohort in 2014 in all woredas. (See *Figure 16* below)

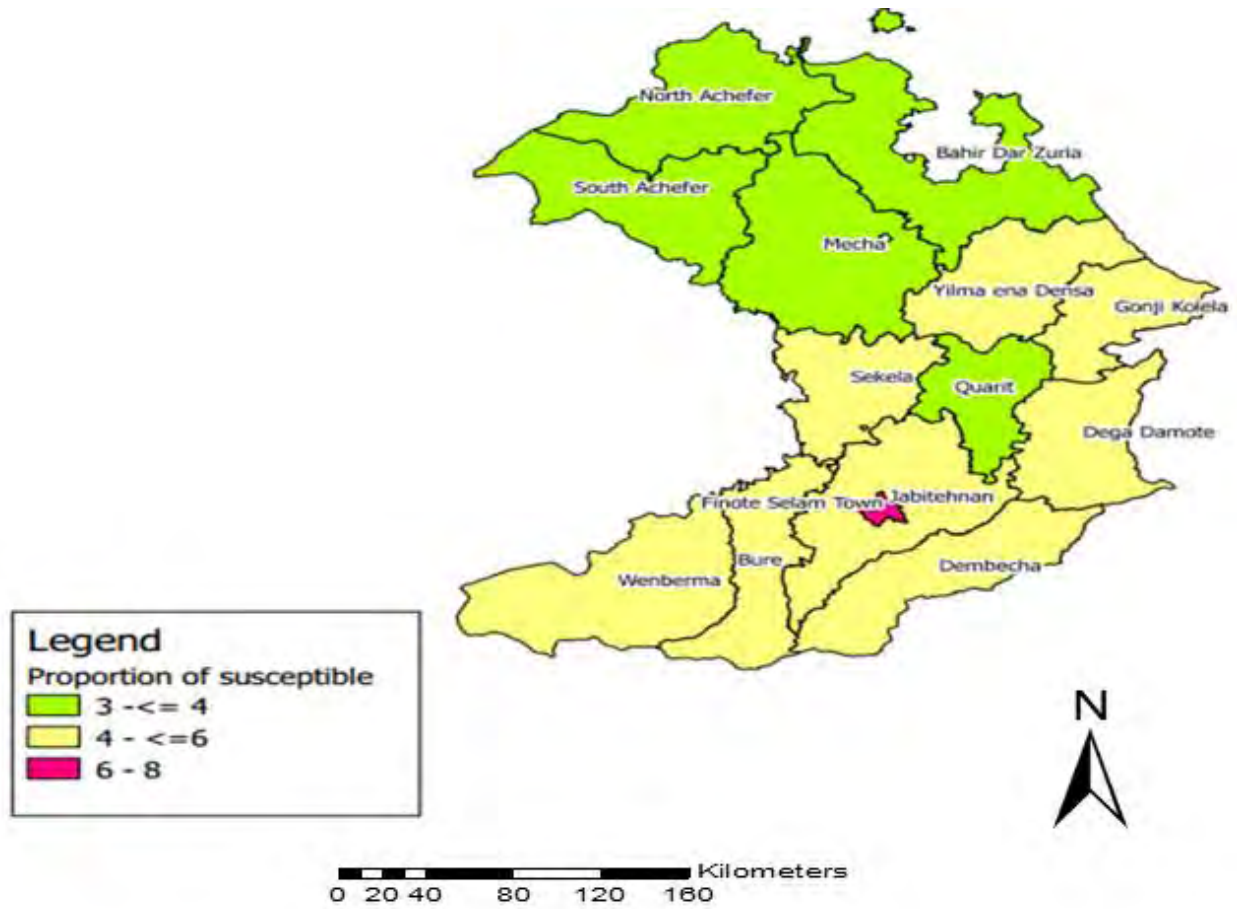


Figure 16: Proportion of susceptible individuals from total population in each woreda, West Gojam Zone, Amhara, 2009 -2013:

Discussion

Unlike the global epidemiology of measles in the post vaccination era the majority of the cases were those less than five years of age moreover, most of the cases in this age group were vaccinated for measles. This might be due the fact that the vaccine doesn't provide absolute protection or it could be because of the fact that most of them had received just one dose and also an improper recording of vaccination history .Moreover it could also reflect vaccine efficacy problem that might occur while vaccination as the reconstitute vaccine may lose their effectiveness. Reconstitute vaccine loses approximately 50% of the potency in one hour at 22 to 25⁰c and is inactive within one hour at temperatures over 37⁰c (6) .Those cases who were greater than five years of age that had contracted measles might be because of the fact that they had not yet developed immunity naturally as most were not vaccinated and the status of immunization had not properly documented (unknown /missed) along with too low routine measles vaccination coverage in the previous years to increase population immunity.

Despite the median age was less five years and SIAS campaigns were known to be undertaken in 2010 and 2013 in the region which targeted a broader age group, about a third 161 (33%) of total reported cases were reported with unknown vaccination status of whom nearly half 77(48%) of them were aged less than five years of age which could be due to poor vaccination history recording practice.

Three woredas: Bahir Dar Zuriya, Sekela and Finote Selam reported the higher measles incidence rate with median measles incidence rate greater than five /10000 population which could be because of the poor performance in routine immunization; all of these woredas had achieved an average measles coverage less than 90% and the average defaulter rate during the same period was higher.

The highest measles cases were reported in the second quarter of the Ethiopian fiscal year: from October to December, according to Ethiopian Fiscal year this might be the seasonal nature of measles the fact that measles transmission intensifies during the dry season in tropical areas

Limitation

Despite sex as one of demographic characteristic that could be a factor for morbidity data is absent of sex variable in most of reporting years. The analysis may overlook the incidence of measles because of the fact that only case based-data was used and in line with under reported nature of the disease. The supplementary immunization coverage was not taken into consideration to estimate the susceptible people; that is why we end up with higher number of susceptible.

Conclusion

The highest proportion of measles cases occurred among those less than five years of age .The routine immunization coverage was too low to develop herd immunity: which had resulted an increase in the accumulation of susceptible that might leave almost all 15 woredas at risk of outbreaks if conditions remain unchanged.

The surveillance system of the zone was not sensitive (in terms of detecting cases based on the case definition). The mean proportion of woredas reporting at least one measles cases per annum was below the required stand ard

Recommendations

Improve data management practice: the data base should include all the pertinent information like sex and case based report formats should be designed either in Excel in such a way that skipping patterns are applied to reduce errors that occurred during data collection.

Improve routine immunization: the highest cases in the under five children connotes the routine immunization is not high enough to develop herd immunity in the population

Intensify surveillance: Measles surveillance in all woreda should be intensified to uncover outbreaks and to monitor the immunization progress and regular outbreak risk analysis at the woreda and Zonal Health Departments.

Further study: studies in birth rate patterns and identification of factors for missed opportunities for immunization are very important to improve immunization and to protect the population from measles infection.

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Chapter III – Evaluation of Surveillance System

AFP surveillance Evaluation in Oromia Zone, Amhara Regional State 2015

Abstract

Back ground: Prior to the advent of immunization, poliomyelitis occurred worldwide. Globally, poliovirus type 2 appears to have been eliminated as the result of polio vaccination yet surveillance is not yet adequate to assure eradication in many countries. Polio Eradication program in Ethiopia was started in 1997. The purpose of evaluation was to assess the relevance, effectiveness of AFP surveillance system.

Method: We conducted AFP surveillance evaluation in purposively selected three woredas (Artuma Fursi, Dewachefa and Jile Timuga) of Oromia Zone, Amhara Region, Ethiopia. We randomly selected one health center and two health posts in each of the woredas. We collected data using checklists adopted from CDC and WHO Guidelines for surveillance evaluation to make observation and to interview the key informants on surveillance attributes and we also used structured questionnaire developed on open data kit (ODK) to interview health workers on their perception and knowledge on AFP surveillance. We analyzed quantitative data using EPI info version 7.1.4.8 and Microsoft Excel. We communicated the finding with the zonal health department.

Result: the AFP surveillance was found to be sensitive; the mean non- polio AFP rate between 2009 and 2013 was 4.7 /100,000 children less than 15 years population. Eighteen (47%) of the total 38 interviewees couldn't clearly define AFP. The surveillance system has case definition for the community and specimen collection does not require any skill however none of the health

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extension workers had filled the case based report format and all of them thought that it was not friendly with them. The system had experienced different changes from multiple surveillance to integrated surveillance system .All 38 interviewees agreed to respond the questionnaire. The key informants underlined the usefulness of the system they said that the system was very crucial to monitor the implementation of the eradication strategies underway .The system lacked representativeness (only facility based surveillance system.) .There was no any programmatic supervision in place .

Conclusion: The system is on its right track regarding attaining the required sensitivity level and it is user friendly in terms of detection and specimen collection. Lack of representativeness, absence of regular supervision and awareness of health workers may affect the system from attaining its objectives hence strengthening community surveillance, sensitization and regular programmatic supervision should a top priority.

Stakeholders:

The stakeholders that are engaged in Acute Flaccid Paralysis(AFP) surveillance include: health workers ,health extension workers ,health facilities (public and private),managers and officers who are working at different levels of woreda health offices ,zonal health departments , regional health bureaus(RHB) and Federal Minister of Health (FMOH) , communities and Partners working on public surveillance such as World Health Organization(WHO) ,Private clinics, community members, Public health professionals, surveillance focal persons, clinicians and laboratory technicians.

System Description

Public Health importance

Prior to the advent of immunization, poliomyelitis occurred worldwide. In the early 20th century, polio was one of the most feared disease in industrialized countries paralyzing hundreds of thousand children every year. It took longer for polio to be recognized as major problems in developing countries .Lameness surveys during the 1970s revealed that the disease was also prevalent in developing countries. As a result, during the 1970s, routine immunization was introduced worldwide as part of national immunization programs, helping to control the disease in many developing countries(1). Following the use of polio vaccine polio has been eliminated from most of the world .Globally, poliovirus type 2 appears to have been eliminated and surveillance is not yet adequate to assure eradication in many countries, it will be the third disease to be eradicated if it is eradicated successfully (2).

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The world has managed to reduce polio by 99.9%; the annual diagnosed cases from hundreds of thousands to 291 in 2012 yet recently there has been arriving renounce back in some countries towards more cases(3) . The remaining 1% is still difficult .conflict ,political instability ,hard to reach populations and infrastructure continue to pose challenges to eradicate polio(4) .

Following the announcement of polio eradication in the South East Asia region on March 27, 2014 by WHO; the portion of people living in polio free regions has reached 80%.(5)

Twenty-one wild cases have been reported worldwide at the end of March 2015 20 in Pakistan and one in Afghanistan. In the same period of 2014 ,51 cases were reported ,39 in Pakistan ,4 in Afghanistan ,1 in Nigeria and 7 imported in five non-endemic countries (6)

The oral polio vaccine is highly effective and inexpensive, (US\$ 0.30per child) (7)and its availability has bolstered the effort to eradication(8) . It is also important to the development of herd immunity(9); as it is logistically impossible to inoculate 100% the population .Vaccinating the majority of susceptible will protect the small individuals unvaccinated as the pathogen no longer survive in the situations where the susceptible is very few(9).

Describe the Purpose and Operation of the Surveillance System

Global polio eradication initiative was started in 1988. In 1996 the African heads of states committed to eradicate polio through implementing the recommended strategies. The strategies include: maintain high routine immunization (>80%) with Oral Polio vaccine /OPV, Supplementary immunization, AFP case based surveillance and mop up immunization .Polio eradication program in Ethiopia was started in 1997. The program was started by conducting subnational immunization in selected areas and establishing AFP surveillance. (10)

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Acute Flaccid Paralysis: is the process of detecting and investigating (stool sample collection) of all AFP cases in children less than 15 years. (10)

Poliomyelitis is the target is targeted for targeted for eradication, therefore sensitive surveillance system is critical for detecting the wild polio circulation(11).

The goal of AFP surveillance is to identify and document the presence and absence of wild polio virus in the country .Surveillance for AFP is used to capture all true cases of paralytic poliomyelitis.

Reliable AFP surveillance data will guide targeted immunization activities in areas with continued polio virus circulation .It is also accepted as the most reliable way to monitor the effectiveness of routine and supplementary immunization in decreasing the transmission .More over it is also used as a basis for certification of polio eradication(10).

Acute paralysis can result from various causes other than polio virus hence detecting and reporting flaccid paralysis is very crucial so that polio cases are not missed(10).

The level of Polio surveillance in Ethiopia starts from the community. The health facilities (Health post, Health Center, Hospital) are designated to report AFP .AFP cases should be reported to the next level within 30 minutes of after identification. The facilities should report both case based and aggregate data of AFP, including “zero” report.

Apart from the health facilities there are also other places to look for AFP cases these include: places where religious leaders, traditional healers and rehabilitation centers are found as parents may prefer taking their sick children to these places before taking them to health facilities. Community leaders, Health Extension Workers and Health workers are sensitized on vaccination

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and AFP surveillance so that all children get vaccinated against vaccine preventable diseases and they can actively take part in AFP surveillance.

The reporting sites should be prioritized before regular visit. The reporting sites should be identified and ranked in terms of priority (High, Medium and Low) based on the size and type of population patient volume, and the presence of physicians and specialists. High, medium and priority sites should be visited once every week. (10)

The standard case definition for AFP surveillance:

Suspected case: Any child under 15 years of age with acute flaccid paralysis or any person with paralytic illness at any age in whom the clinician suspects poliomyelitis

Confirmed case: A suspected case with virus isolation in stool

Whenever there is AFP case is found the case should be investigated immediately using AFP investigation form. Four investigation forms should be filled and two stool specimens also should be collected 24 hours apart in two clean separate clean containers and the specimen should reach to central laboratory within 72 hours. The timeline to report between successive reporting levels is about 30 minutes. The intended time taken to report the immediately reportable event to the national level is two hours. When suspicious case of AFP is found in log book needs to be followed to check for the presence and absence of AFP. Follow up examination is conducted for cases investigated after 14 days of paralysis to check for the residual paralysis.

Weekly summary AFP report is also part of the surveillance system; the Health Facilities (Public and Private) are expected to report. Cases reported by case-based are also reported by weekly report format in that week. Weekly reports from the health facilities are sent to the woreda health office by phone or submitting the hard copy report. The reporting means from woreda health office

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is by phone, paper based and electronically based on the availability of the infrastructure and the skill of the focal person .The zonal health department sends the report electronically to the regional health bureau .The regional health bureau also electronically sends the report to Federal Ministry of health(As shown *Figure 17* below) . The data qualities for both reporting phases; immediately and weekly are regularly checked at each level .The health care workers and PHEM focal persons get sensitized how the reporting formats are filled specially the case based report format.

Active surveillance is also should be conducted in priority areas to look for missed AFP cases and to identify cases that were brought to get treatment.

There is also a feedback provision system in place .Regular feedback is expected to be provided to the partners and the reporting institutions. The collected case based-data is entered into Epi info and the data is shared in Microsoft Excel format.

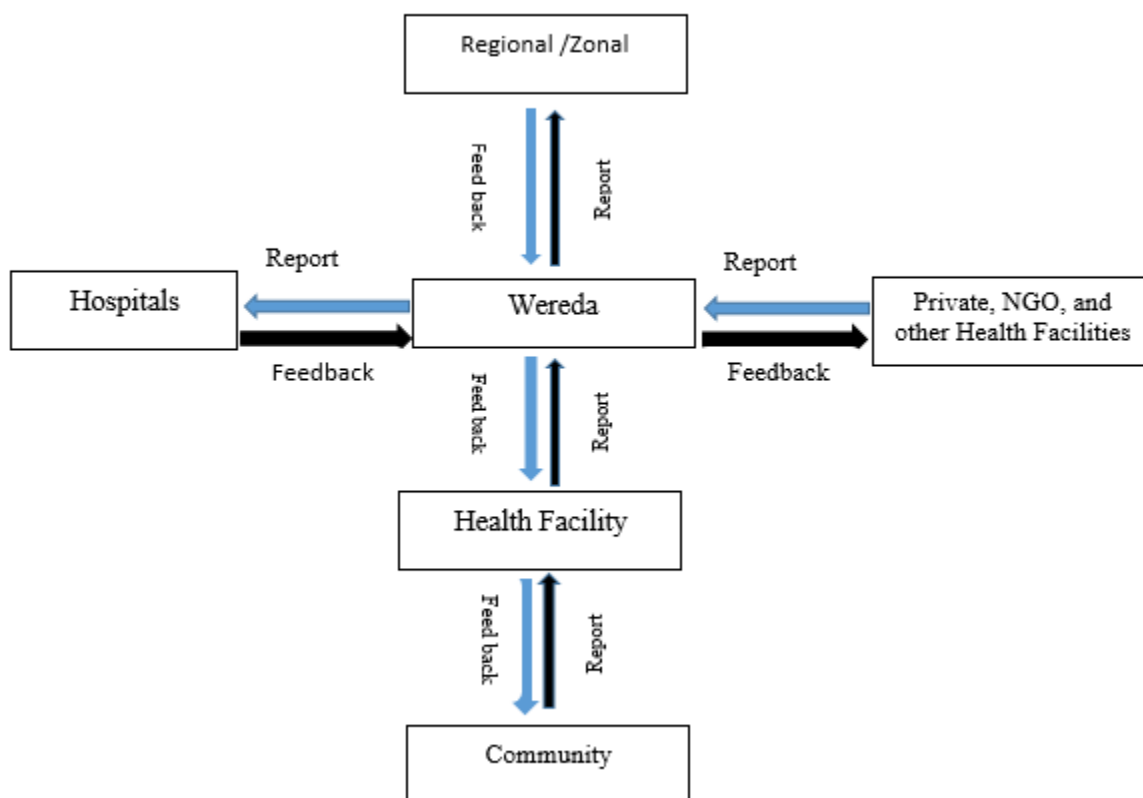


Figure 17: Information flow in PHEM Ethiopia

Description of the study area

Oromia zone is one of the 11 zones found in Amhara National Regional State .It was named for Oromo people who settled in the area the zone is bordered on the south west by North Shoa, on the Northwest by South Wollo Zone and Argoba Special Woreda and on the East by the Afar Regional State. Kemise is the administrative center of the zone .The zone consists of seven woredas including the two town administrative (Bati and Kemise Town). It has 118 kebeles (16

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urban) the zone has a total population of 52964 of whom 263 135(50%) are males, only small proportion 14% (72385) of the inhabitants live in urban setting. The children less than 15 years of age are estimated to be 225,627. The primary health coverage in the zone is 100 %.

The AFP surveillance evaluation was conducted in Artuma Fursi, Dewachefa and Jile Timuga woredas. The total population in these woredas is 95019, 121641and 83554 respectively. These woredas accounted for more than half of the total population in the zone. The primary health coverage in the woredas is also 100%.

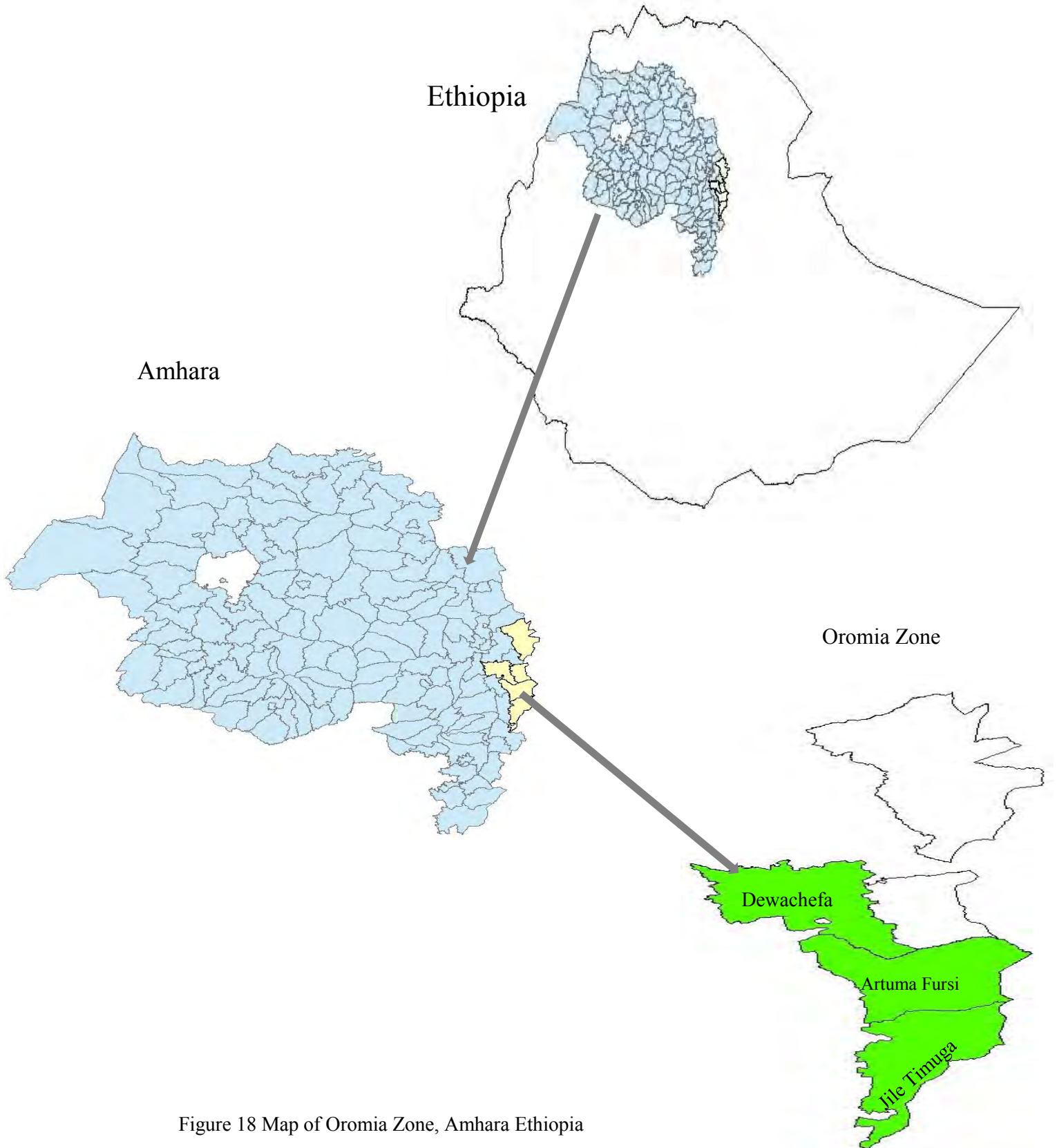


Figure 18 Map of Oromia Zone, Amhara Ethiopia

Resource

The source of budget for surveillance system is from the Government and non-Governmental organizations. Most of the resources for undertaking Surveillance are supplied by the government; the salary of the Health workers who are working on the surveillance system is covered by the Government. The partners on the other hand support the surveillance system, though providing technical and financial support that enhances the proper functioning of the system. The World Health Organization is the most important one that is playing a great role in developing guidelines, protocols, supportive supervision, training and financial support to reinforce active case search and reimburse the expense of health workers who take specimen to central laboratory.

Evaluation Design:

Purpose

To assess the relevance, effectiveness of AFP surveillance system items of attaining the set surveillance objectives in the in selected woredas of Oromia Zone in 2015.

Specific Objectives

- To measure the AFP surveillance performance indicators
- To describe the important surveillance attributes
- To identify bottlenecks that hinder the surveillance system
- To use the finding to propose corrective measures

Sample and sampling procedures: We conducted purposive judgment non-probability sampling method ; the selection of woreda was based on the population size and surveillance performance

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and then we selected one health center in each of the selected woredas using lottery method and we also selected two health posts in the catchment of the selected health centers using selected by lottery method. We interviewed all the health care workers and one health extension worker who were on duty during the visited day in the visited facilities. The health care workers and the health extension workers who were on duty were interviewed so as to minimize the selection bias as the number of clinical nurses exceeds the other professionals in the health center. We randomly selected and interviewed one of the two health extension workers in conditions where only one health extension worker.

Data collection: we used a mix of qualitative and quantitative data collection approach; key informant interview, record review (reports and log books) and direct observations, personal interviews were made. We interviewed 38 health care workers and health extension workers using structured questionnaire designed on a special platform known as ODK collect. We collected data on the knowledge, perception and practice of health workers and health extension workers on the AFP surveillance so that it would be triangulated with the other findings. We also observed and collected qualitative data using checklist adopted from revised CDC's surveillance Evaluation Guideline 2001 and WHO surveillance Evaluation Guideline 2006

Data processing and Analysis: We analyzed the data using Epi-Info software version 7.4.1.0 and Microsoft Excel. AFP surveillance indicators such as non-polio AFP rate and stool adequacy rate, and proportions on regarding surveillance functions were computed.

Ethical considerations: Health care workers, health extension workers and key informants (Public Health Emergency Management officers/PHEM, Heads) in the selected woredas were

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requested for their consent to take part in the evaluation; besides these none of the subjects were not asked for personal data such as phone number.

Result

We interviewed 38 health workers and health extension workers ,of whom 16 (42%) were females .The median years of service were also found to be five years (with rage of 3 months to 15 years) .Most of them 10 (2%) were nurses by profession. Only 12 (32%) had ever trained at least one time in their entire career. The health extensions trained since two years ago; we found trained focal persons in each of the three health centers visited .The attrition rate of those trained focal persons and trained PHEM officers in all the three Woredas in the previous year was the previous one year was zero.

Usefulness

AFP surveillane is used as a proxy for Polio surveillane .All acute paralysis may not cause by polio virus yet paralysis is one of the sign and symptoms of polio cases hence the surveillane is designed in such a manner that it captures true cases poliomyelitis. The surveillane helps to identify the areas where there are wild polio virus circulation, to evaluate the effectiveness polio immunization strategies (Routine and supplementary immunization activities) and the surveillane is also basis for polio eradication certification. All the key informants and the interviewees strongly agreed that the surveillane is important; they highlighted that because of the fact that the disease surveillane systems are streamlined and integrated it would enable them to uncover outbreaks and to instigate response so as to halt further spread. The key informants added that AFP surveillane

in particular was very important revealing the commitment of the government in implementing the polio eradication strategies. One health extension worker said that “Surveillance tells me what is happening in my kebele”

Simplicity

The case definition for AFP is highly user friendly .It is further shortened in a way that any layman can identify flaccid paralysis case. The levels to which the report is communicated with is also straight forward and vertical .The collection of specimen doesn't require special skill and equipment .It only requires sensitization and the follow-up individuals working in the system .The weekly report format is used for the surveillance is the one that is used for reporting other notifiable diseases and events; no separate weekly report format for AFP. None of the health extension workers said that they had not filled the case based report format and all of them thought that the form was not friendly to them as it had been prepared in English. Moreover the fact that the detailed information collected during follow up of the late cases late cases need follow up along with the detailed information to be collected during follow-up makes the system relatively difficult when it is compared to investigation of other diseases /conditions .Out of 36 interviewee only five (14%) witnessed that they had ever filled the case based at least one time ;according to them on average it would take them about 10 minute to complete the case based .The surveillance performance indicators to be monitored are not too many and difficult to be calculated ,analyzed and interpreted by program managers .

Currently, following the implementation of electronic PHEM (E-PHEM) we observed that dual systems were being practiced at woreda health office; traditional reporting system /Excel data base and E-PHEM which makes the woreda PHEM officers to enter the data in the two system separately. According to the key informants (particularly woreda PHEM officers) the E-PHEM

had a number of limitations such as: it never allow to monitor timeliness and completeness, it was not customizable (it is impossible to add reportable data elements) and it didn't track all the reportable data elements (it fail to include total outpatient under the section malaria report which is included in the excel data base)

Flexibility

The disease surveillance system in the country before 1998 was multiple prioritized conditions had their own surveillance system separately. However following the commencement of integrated disease surveillance and Response (IDSR) system in 1998 the multiple surveillance systems switched to integrated disease surveillance approach the system was functioning between 1998 and 2009. When the new Business Process Reengineering (BPR) was started in the in 2009. Public Health Emergency Management (PHEM) was established as one of the seven new core processes established in Federal Ministry of Health .Its scope is wider than IDSR as it tracks public health emergencies apart from disease outbreaks. During the era of IDSR monthly morbidity and mortality reports were collected from health centers and hospitals. However in the new system, PHEM the reporting begins from the health post and the reporting frequency shifted to immediately and weekly basis. AFP was one of the 23 prioritized diseases and conditions reported currently in spite of the fact that there are 20 priority disease and conditions are prioritized to be reported the in the system . It also allows to report other events that are found to be threats for the public .The system is designed in a way that is flexible to include diseases that emerged and reemerged; for instance, following the occurrence of the pandemic influenza H₁N₁ in 2009 the disease had included under the system.

Data Quality

During our visit, we found weekly report formats in which AFP was left blank .Besides this in one of the health center we found a weekly report format prepared by hand writing, which didn't include the fields for all immediately reportable events /conditions that are always supposed to be included in the report format .Health facilities are supposed to record zero in the column whenever there is no cases of immediately notifiable disease in that particular week.

Some of carbon copy reports found in the health facilities lacked clarity; it was not clearly recoded; values recorded on the carbon copy were recorded on the way that misleads /confuses; we found report formats in which the record value of the field was wrongly recorded in the field that is either below or above it in the order of appearance on the report format .

From the data base between 2009 and 2013 the vaccination history for five (10%) cases was reported to be as unknown

Acceptability

All the key informants and interviewee were keen to participate in the study .The response rate was 100% .We found that the reports were more or less complete ;almost all the fields were filled . Feedbacks from the central level to the reporting health facilities were not delivered on time even in some of the health facilities they didn't have any ideas regarding feedbacks .The rate of community participation is still very low despite the community surveillance had been started in the woredas .One of the six health extension worker complained that the woreda health office along with the health center told her that she couldn't take the specimen to the central .They told her that as if health workers were the only authorized to take the specimen to the central laboratory, which is untrue , however she had managed to do so.

Sensitivity

The overall sensitivity notification system in the zone has been best yet sensitivity was varied in different woredas .The mean non polio AFP rate /100,000 children under 15 years of age between 2009 and 2013 in the zone was found to be 4.7 .The zone had achieved the required Non-Polio AFP rate (Which is greater than or equal to two /100,000 children under 15 years of age) between 2009 and 2013 (as shown in *Figure 18*) .The average non-polio rate in Artuma Fursi, Dewachefa and Jile Timuga was four ,two and 10 respectively .

We found case definitions of AFP in all health centers and in the three health posts out of the six health posts visited .All the case definitions found in the health posts were prepared in English, despite there were case definitions in Amharic. Eighteen (47%) of the total 38 interviewees couldn't clearly define AFP. Some of them failed to state the case definition, even though there was case definition on the wall of the room where they are working. All of the six health extension workers said that they preferred Amharic case definitions to English .Two of them added that it would have been also good to have case definitions in Afan Oromo as well. The majority of the participants 29 (76%) answered that the AFP surveillance was a proxy indicator for polio; the remaining nine thought that it was for measles.

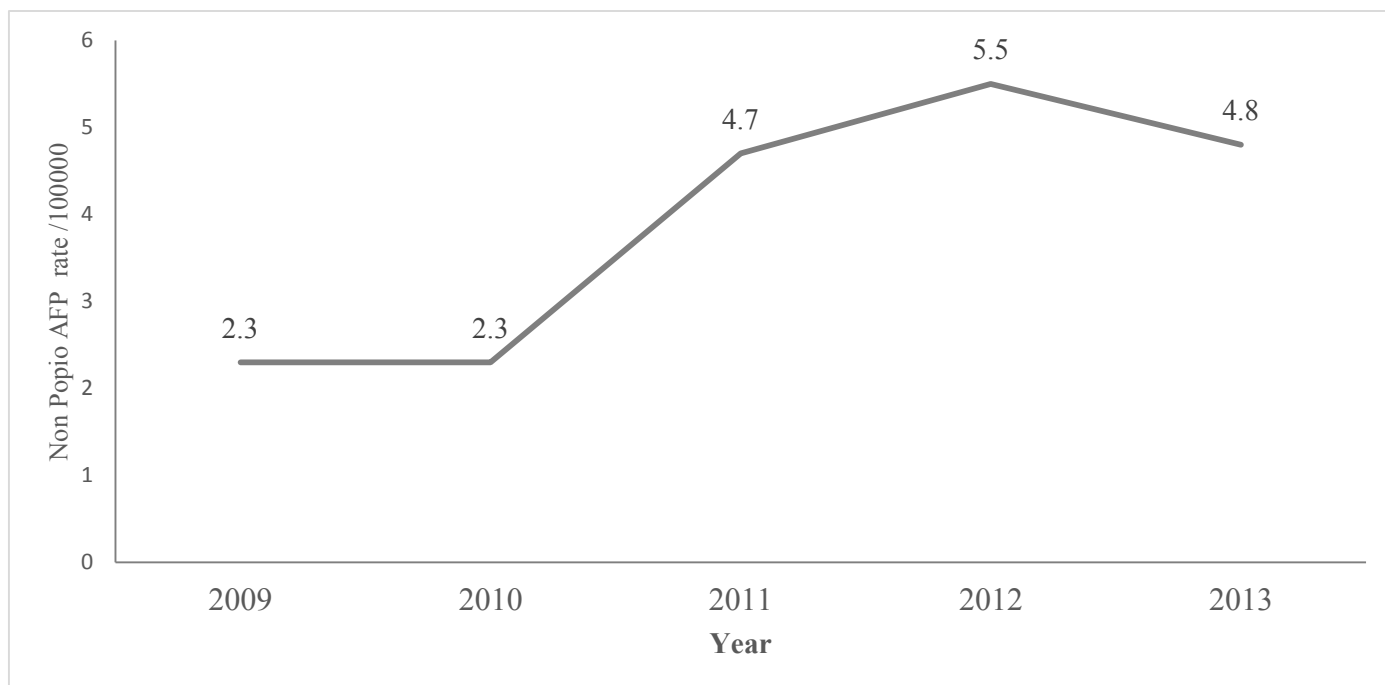


Figure 18: AFP surveillance performance Amhara Region, Oromia Zone, 2009-2013

Predictive value positive

We couldn't calculate the predictive positive value as there wasn't any positive AFP case for wild polio cases.

Representativeness

The out Patient (OPD) attendance per capita in the zone in 2014 was 0.6 whereas the OPD attendance per capita in Artuma Fursi, Dewachefa and Jile Timuga was 0.2, 0.5 and 0.8 respectively. None of the woredas except Jile Timuga achieve the target set on health Sector strategic Plan IV; which shows there is still a gap on the community side to visit the health facility despite 100% primary health coverage. The reporting rate among health facilities varied ;the

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reporting rate of health centers ,health posts and private health facilities was 98%, 80%and 84% respectively .

Timeliness The weekly report timeliness in the zone in the previous fiscal year (2006) was 83% and the timeliness of Artuma Fursi, Dewachefa and Jile Timuga was 84%, 86 % and 82% respectively. The median date when the AFP cases was recognized by health workers between 2009 and 2013 was five. The large proportion of the interviewee 34 (89%) answered that AFP is reported immediately (within 30 minutes) to the next level of whom 32(94%) could clearly define AFP .On the other hand 11(29%) ,14(37%) , five (13%) and nine (24%) of the interviewees assumed that AFP case would be considered as late case if it was investigated 14 ,60 and 90 days after the onset of paralysis respectively .

Stability

All of the six health Extension workers have been trained on PHEM or AFP surveillance since two years ago. Twenty (63 %) of the total 32 health workers and five of the total six health extension workers answered that they didn't ever know the case-based report format for reporting AFP; only the PHEM focal persons were familiar with such stuffs .All the health offices didn't take regular back up data from the computers in which they are using .The health offices had blank report formats that would be used in the outages of power and network .The health posts sent reports the nearest health center by travelers /patients who may pass through the health center .They also used their mobile phones to report ,sometimes they themselves took the reports to the catchment health center ; which had its own drawback in delivering the report on time and in wasting time of the health extension workers which result in not only disrupting the service quality which is

provided by the health post but also has straight forward impact on the stability of the surveillance system as well.

There had been no programmatic supervision /focusing on PHEM in place to monitor the progress ,identify the problems so that corrective action is taken to keep the surveillance on the intended track . The key informants expressed that the system might not keep its current pace in the absence of World Health Organization.

Limitation and strengths of the evaluation

As the sampling design, non-probability sampling design in line with the sample size (number of health facilities and woredas) covered in the study may not be not representative enough; it may not allow us to make strong conclusion on the surveillance status that is valid for the entire woredas found in the zone. The study on the other had had strength regarding interviewing health workers apart from key informants in order to support the qualitative findings.

Conclusions

The overall sensitivity of the surveillance system is found to be sensitive enough according to the indicator set by WHO nevertheless there were varieties in terms performance among woredas. The surveillance system was found to be useful, acceptable, simple, and flexible however the system fail to be representative enough and also has a problem in data quality.

Recommendations

Capacity Building: health workers especially health extension workers should get regularly trained on disease surveillance activities. Not only the health extension workers but also the health care workers should be regularly sensitized on the notifiable diseases and conditions.

Case definitions: case definitions with different language; Amharic, Oromifa and English should be distributed to health facilities. PHEM officers should make sure the proper delivery of case definitions and also make regular follow-up on the proper utilization of case definitions by end users.

Supportive supervision (programmatic): Regular programmatic supervision is critical and should be in place to ensure the effectiveness of PHEM activities.

Improve reporting means /approach

We strongly recommend the woreda health offices to assign someone in the catchment health center to collect reports and to support the health posts on different activities at least once a week. Moreover case-based report format should be translated to the local language (Amharic) by regional health bureau in way that it is friendly for those health extension workers.

The FMOH should figure out the issues that should be taken into consideration before the commencement of the implementation of E-PHEM in the country.

Community surveillance: To increase the sensitivity and the representativeness of the surveillance system the community based surveillance system should be reinforced. The one to five formation team leaders /developmental team should be encouraged in order to increase their participation on the surveillance.

Feedback: the health offices and Zonal health department should make sure that of laboratory result has been sent back to the reporting health facility in time and also should make sure its proper documentation at health facility level.

Compiled Body of Works

Evaluation: regular surveillance system evaluation should be carried out by zonal health departments, regional health bureau and FMOH for the purpose of maintaining the efficiency of the system towards achieving intended objectives of the surveillance system.

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Chapter IV – Health Profile Description Report

Executive summary

The Amhara National Regional State is one of the nine regional states found in Ethiopia which is located in Northwest of the country; it is the second most populous region next to Oromia Regional State. It has eleven zones and two town administrative. Oromia Zone is one of the three special zones found in the region. It was founded in the late summer of 1994 in response to question of ensuring the autonomy of Afan Oromo speaking people.

Artuma Fursi is one of among seven woredas found in the zone. It is located in the south of the central town of the zone, Kemise Town. The capital town of the woreda is Chefa Robbit which got its name from the valley “Chefa “and “Robbit” from the market day ,Wednesday which is meant “Robe “ in Amharic.

There are 25 kebeles of which only two kebeles are urban. The total population of the woreda in 2014 is estimated to be about 93,386, the second most populous woreda in the zone. Most of the inhabitants’ are Oromo (86%), followed by Amhara (12.54%) and the rest account only 0.5% of the total population.

The main economic activity in the area is agriculture; Most of the people are engaged in crop production (about 60%) and livestock (32%) and the rest (8%) of the people are engaged in trade.

Method: we interviewed and made discussion with concerned bodies; we reviewed routine service reports and survey results. We compared the indicators with what has been set on health service development program.

Finding and Discussion: In spite the fact that education is a corner stone for economic development of a nation, largest numbers of out of school children all over in the world are from sub Saharan Africa, where half of out of school children are found. In 2006 E.C, though woreda had planned to enroll about 22,235 students, there were about 22283 students registered of whom 11088 (49.8% were Females. .About 100(15%) teachers have been left their job since the beginning of the fiscal year.

Although all pregnant women were attended ANC once , the proportion of pregnant women who had had four visits were only 45%; which was more than twice as large as the national coverage (19.1%) found in EDHS 2011 yet the discrepancy was very high. In 2013, 17% deliveries in the woreda were attended by skilled health professional. Despite good access for immunization, the utilization is poor; the dropout rates for pentavalent vaccines and measles were 11 and 14% respectively; which were more than two fold of the target. Total clients who has received PIHCT and VCT were 13945(32%) of whom 74(0.1%) were positive whereas the positivity rate among total tested pregnant women (1774) was 0.3%.

In the previous fiscal year TB case detection rate (All forms), Cure rate, and Success rate were 60, 76and 86% respectively. The detection and the cure rate were below the target

Conclusion: Most of the activities that are being undertaken are likely to be on the good track however an incessant efforts are crucial to play a role in achieving health related Millennium development goals (MDG)

Background:

Amhara National Regional States is one of the nine regions found in Ethiopia which is located in Northwest of the country; it is the second most populous region next to Oromia Regional State. The region has eleven zones and three town administrative. Three zones in the region are special and autonomous as the residents have different culture and language from the rest of the zones in the region .Oromia Zone is one of the three special zones in the region .It was founded in the late summer of 1994 in response to question of ensuring the autonomy of Afan Oromo speaking people. The name of the zone was given from the Oromo people who are the major ethnic group in the area that account for more than eighty-five percent of the population in the zone .The zone is found in Southeastern part of Amhara Region ;currently it has five woredas and two town administrative ;Bati and Kemise Town , the former is well known among most of Ethiopians as there are a number of traditional songs about the beauty and the hospitality of the people whereas the latter is not as famous as Bati yet it is the center of zone administrative, which is found in the Northeastern Ethiopia, with latitude and longitude of 10°43'N 39°52'E .It is low land , with elevation of 1424 meters above sea level .

Historical back ground of the area

Artuma Fursi is one of the woredas in the zone which is located in the south of the central town of the zone Kemise , the woreda capital is Chefa Robbit Town which got its name from the valley “Chefa “and Robbit from the market day Wednesday which is meant “Robe “ in Amharic .

Geography and climate/Agro Ecological zone

The woreda is located $10^{\circ}35'23.14''N$ and $40^{\circ}01'29.46''$ with altitude of 1762m above sea level. It is bounded to Dewachefa and Dewie Harewa Woreda in the North Jile Timuga Woreda in the South, Afar Regional State in Eastern and Antsokia Gemza Woreda of North Shewa Zone

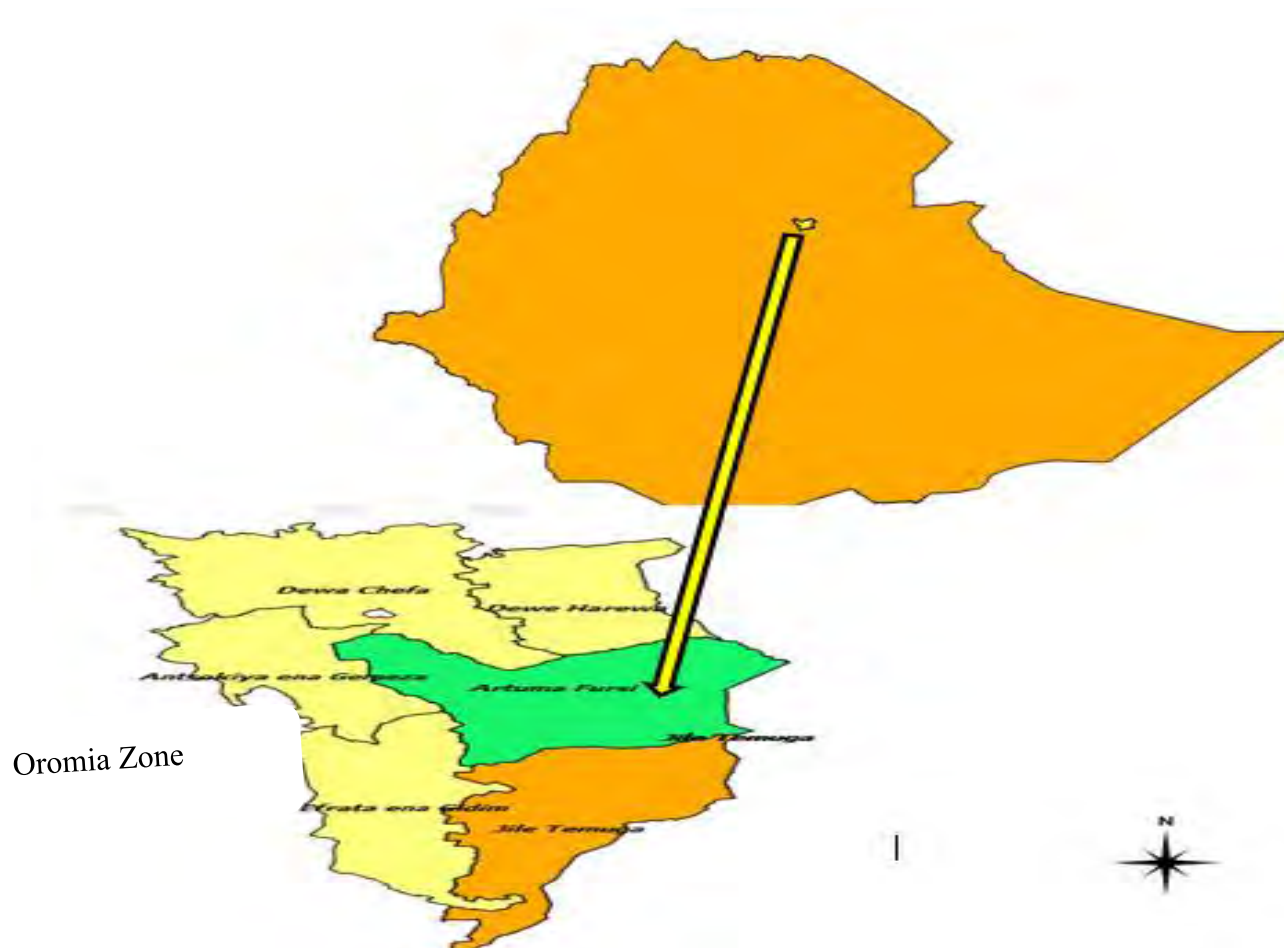


Figure 19: Map of Artuma Fursi Woreda, Amhara, Ethiopia

(Amhara) in North West, Efrata Gidim Woreda in the southwest. There are two climatic zones Kola (80%) and Woyina Dega (20%).The surface area of the woreda is about 694 Km². The average annual rain fall in the area is 600-900mm per annum and minimum and the maximum average annual temp is 12 and 34⁰C respectively.

Political and administrative organization and demography

There are 25 kebeles of which only two kebeles are urban. The woreda is the second most populous. The total population of the woreda in 2014 is estimated to be about 93,386 which account for 18% of the total population in the zone .Like most of the areas in the country the majority of the population, 81415(91%) reside in the rural.

Most of the inhabitants are Oromo (86%), followed by Amhara (12.54%) and the rest account only 0.5% of the total population .Majority of the residents are Muslims (98.5 %) whereas Orthodox and other religions followers account 1.5%and 0.5% respectively.

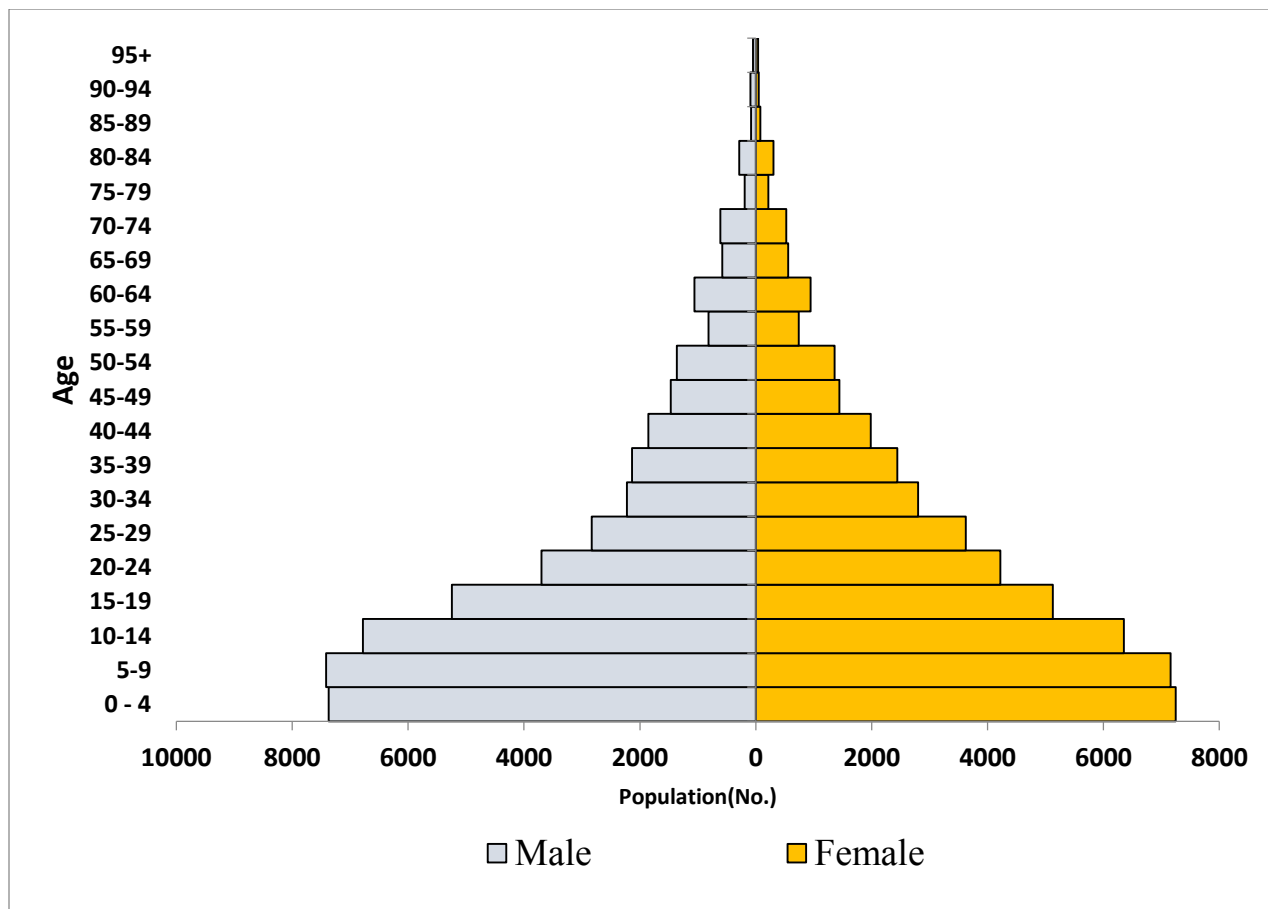


Figure 20: Population Pyramid of Artuma Fursi Woreda, Ethiopia 2014

Economic activity

The commonest food crops that are produced include; maize, sorghum and teff. Khat is the cash crop that is cultivated by the farmers for market. It is also highly consumed by the community as stimulant while working and attending social gatherings (ceremonies).

Transportation and communication facilities

As the woreda capital town is along the main road from Dessie to Addis Ababa where there is full access for public transportation for the people who travel to and from. Currently the Federal

government of Ethiopia is intensively working on constructing roads to increase transportation access in rural areas which in turn has a straight forward impact on improving livelihood of the community .The community can easily bring their products to the market besides this it has a vital role in helping the effort that is being made to reduce maternal death as mothers can be taken health facilities by ambulance within fraction of hours. From total 25 kebeles 15(64%) have access for public transportation at least once a week. Regarding electrification five (20%) kebeles have access for 24 hrs. of electricity in addition two health facilities in kebles where no electrification, have solar source of energy on the other hand almost all kebles have access for mobile network.

Education

Education plays a vital role for the development of a country; these days access for education at all level has showed tremendous progress. In the woreda there are about 44 primary schools, two high schools, one Preparatory school and one TVET that provide education for the society. Though the access and the enrollment were very poor in the previous decades, these days the access and the enrollments have shown remarkable progress.

Health service coverage

The health service coverage is not an exception regarding improvements. To improve the health status of the marginalized community the Federal Government of Ethiopia has embarked health extension program which mainly focus disease prevention and control and health promotions activities .The physical health coverage in the woreda is 100%.There are six health centers and 24 health posts that provide primary health care service for the community.

Objectives

General Objective: To assess and describe health related issues about health status, health indicators and to identify problems for priority setting.

Specific Objectives

- ❖ To identify the constraints and strengths in the woreda health system
- ❖ To develop baseline document for further planning and implementation for the woreda health office and other bodies that have stake in health
- ❖ To monitor the key health performance indicators for priority setting

Method

Study design; qualitative/ interviewing and observation

Data collection; Data was collected using checklist: officers at woreda level; health office, educational office and Agricultural and rural development offices were visited to collect respective pertinent information. Health Management Information System (HMIS) data were reviewed; national health survey documents such as EDHS 2011 were also reviewed so as to collect some pertinent indicators that have not been collected at woreda level.

Finding and discussion

Food security

Despite all millennium goals are equally important, food security is the first and foremost important goal of MDG. Achieving the reality of other goals without ensuring food security is unthinkable. The countries in which most population living below the poverty line specifically in sub-Saharan Africa are fighting to defeat the battle against extreme poverty and hunger since the declaration. Ethiopia was one of these with history of prevailing drought and famine during 1980s. Immense activities have been in place to alleviate poverty and to change the image of the country as well as the result of this extraordinary progresses have been observed.

The woreda is one among some woredas in the region where productive safety net program is being undertaken. The program focuses on the poor so that they develop asset and productive enough. About 11171 (27%) safety net beneficiaries have graduated since the initiation of the program, 2006. There are two cropping season in the woreda; Mehere which starts from April ends at December and Belig, as the zone is among few zones in the region that produce in Belig; that ranges from February to June. According to the previous crop assessment (2005 E.C cropping calendar³) the yield found was about 400,479 quintals which was 87% of what had been planned and was the highest production ever in decade. In spite of the fact that there had been substantial increment in production there were still few that need support. According to pocket area analysis about 4009 population need support nevertheless the number decreases to 701 when safety net is taken into consideration.

³ Crop calendar starts from Tir 1 and ends at Tahisas 30 /different from fiscal year

Education

It is unquestionable that education is a corner stone countries' development. A country has nothing to do without educated human resource; this is why it is one of MDGs that are supposed to be achieved at the end of 2015. It is intended to achieve universal primary access coverage and also target is to alleviate gender disparity in attending schools.

As a matter of fact the largest numbers of out of school children all over in the world are from sub Saharan Africa, where half of out of school children in the world are found. The region is with the smallest net adjusted enrollment rate which is about 77% in 2011(MDG report 2013). In Ethiopia tremendous progress has been observed in increasing access and enrollment since two decades ago. The nation has a grand strategic plan known as Growth and Transformation Plan, so that the country become one of the middle income nations of the world at the end of 2025. The nation has set targets in all sectors to bring what has been planned.

The targets of Education sector Development program IV (2003 -2007 E.C)/ESDP mainly focus on admission, transition and internal efficiency. The country has targeted net intake rate in grade 1 to 97% and the dropout rate and repetition rate for grades 1-10 to be 1% each.

In 2006 E.C, in spite of the fact that the woreda had planned to enroll about 22,235 students there were about 22283 students registered of whom 11195 (50.2%) were males and the rest were females. The dropout rate has shown to be declined by 63% as compared to the previous year which was 4.9%, which was five times what is targeted in ESDP IV. Though the current dropout rate (1.93%) there were threats that would likely increase the rate; the first and most important issue was high attrition rate of teachers who come from Oromia Region in search of better life

.About 100(15%) teachers had left their job since the beginning of the fiscal year .The second factor that attributed for drop out was the way of life of the community as most of the farmers take their cattle in places where there is pasture; particularly male student become out of school as they are supposed to keep cattle. To tackle the attrition rate of teachers in the woreda was deploying those diploma and degree graduates regardless of their field of study so as to mitigate the students who would be out of school because of absence of teachers. There was an intention of deploying those who had completed grade 10 and got them trained on pedagogy during in the summer in the college found in Kemise.

Water and sanitation facilities in schools where pupils spend more time during weekdays are highly vital to control the critical problems particularly communicable diseases. .According to annual abstract of Minster of Education 2007/2008 the latrine coverage in primary and secondary schools was estimated to be 90% and 100% respectively .Likewise in the woreda all of the schools, 48 (100%) had pit latrine however the water supply coverage was 27%(13) which is less than the national estimated coverage (32%) about seven years ago.

Health services

It is impossible to have data on indicators such as child mortality rate, maternal mortality ratio, fertility rates etc. at woreda level; instead data of the region (Amhara) from the national demographic health surveys was taken to as a surrogate for these indicators; the following were indicators from EDHS 2011.(Table 8 below)

Compiled Body of Works

Table 8: Vital statics, MDG targeted Health Indicators:

Indicator	Woreda	National	MDG target	Remark
Live birth	2.9%	3%		
Pregnant women	3%	3%		
Total fertility rate	4.2	4.8	4 child	It was 6.9 children /woman before few decades ago (National)
maternal mortality ratio	No data	676/100000live birth	267/100000	No data regional data available/no progress
Dependency ratio	0.97			
Infant mortality rate	108/1000 live	59/1000 birth	live 31/1000	
Under five children mortality rate	76/100 live	88/1000 birth	live 68/1000	
Child mortality rate	34/1000 live birth	31/1000 birth	live	

Maternal health

Maternal health service is the fundamental key component of essential health service .Maternal mortality rate can tell the health status of country .Governments all over the world had signed to reduce maternal mortality by three fourth by the end of 2015 however the progress in most of the countries is not substantial enough to keep it on track. Globally maternal death has declined since two decades ago .In Ethiopia the rate is slightly stable in the past five years According to DHS 2005and 2011 MMR was 673 and 676/100000 live births respectively.

Antenatal care

Every pregnancy is assumed to be at risk; the physiological and pathological changes that occur during pregnancy may be life threatening not only for the mother but also for the baby if the conditions are strictly followed by health professionals. It is recommended that a pregnant woman should have four ANC visits during her pregnancy period so that the likelihood of risk is identified and intervene which in turn contributes in mitigating the preventable death of mother and baby.

In developing regions of the world the proportion of pregnant women who received at least once has shown increment from 63% to 81% from 1990 to 2011(MDG report 2013). According to EDHS 2011. In Ethiopia more than half (57%) of mothers did not attend ANC. In 2005 E.C in the woreda all of the pregnant women had provided at least one time ;more than half (59.1%) pregnant women in Amhara Region had not got ANC according to EDHS 2011. In spite of the fact that all pregnant women attended ANC clinic at least one time; the proportion of pregnant women who had had four visits were 45% which is more twice as large as the national coverage (19.1%) found in EDHS 2011. The coverage is not satisfactory enough to achieve what is targeted by the woreda and the region as well.

Delivery service

It is highly promoted and recommended that pregnant women should be assisted by skilled personnel to prevent and manage complications that may cost the life of mothers and baby as well. It is one of the fundamental maternal health services which play an important role in reducing maternal death globally. It is the single most important indicator that surrogate the progress and the effort exerted to reduce maternal death.

The proportion of mothers who gave birth with the assistance of skilled professional had only shown an increment of about 18% (from 55 to 66%) from 1990 to 2011. Majority of mothers in Ethiopia prefer to give birth at home for many cultural and traditional beliefs. Most of them believe that it is not necessary. About 89.5 % (EDHS 2011) mothers in the country had delivered their babies at home. Only one from ten (10%) mothers in Ethiopia were attended by skilled health worker during delivery (EDHS 2011); In previous budget year, 2005 about 17% deliveries in the woreda were attended by skilled health professional; the coverage was somewhat higher than the previous years within the woreda, the national and regional baseline nevertheless there was very low as it is targeted 60% nationally at the end of 2015.

Post-natal service

Postnatal service is one of the cost effective interventions that play a remarkable role in reducing the death of babies and mothers. Following the health status of the mother and the baby immediately after birth is crucial as most of the deaths of neonates occur in the first 48 hours of the first month after delivery and it is also important to continue provide the service through home visit. The proportion of mothers who were provided postnatal service at least one time either by health workers or health extension worker in the woreda were 57% which was by far less than what has been set to be achieved by the nation (76%) at the end of 2015. However it was encouraging as compared with regional coverage (DHS 2011 data). Majority of the women in the region had not had any PNC service (in two years period preceding the survey).

Family planning service

In developing nations such as Ethiopia many women get pregnant while they are not intended which they try to abort. About two third of maternal death in Ethiopia is attributed to unsafe

abortion; to mitigate the prevalence of a problem improving access of family planning is very instrumental.

The government of Ethiopia has targeted to decrease the fertility rate from 5.4 to 4; the current base line is estimated to be 4.8 (EDHS2011). To measure the progress towards reducing fertility rate proxy indicators such as contraceptive prevalence rate (CAR) and contraceptive acceptance rate are utilized. In the country the contraceptive prevalence rate in the past two decades has increased by six fold. The CAR in the Woreda was found to be 53% which is by far less than what is targeted in HSDPIV.

Child Health

Immunization

Child health service is one of the corner stone of health service .The status child mortality can express the quality of health services. It is targeted in MDG 3 to reduce child mortality by two third from 1990 to 2015.Globally child mortality rate has declined by 41% from 1990 to 2011 (MDG report 2013).Ethiopia is one of the five countries in sub Saharan African Region that have been successful in reducing child mortality rate by at least 60%. Immunization is one of cost effective public health intervention that is being under taken to prevent vaccine preventable diseases which claimed the lives of many in previous decades however these days the death have shown tremendous decline.

The administrative coverage in the woreda in the past fiscal year was very good all the eligible were vaccinated for all antigens that are provided currently in the country .Despite good access the utilization was poor; the dropout rates for pentavalent vaccines and measles were 11 and 14% respectively .Which were more than two fold of the target .Besides this there was apparent data

quality problem; the coverage of all antigens including measles was extremely high above 100% which by far exceeds .EDHS 2011 result that revealed the measles coverage at national and regional level (Amhara) were to be 55.7 and 62% respectively .The vaccine wastage rate for BCG and measles were high with rate of 43 and 33% respectively.

Nutrition

Nutrition is essential for health; whenever there is good nutrition there it has a crucial role in improving health status and economic development of the nation. Improving nutrition is one of the key interventions that are being under taken to reduce the death of children. In Ethiopia malnutrition is the underlying cause of child mortality. The prevalence of chronic and acute malnutrition in the country is high. The prevalence of wasting has shown dramatic decline in the past one decade on the other hand the prevalence rate of wasting remained constant the rate was found to be 12 and 10% according to 2000 and 2011 EDHS respectively. This is three fold the target (3%) to be achieved at the end of 2015. In the woreda the proportion of children less than 3years old who were severe and moderate malnutrition in the previous one year were 5.3 and 3.5 respectively.

Integrated management of neonatal and childhood illnesses/ IMNCI

Integrated management of new born and child hood illnesses is very fundamental to mitigate child mortality .In spite of the fact the access for the service has improved there is still on the health seeking demand of the community to bring the sick to health facilities .In the woreda all six health centers provide IMNCI service .

Disease prevention and control activities

Malaria

Malaria is one of public health problems in our planet half of the world's population is at risk of malaria. It is a critical health problem of the community in particularly in sub-Saharan African region. Most of the deaths from malaria are from Africa of whom majority are children less than five years of age. Ethiopia is one of the malaria endemic countries in the world with 68% of the population at risk of the disease. The country was among four nations that reported more than 80% of Plasmodium vivax cases in the world (WHO Malaria report 2013). The country has developed strategic plan to eliminate malaria.

The proportion of confirmed cases in the woreda in previous year was 20/1000 population. This is by far greater than the pre elimination and elimination targets five and one /10000 risk population respectively. This indicates that the level of risk is high.

About 80% of the unit structures were sprayed to protect the community from malaria (as shown Error! Reference source not found. below) the coverage is optimum but is less than the target for elimination (90%). During IRS operation data on long lasting Insecticide Nets (LLIN) availability were also collected; it was found that the available LLIN was about 11544 that can protect 23088(65%) the risk population in the kebeles as a single LLN is supposed to protect two individuals. During the assessment utilization rate was also assessed and it was found that 50% pregnant women and 15% children under five years of age had slept under LLINS. The target is to achieve more than 80%LLIN utilization rate among pregnant women at the end of 2015.

The commonest reason for most of the houses were not sprayed was the houses were locked by the time the spray team was in the village which could be arranged early prior to operation

Compiled Body of Works

Table 9: Indoor residual spray performance by targeted kebeles, Artuma Fursi, Ethiopia 2013

Kebele	Total unit structure	Unit structure sprayed	Not sprayed(n=3037)		
			Locked	Refusal	Under construction
Chefarabbit	4153	3056(74%)	626(15%)	356(8%)	115(3%)
Chereti	7453	6111(82%)	388(5%)	191(3%)	745(10%)
Jara	1383	227(80%)	207(15%)	27(2%)	41(3%)
Chiri	2805	2272(81%)	449(16%)	28(1%)	84(3%)
Hula Tukuye	1479	1242(84%)	89(6%)	74(5%)	73(5%)
Edo Medine	2979	2770(93%)	89(3%)	60(2%)	60 (2%)
Ashewalute	3338	3071(92%)	134(4%)	100(3%)	33(1%)
Dimtu	5000	4050(81%)	450(9%)	300(6%)	200(4%)
Besheedida	2514	2212(88%)	151(6%)	50(2%)	101(4%)
Total	31104	25011(80%)	2583(8%)	1186(4%)	1452(5%)

HIV /AIDS prevention and control

The pandemic has claimed the lives of many worldwide since the first cases were reported three decades ago .Globally it is estimated that 34 million people living with HIV in 2011 of whom 69% are from sub-Saharan Africa .The region also accounts the majority(70%) of AIDS related deaths worldwide . The numbers of newly infected cases has fallen by 21% from 2001 to 2011.The

decline in Sub-Saharan Africa was about 25% in the indicated period. These days as the access for anti-retroviral therapy has improved the case living with HIV will increase.

As the people with HIV infection live for a long time without manifesting sign and symptoms it is difficult to set intervention in place unless screening programs are being carried out. HIV counseling and testing services play a fundamental role to measure the annual incidence and to estimate the individuals to be enrolled in antiretroviral therapy. In the Woreda all of the six health centers provide PMTCT, PIHTC and VCT services from which only two health centers provide ART service.

The performance of PMTCT, PIHTC and VCT services from what has been planned were 60%, 39% and 21% respectively. Total clients who have received PIHTC and VCT were 13945(32%) of whom 74(0.1%) were positive whereas the positivity rate among total tested pregnant women (1774) was 0.3%. 8 from total 9 positive deliveries were received complete ARV. The cumulative people living with HIV/AIDS ever started ART were 156 whereas those who are currently receiving ART were 126.

TB prevention and control

TB is a public health problem in all regions of the world. One third of world's population is at risk of getting the disease. The dual epidemics; AIDS and TB are the critical enemies of mankind. The synergistic impact is severe. In MDG it is targeted to reverse the incidence of TB worldwide. The world is in its right track in combating the disease. Ethiopia is among the top ten countries with highest TB cases in the world. To fight the disease identifying those cases and get them enrolled in DOT is the corner stone of the control program.

Compiled Body of Works

In the previous fiscal year TB case detection rate (All forms), cure rate, and success rate were 60, 76 and 86% respectively. All of the achievements were lower than what is intended to be achieved by HSDP I.e. 75, 86 and 90% respectively. The proportion of TB cases diagnosed who were tested for HIV were 141(98%) of whom 18(13%) were found to be positive. All expected six leprosy cases were detected in the year.

Hygiene and sanitation

Improving access for hygiene and sanitation is the most important intervention that mitigates the prevalence of most of communicable diseases that are highly prevalent. In Ethiopia the communicable diseases are the critical public health concern more than three fourth of the population in the country is at risk of communicable diseases. Most of hygiene and sanitation interventions are inexpensive; For instance studies found that hand washing with soap can cut diarrheal incidence by half. Availability of latrine ,waste disposal pits in the woreda was achieved almost 100% however only about three fourth (74%)of the residents have access for safe water supply .Though there was good physical availability sanitation facilities diseases transmit through feco-oral route were among top ten causes of morbidity ;Diarrhea (non- bloody) is the top cause of morbidity for under five children. (*Figure 19 below*) Which may be because of poor utilization of the existing facilities.

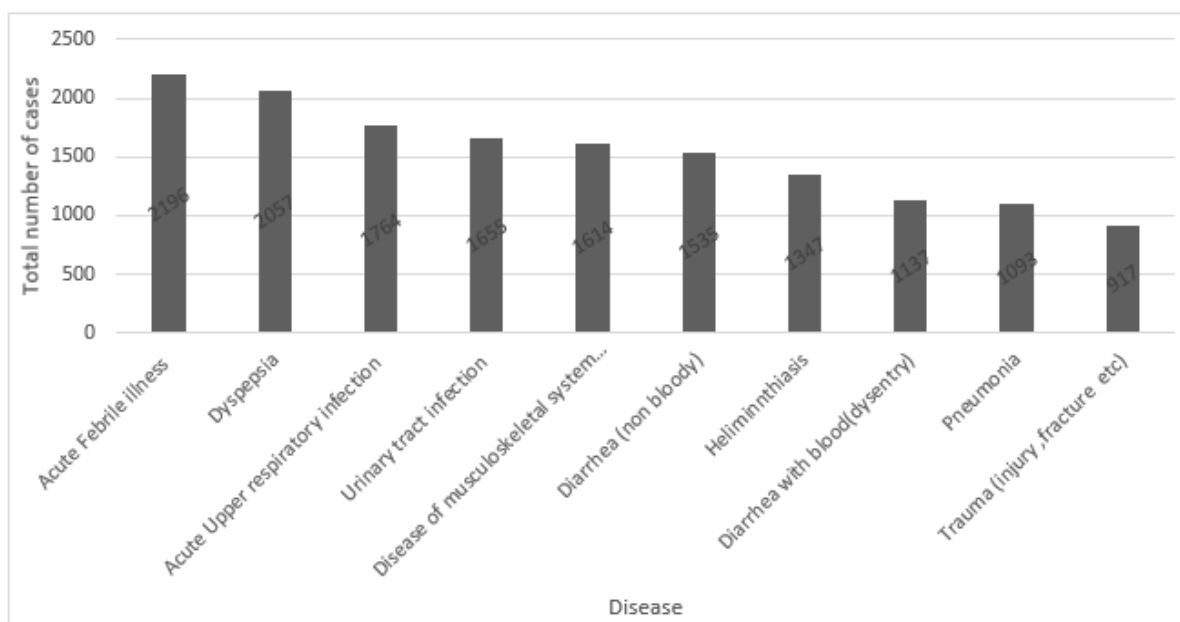


Figure 21: *Ten top causes of morbidity for among adults (>5yrs Of Age) Artuma Fursi Woreda, Ethiopia 2014*

Health service institutions and infrastructures

According to the health tier system of the country; Physical availability alone is not a guarantee to provide the quality health services; the access for infrastructure is equally important to upgrade the quality of care .The primary health service coverage is almost 100%. The ratio of health center and health post to that of population ratio was about 1:15564 and 1:3891 which indicates there is better physical health service coverage.

All health centers have been electrified; one of health center has its electric power source from solar .The health centers have access for mobile network ,public transportation service .In the woreda there are about 24 health posts that provide communicable disease prevention and health promotion services .Majority 23 of total 24 health posts have no sustainable 24hrs electric power

supply .Nine health posts have access for mobile network .Moreover There were about 22 lower private clinics two pharmacies and three diagnostic laboratories that provide health service s.

Health Work force availability

The battle against fighting disease and promoting health can be successfully accomplished whenever there is well skilled workforce in different professional categories which has straight forward impact in improving the livelihood of the community. Hence sufficient health workers in each discipline is a very critical issue that should be addressed to bring what is targeted on health sector development program which is one of the key component of giant Growth and transformation plan of the country which is supposed to pave the way that leads the country to be one of the middle income nations in the globe. Current status of the work force in the Woreda according to need was analyzed as follow (Table 10)

Table 10: Average staff requirement and gaps in selected professional categories to be filled at health center level, Artuma Fursi Woreda, Amhara Region, Ethiopia 2014

Profession	Total required ⁴ in the woreda	Currently working	Health worker to population ratio	Gap
Health officer	12	7	1:13341	5
Midwife	12	7	1:13341	5
Nurse	48	45	1:2075	3
Pharmacy Technician	12	8	1:11673	4
Laboratory technician	12	10	1:9339	2

⁴ The number of health workers required in all six health centers in the Woreda

Two kebeles in the woreda were with no health extension worker while eight kebeles were with one only one HEW worker.

Conclusion

Most of the activities that were being undertaken were likely to be on the right path ; the access for immunization and antenatal care are good however there are a problems related to continuous utilization of services .To sum up ;although there have been progresses in most of health essential health services in the previous one year there are still gaps that should be addressed in order to achieve what has been targeted HSDP .

Recommendation

Ensure data quality and reduce defaulters the data on EPI data seem to be liable for quality as the performance in all antigens was more than the eligible thus data quality should be addressed

Increase reproductive health service coverage :continuous efforts should be exerted in increasing the proportion of pregnant women who will have four ANC visit and give birth at health facilities with the help of skilled health professionals .Moreover increasing the proportion of mothers who get postnatal service should be also underscored .

Increase initial and effective quality utilization

To play a remarkable role in combating the pandemic the screening tests are instrumental as the higher the individual tested the more it is likely to identify those with the virus which helps to get individuals enrolled in ART and to guide intention actions. It is also important to follow those who have ever started ART so that they adhere with their treatment.

TB prevention and control: Efforts should be made to increase detection rate and those who are diagnosed positive and on treatment should be followed for not to drop and laboratory tests should be done to monitor the outcome. The proportion of screening of TB cases for HIV /AIDs and vice versa should be reinforced.

Intensify Malaria prevention and control

Identification and managing mosquito breeding sites should be one of the priority agendas of the health development army. The commonest reason for most of the households that were not sprayed was because the houses were locked by the time IRS operation was undertaken; therefore it is wise to plan ahead of the operation when the residents will be at home so as to cover all of the targeted kebeles houses so that there will be mass effect .

Deploy human resource

The woreda health office should convince the cabinet so that sufficient budget is allocated to full fill the workforce according to need. This may address the service disruption that occurs whenever there is attrition of health worker and health extension workers.

Plan of action

The following plans of action on key interventions have been proposed. The activities that are to be undertaken are supposed to be the most pillars of excellence that bring the intended result as far as implemented in efficient manner

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Table 11: Plan of action after assessment

Intervention	Activity	Target	Time Frame	Implementer	Indicator	Resource needed	Funding Agency	Estimated cost
Improve EPI(Improve utilization)	-Screen those children who failed to take the antigens according to the schedule	>95%	-Up to the end of June 2014		-Dropout rate for pentavalent vaccines and Measles vaccines	-Human resource		
	-conduct conference with pregnant women in the kebele	-Skilled delivery coverage= 40%			-% of deliveries attended by skilled			

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	<ul style="list-style-type: none"> -registered and follow all pregnant women including expected day of delivery. -Focus group discussion -Advocate religious leaders -Discussion with traditional birth attendants -Provide PNC service 	<ul style="list-style-type: none"> -Proportion of mothers with four ANC visit = 75% 	<p>April to Dec.2104</p>		<p>health professional</p> <ul style="list-style-type: none"> -% of pregnant women who have got ANC at least four times - 			
<p>3.Reinforce TB prevention and</p>	<ul style="list-style-type: none"> -Sensitization of health development army 	<ul style="list-style-type: none"> -CDR=75% -Cure rate =85% 			<ul style="list-style-type: none"> - <p>Proportio n All</p>	<ul style="list-style-type: none"> -WorHo 		

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<p>control activities</p>	<p>-Assign village leaders to follow those who have started treatment -Distribute case reminder posters -Training of health professionals</p>		<p>-April to Dec.2104</p>		<p>forms of TB detected -</p>	<p>-Partners (heal TB) -</p>		<p>40000</p>
<p>4.Increase work force</p>	<p>-Deploy Health officer, Midwife ,Laboratory and pharmacy technicians</p>	<p>HO=3 Midwife =3 Laboratory =2 Pharmacy =3</p>	<p>July – September 2014</p>		<p>-Health workers to population ratio</p>	<p>-WorHo -RHB</p>		<p>184,320</p>

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5.Strengthenin g monitoring and Evaluation	-Conduct integrated supportive supervision and provide feedback	4(quarterly)			-review meeting self- assessme nt review meetings conducte d supervisi ons conducte d and provided feed back			
	-conduct self-assessment review meeting	12 (monthly)						
	- Review meeting	4(Quarterly)		-WorHo -ZHD -HFs				

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<p>6.Intensify Malaria prevention and control</p>	<ul style="list-style-type: none"> -Social mobilization -Ensure community participation on Planning -Environmental management -continuous follow up on Bed net utilization -Apply abate chemical in areas where environmental management is not feasible 	<p>Malaria incidence below 10/10000</p>	<p style="writing-mode: vertical-rl; transform: rotate(180deg);">July –June 2014</p>	<ul style="list-style-type: none"> -FMOH -RHB -WorHO -ZHD -Partners 	<p>- Proportio n of HHS sprayed -Areas drained, filled, harvested etc.</p>	<ul style="list-style-type: none"> -human resource -Vehicle -Allowance 	<ul style="list-style-type: none"> -Global fund -Woreda finance 	<p>200,000</p>
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Chapter V – Scientific Manuscripts for Peer reviewed Journals

5.1. Measles outbreak -Bugina, Ethiopia, 2014

1.1 **Title:** Measles outbreak investigation -Bugna, Ethiopia, 2014

Abstract

Background: Measles is one of the most infectious human diseases. It caused millions of deaths worldwide, yearly in the pre-vaccination era. During this era more than 90% of the persons were infected at the age of 10 years. In January 2014 suspected measles outbreak was reported from Bugna Woreda. Our objective was to determine the existence of an outbreak, identify the risk factors and to propose containment measures.

Method: We conducted a descriptive and a case control study (unmatched); a case was defined as any person with fever, maculopapular rash, and one of the following: cough, coryza and conjunctivitis. All (73) cases were compared with equal number of neighbor controls. Five specimens were collected and sent to central laboratory. We interviewed the participants, reviewed reports and conducted rapid convenience survey to measure the immunization coverage in the kebele. We ascertained the vaccination status through history and card. We performed univariate and bivariate analysis. We computed odds ratio, attack rates and preventable fraction of vaccination. The chi-square test statistic was used.

Result: From the total 73 cases; 57 (78%) aged greater than five years. Sixty-seven (92%) cases of total 73 were unvaccinated of whom three (4%) of total 67 unvaccinated cases were ineligible⁵ for routine immunization. Four of five tested specimens were positive for measles IgM. Among

⁵ Measles vaccination(routine and SIAS) in Africa starts

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110 children (<5yrs) found during door to door survey, only 73 (66%) had a history of measles vaccination. The administrative coverage was >90%. Having contact with a measles cases (OR=2.3, 95% CI (1.18-4.48) and those traveled to places where measles cases reported (OR=12.5, 95%CI (2.7-113.5). Being vaccinated was a protective factor (OR =0.13; (95%CI (0.036-0.467). The vaccine efficacy was calculated to be 75%.

Conclusion: Unvaccinated people who made contact with measles cases and those who traveled to areas where the measles was reported had a higher risk of contracting the measles. The reported vaccination coverage may be different from the actual. We recommended improving measles vaccination and further immunization surveys.

Introduction

The measles virus is highly infectious and, in the pre vaccination period, >90% of individuals were infected by the age of 10. (1). In 2011, there were 158000 deaths globally, which is estimated to be 430 and 18 deaths in each day and hour respectively. More than 95% of the deaths occur in low income countries (2). Accelerated immunization activities have had a major impact on reducing measles deaths (3). Since 2000, more than one billion children in high risk countries were vaccinated against the disease through mass vaccination campaigns. Global measles deaths have decreased by 71% despite this global progress, some populations remain unprotected. (3) Outbreaks can occur in populations in which fewer than 10% of people are susceptible. (4) In 2011, an estimated 20 million children worldwide did not receive the first dose of vaccine. (3) More than half of these children live in five countries: the Democratic Republic of the Congo, DRC) (0.8 million), Ethiopia (1 million), India (6.7 million), Nigeria (1.7 million) and Pakistan (0.9 million). (3)

In Africa before the introduction of measles vaccination, measles was primarily a disease affecting young children and one million cases were reported annually (5) It is estimated that about 28000 measles- related deaths occur in Africa each year (6) several sub-Saharan African countries experienced measles outbreaks, with more than 199,000 cases officially reported to WHO in 2010, and more than 194,000 in 2011 (7)

Measles is one of the communicable diseases that is still causing mortality and morbidity in Ethiopia. (8) In 2010, the country was among the eleven World Health Organization (WHO)

member nations which reported a measles incidence rate of 5-10/1000000 risk population which is the highest measles incidence rate in the horn of Africa. (9) In 2011 there was a large outbreak in the country with a total of 3255 cases (3)

Measles is one of the priority diseases and events that are reportable in Public Health Emergency Management (PHEM) system of the country. It was on January 23, 2014 that Amhara Regional State Health Bureau PHEM core process received a suspected measles outbreak report from North Wollo Zonal Health Department PHEM case team through the routine weekly surveillance report. The Early warning officer called the Zonal Health Department to verify the report .He verified that all of the reported cases were from one kebele, Kuwaro of Bugna Woreda .On the next day we arrived at Bugna Town, the capital town of the woreda and began our investigation after we had made discussion with the Woreda Rapid Response Team.

General objective: To determine the existence of outbreak, identify the potential risk factors of measles outbreak and guide prompt containment actions.

Specific objectives:

- ✓ To confirm the existence of an outbreak
- ✓ To characterize the extent of the outbreak in terms of place, person and time
- ✓ To identify the cause and contributing factors
- ✓ To propose appropriate containment actions

Materials and Methods

Study area and Population ; Bugna woreda is one among 167 woredas in Amhara National Regional State .It is found in North Wollo Zone ,which is one of the five zones in the Eastern Amhara Region . The woreda is located in the Northwest corner of the North Wollo Zone, Bugna

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is bordered on the South by Meket Woreda , on the West by the South Gondar Zone, on the North by the Wag Hemra Zone, and on the East by the Lasta Woreda, which is the home of the most gorgeous and UNESCO registered church of Lalibela .The woreda capital town is Ayena .The woreda is 228 km away from the zonal capital., Wolidiya Town .It has a total population of 77,508 of whom about 11048(14.3%) are children less than five years of age and the sex ratio is one .

There are about 13 kebeles in the woreda; 12 of total 13 kebeles are rural. Kwaro is one among the 12 rural kebels found in the woreda. It has a total population of 6300 which accounts for 8.1% of the total population residing in the woreda. Likewise the reported measles vaccination coverage in the kebele in the first six months of this fiscal year and in the previous year was more than 90%.

Sampling and sample size: Total of 146 study participants were enrolled; all of the 73 cases, and equal number of neighborhood controls were enrolled

Data collection: we collected data using a structured questionnaire .The data collected include: Identification, demographic, risk factors and clinical information. In addition, we used observation checklist and rapid convenience survey formats to collect data on PHEM activities undertaken in the woreda and to validate the reported vaccination coverage respectively.

Case finding and identification: We carried out door to door active case search to identify cases using the WHO standard case definition for measles: suspected case, any person with generalized maculo-papular rash and fever plus one of the following: cough or coryza (runny nose) or conjunctivitis (red eyes).

Study design; we conducted an unmatched case-control study with ratio of 1:1 .Those neighbors who were not diseased during the study period were taken as controls irrespective of their demographic characteristics.

Data collection and analysis: We entered and analyzed the data using EPI Info version 7.3.3.1 and Microsoft Excel 2007. We used both Fisher`s Exact test and chi -square test to examine the significance of the association of risk factors in contracting measles. We estimated preventive fraction of those vaccinated which is proxy estimate for measles vaccine efficacy using the formula: $VE = [1 - (ARV / AR_u)] \times 100$, where VE is vaccine effectiveness as a percent, ARV=measles attack rate among vaccinated and AR_u = measles attack rate among unvaccinated. Specimens were collected prior to the arrival of the investigation team.

Result

The median age of the 73 cases and the controls were 17 years (range: 7 months to 50 yrs.) and 21 years (range: 2 -62 year) respectively .Most of the study participants were males 90(62%). More than half of the participants, 76(52%) were farmers; the remaining 70 (48%) were housewives,

students and children, who were ineligible for school or those engaged in other activities to help their parents

Based on the case definition all 73 had the clinical features fever and rash during the time the study was conducted or had a history of both clinical features (See Table 1)

TABLE 12 DIAGNOSTIC CRITERIA FOR MEASLES, KUARO, BUGNA, AMHARA REGIONAL STATE, ETHIOPIA, 2014

Sr.no.	Criteria	Frequency	Percent
1	Rash	73	100%
2	Fever	73	100%
3	Conjunctivitis	73	100%
4	coryza (runny nose)	65	89%
5	Cough	70	96%

Specimens were collected from five cases of whom four were found to be IgM positive for measles.

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The index case was 20 yrs. male with an onset of rash on 26/12/2013 (as indicated in **Error! Reference source not found.** below) and he had been in Lalibela for four days (17-21/12/2013) and in Ayina, the capital town of the woreda, from 22 to 23/2013. Most of the cases, 56 (77%) were with date of onset of rash 22(30%) and 34 (47%) in week four and five respectively.

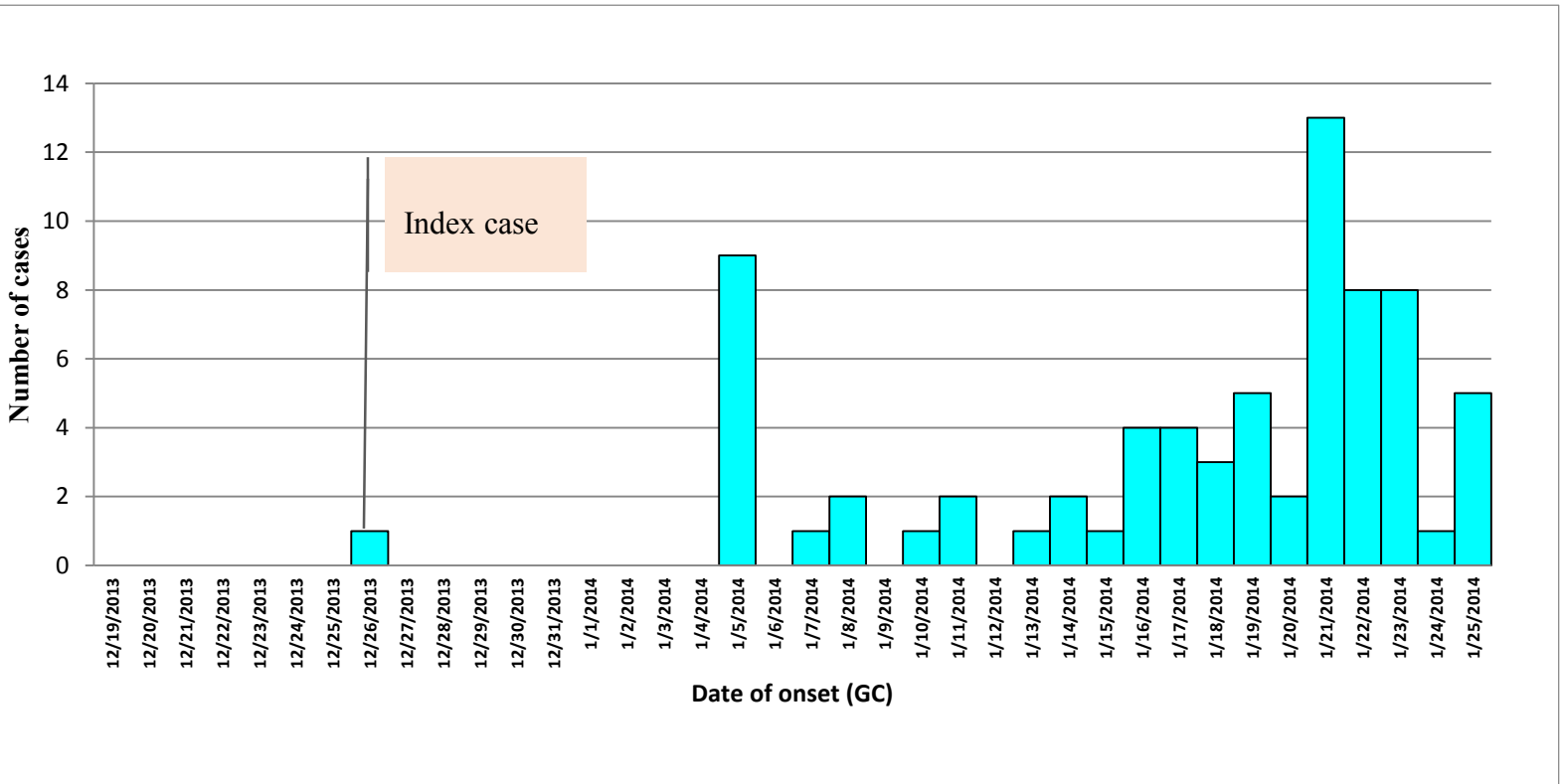


Figure 22: Reported measles cases by date of onset, Kuwaro, Bugna, Amhara, Ethiopia January 2014

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The outbreak had affected three villages: Workiazila, Bilagod and Workialiba of which Workiazila accounted for 47(64%) of total reported cases. (See *Figure 3* below)



Figure 23: Measles cases and attack rates, Kuwaro, Bugna, Amhara, Ethiopia, January 2014

The majority of the cases, 47 (64%) were males. The attack rate in males and females were 15 and 8/1000 respectively. Approximately, about two-third of the cases, 47 (64%) were in the age group 15-44 yrs. Only about more than one-fifth 16 (22.9%) of the cases were children less than five years of age. (See *Table 2* below)

Table 13 Age-specific attack rate of measles in Kwaro, Bugna, Amhara, Ethiopia January 2014

Age category	Population	Reported measles case		Attack rate (%)
		Number	percent	
<5yrs	898	16	22.9	1.8
5-14	1732	9	12.3	0.5
15-44	2640	47	64.4	1.8
45+	1030	2	2.7	0.2
Total	6300	73	100	1.2

Only three (2%) of the study participants were vaccinated. The majority of cases 67 (92%) of were unvaccinated of whom only three (2%) of them were not old enough to get vaccinated. The highest percent of individuals were in the age group 15-44 yrs. who accounted 47(64 %) of the total 73 cases (as shown in Figure 4 below)

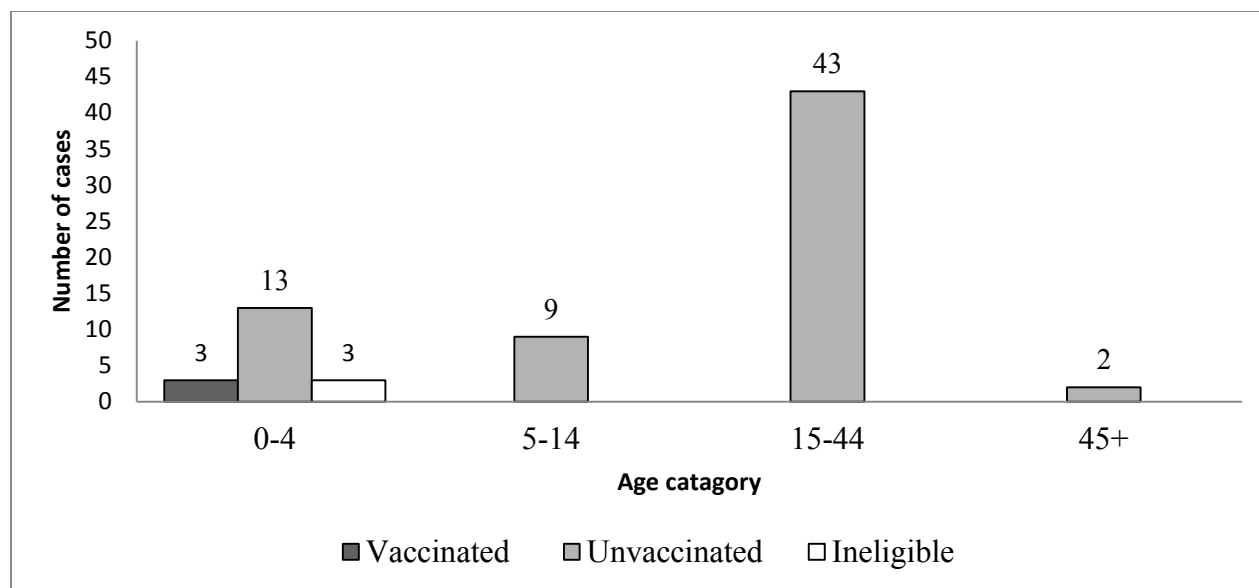


Figure 24 Distribution of measles cases by age and vaccination status, Kuwaro, Bugna, And Amhara, Ethiopia January 2014

Despite the reported administrative measles coverage of the area in the previous six months (July to December 2013) and in 2013 supplementary immunization activities (SIAS) were very high, (more than 90%), during rapid convince survey, we found that only 73(66%) of children less than five years of age had received at least one dose of measles vaccine. (From the total 110 children found during door to door visit)

More than half of the participants, 87 (53%) had had contact with suspected measles cases. 46 (63%) from total 73 cases had had contact history besides this 21 (14.4%) of the participants had a travel history; 19(26%) cases and two (3%) controls had travel history. Five (9%) females of total 56 (38%) female study participants and 16 (18%) males of total 90 male participants had traveled to villages where measles cases were reported.

We observed that the area where the measles broke out is hard to reach, which is far not only from the health center and but also from health post moreover it is impossible to access by any means

of transportation apart from these; one Health Extension worker (HEW) is serving 6000 population along with the fact the health post is located far from the community and difficult terrain may hamper the provision of immunization. The other key point is that HEWS are supposed to spend 75% of working days outside the health post (in the community) working on different primary health services including RI. Immunization services are given daily at health centers (HC). The five health posts in the catchment take their allotted vaccine every month from the HC

We hypothesized that; perhaps, the higher the number of unvaccinated individuals in line with the fact that a number of cases had history of contact with suspected measles cases and travel to villages where cases were reported could be the risk factors for contracting measles. From total 73 cases; 14(30%) of the males and 5 (20%) of the Females had travel history.

Using bivariate analysis we compared cases and controls with respect to contact with measles cases, travel history to places where suspected measles cases were reported and vaccination status. We found out that being vaccinated for measles is found to be significantly associated to be a protective factor against contracting measles with an odds ratio of 0.13 with 95% CI (0.024-0.49) and P -value of 0.00063)

The preventable fraction of vaccination (vaccine efficacy) was calculated to be approximately 75%. On the other hand, while examining the epidemiological risk factors, contact and travel history; we found that having contact with suspected measles cases and travelling to places where suspected cases were reported were significantly associated with contracting measles; OR= 2.3 with 95%CI (1.19-4.48) ,p value 0.02 and OR= 12.5 ,95%CI(2.7-113.5) and with p – value 0.00016 respectively .

Discussion

The measles outbreak was confirmed outbreak as four of the total cases investigated by laboratory were positive for measles IgM. Measles outbreak is said to be confirmed when three from total five cases are IgM positive (3). Workazila, the most affected village this could be fact that the index case resides as the reproductive rate of the disease is very high .It is documented that there may be 17-20 cases following the introduction of one case amongst the susceptible individuals.

As described in the Epi-curve most of the cases, 60 (82%) were with the month of rash onset in January this might have come about because of the fact that the seasonality nature of measles in tropics transmission intensifies in dry seasons and also the congregation of people around churches to celebrate Epiphany and other religious holidays celebrated in the Epiphany week. These social gatherings might have facilitated transmission .It is documented that measles transmission in tropics intensified in dry seasons (4)and it is also known that the potential to spread of the disease is influenced by social gatherings, holydays (5)

High percent of cases were among adolescents and adults, this could be because of the fact that majority of children less than five years of age were vaccinated either during routine or SIAS .This is this supported by the changing epidemiology of measles in African region following the introduction of immunization and also consistent with measles case- based surveillance data analysis conducted in few selected administrative zones in Ethiopia (6) those who were unvaccinated, remained susceptible for years . The same finding in outbreak investigation of measles in Zakar District , Zimbabwe revealed that the highest percent of cases were those who were unvaccinated .(7)

Having traveled to places where measles cases were reported had very strong association ;the odds of contracting measles among those who traveled was 12 times higher than those had not yet traveled /prior to 7-18 days .Similar study in Northern Ethiopia revealed the same result (8)however the precision /the wider confidence interval was relatively lower which could have been because of the sample sizes was not large enough .

Calculating preventable fraction of vaccination as proxy indicator of vaccine efficacy the vaccine efficacy was found to be 75% .which indicate vaccination prevented 75 % of the cases that might have otherwise occurred among vaccinated children had they not been vaccinated. Similar study in Iran revealed consistent finding (9).The field efficacy of vaccine is less than what is theoretically expected in ideal world. This could be resulted from poor vaccine handling and management .The rapid convenience assessment of measles vaccination provide evidence on unreliability of the administrative vaccination coverage though the sample size is too small and the sampling method was non-probability sampling. Reported /administrative vaccine coverage in the country revealed that administrative coverage was by far less than the vaccine coverage estimated by Surveys. The high administrative coverage may not help to identify and map areas with high percentage of susceptible population which in turn also a suggestive on the likelihood of outbreak occurrence.

Limitation

Our study has limitations in the following aspects: selection of controls as the controls who were enrolled in the study were those neighbors of cases who were at home during the investigation those who were outside in the house might have different characteristics Our work is not an exception in experiencing recall bias; not only controls but also few cases were doubtful to remember contact histories.

Conclusions

Contact with measles patients and traveling to areas where measles virus was circulated /where measles cases were detected and reported previously were along with being unvaccinated could have been the risk factor for contracting measles.

Recommendations

Strengthening routine EPI;-improve routine immunization, limit missed opportunities so that every children in the catchment is get vaccinated

Reinforce case management; cases should be detected early and get managed so that there will not be complication.

Intensify public health surveillance; identifying cases before to prevent complication and analyzing are the cornerstones in gearing the response activities. In addition risk mapping of Kebeles/villages should be prioritized based on monitoring the number of susceptibility individuals that enter in the susceptibility pool.

Supplementary immunization: as most of the cases were age greater than five, whom are not addressed by routine immunization catch-up campaign for those aged 9 months to 15 years could be considered or mini campaigns should be conducted to

Initiation of community based surveillance: as the affected kebele is very far from health facilities in line with the fact that most of the cases, 50 (68%) were detected by the investigation team may reveal that the health workers were not capable enough to get reach the community; the health facilities is located too far to from the community not only to uncover the occurrence of outbreak but also to provide Primary health services. Therefore it is cost effective and rationale to

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get the community members /Health Development Armies/HDA involved in surveillance activities to ensure sensitivity of surveillance system in the area.

Moreover further studies and assessments on the probable factors for lower vaccine efficacy (<85%) and immunization survey should be in place.

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Chapter VI – Abstracts for Scientific Presentation

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6.1 Measles outbreak Investigation -Bugna, Ethiopia, 2014

Background: Measles is one of the most infectious human diseases and caused millions of deaths worldwide, yearly in the pre-vaccination era. During this era more 90% of the persons were infected at the age of 10 years. In January 2014 suspected measles outbreak was reported from Buna District. Our aim was to ascertain the causal agent and identify the risk factors

Method: A case was defined as any person with fever, maculopapular rash, and one of the following: cough, coryza and conjunctivitis. All cases were compared with unmatched neighbor controls. 5 specimen were collected and sent. We questioned the subjects, reviewed reports and conducted convenience survey. We performed univariate and bivariate analysis .We computed odds ratio, attack rates and preventable fraction of vaccination. The chi - square test statistic was used

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Result: About 73 cases were identified to have measles. 57 (78%) of 73 were aged greater than five years. 67(92%) cases of total 73 were unvaccinated. Just three (4%) of total 67 unvaccinated cases were ineligible. Four of five tested specimens were positive for measles IgM. Among 110 children found in rapid convenience surveyed, only 73 (66%) experienced a history of measles vaccination. The administrative coverage was >90%. Having contact with a measles cases (OR=2.3, 95% CI (1.18-4.48) and those traveled to places where measles cases reported (OR=12.5, 95%CI (2.7-113.5). Being vaccinated was a protective factor (OR =0.13; (95%CI (0.036-0.467). The vaccine efficacy was calculated to be 75%.

Conclusion: Unvaccinated people who made contact with the diseased and traveled to areas where the measles was reported had a higher risk of contracting the disease. The reported vaccination coverage may be different from the actual. We recommended improving measles vaccination and further immunization surveys.

Key words: measles, Bugna, convenience survey

Word count: 274

6.2 Measles case-based surveillance data analysis and outbreak risk mapping-West Gojam, Ethiopia, 2009 – 2013

Background: Measles is highly contagious and remains a leading cause of childhood mortality. Outbreaks can occur in populations in which fewer than 10% of people are susceptible. Our objective was to describe surveillance data, to identify risk of outbreak and to produce data on the status of disease control strategies.

Method: We reviewed case-based surveillance and routine immunization data from 15 districts between 2009 and 2013. Susceptible people were those who were unvaccinated or unimmunized. We did a descriptive univariate analysis to characterize the disease to measure surveillance indicators. WHO outbreak analysis tool was also applied to calculate the number of susceptible people over successive birth cohort.

Result: 275 (56%) of total 492 cases reported were among individuals aged less than five years. The median incidence rate in the zone was five per 1000 population. The highest median incidence rate was in Sekela district, 11 per 1000 populations. The month of onset of rash of 335 (68.1%) cases was from January to June. The median vaccination coverage was 83%. Six districts among 15 had median non-measles rash illness rate below two per 100000 population. The proportion of susceptible among the current population was 5 % (111005). Four districts accounted for 45267 (41%) of the susceptible: Yima ena Densa 13413 (12%), Mecha 11887 (11%), Dega Damot 10729 (10%) and Jabitehna 9237 (8%)

Conclusion: The large percentage of cases in under five children connotes that it may arise from low measles vaccination coverage; moreover the weak surveillance system along with

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accumulation of susceptible in some districts increases the risk of outbreaks. Actions need to be taken to improve immunization coverage and to intensify public health surveillance.

Key words: measles, West Gojam, risk analysis.

Word count: 261

Chapter VII – Narrative Summary of Disaster Situation Visited

Introduction

North Wollo Zone is one of the 11 zones in Amhara Region of the Northern Ethiopia .It is bordered on the South by South Wollo on the West by South Gondar, on the North by Wagehimira Zone on the North West by Tigray Regional States. The zone has a total population of 1,586 706 of whom 215,980 (14%) urban inhabitants and there are 12 woredas (three town Administrative) found in the zone. Weldiya Town is the administrative town of the zone. The zone is the home of tourist attraction sites in the country; the rock hewn church of Lalibela, which was designated as one of the world's heritage sites by the United Nations Educational, Scientific and Cultural Organization (UNESCO) world heritage site in 1978. The primary health coverage in the zone is 96.4%

Objective

General Objective: To assess the overall preparedness and response capacity, to identify the potential risk of emergency and to use the information for corrective action

Specific Objectives

- To identify the risk factors for disease outbreak emergency
- To assess the Emergency preparedness and Response activities
- To pass the information to stakeholders so that they can intervene

Method

The Federal assessment team, which was composed of different Minster sectors came and convened the Regional Nutrition and Emergency task force .The Regional Bureaus and Non-

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Governmental Organizations in the region assigned officers to be a member of the Regional assessment team that would conduct the assessment with the collaboration of the Federal team.

The assessment team further divided into three: the teams were deployed in different woredas in that are found in the five zones in the Eastern part of the region. The division of the three teams was made in such a way that each team had two sub teams: the food and the non-food.

Study Sites: We selected five woredas: Daunt, Guba lafto .Meket, Wadila and Lasta based on the outbreak status and also we took the zonal health department`s recommendation into consideration. The total population in these woreda was 70536(5%) ,159118 (10%),246126(16%) ,138,821(9%) and 128223(8%) respectively .The woredas accounted for about half of the total population in the zone .Meket is the largest woreda in the zone with a total keble of 47 .

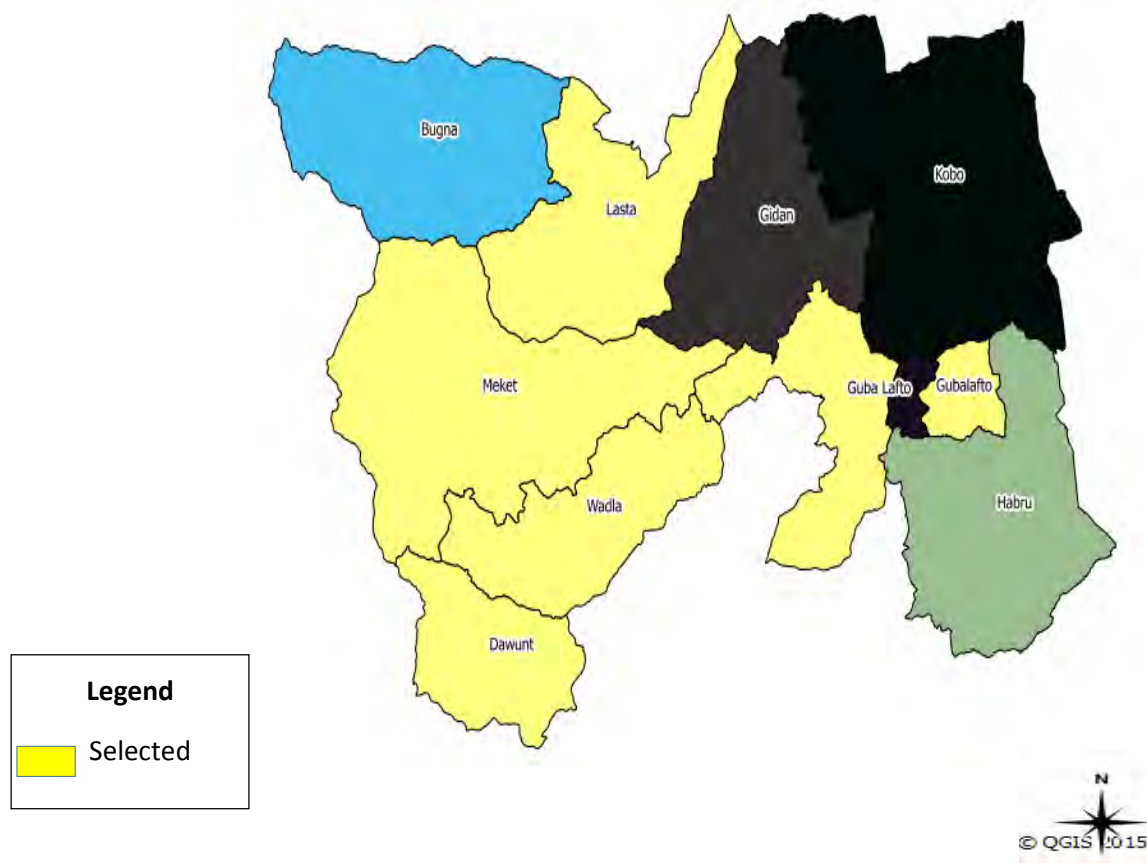


Figure 25 Map of North Wollo Zone showing woredas selected for Belig assessment, June 2014

Compiled Body of Works

Data collection: We collected data on the preparedness, the availability of logistics supplies, budget, coordination and other risk factors .We also reviewed the existing records /reports, observed the stock status. We also interviewed the key informants (Officers at woreda health offices and zonal health department) using checklist prepared by Federal Minster of Health

Data Analysis, Interpretation and Dissemination: We analyzed the quantitative data using Microsoft Excel; we also use Quantum GIS (version 1.7.2) to depict the disease incidence by map. We calculated rates and. Finally, we made a presentation at zonal level and regional level in order to pass information to the different stakeholders so that they play their role in addressing the gaps.

Result

All the visited five woredas had neither Emergency preparedness plan nor functional Public Health Emergency Management Committee /PHEMC. Only two woredas: Meket and Guba Lafto were able to secure budget for emergency though it was not sufficient .Each of these woredas allocated 25000 ETB.

Diarrhea and acute upper respiratory infections were the leading cause of morbidity in under five children and adult respectively. Pneumonia was found to be one among the top five causes of morbidity in all of the woredas .Acute upper respiratory infection was found to be the leading cause of morbidity in Wadila and Lasta. Acute Febrile illness and diarrhea (non-bloody) were the leading causes of morbidity respectively.

Outbreak

The disease that was seen as an outbreak in the visited woredas in the preceding five months was measles. Seven of the total 12 woredas found in the zone had experienced a measles outbreak in the year 2006 EFY. All the visited woredas had experienced at least one measles outbreak despite the outbreak in Wadila that had not been confirmed yet. The two woredas Meket and Dawunt reported the majority of the cases from the total 1866 measles cases reported. The two woredas reported 895(48%) and 725(39%) measles cases respectively. More than half, 26 of the total 47 kebeles in Meket Woreda reported at least one measles cases. The highest measles incidence per 1000 population was in Dawunt which was about 10 /1000 population. (Figure 26 below)

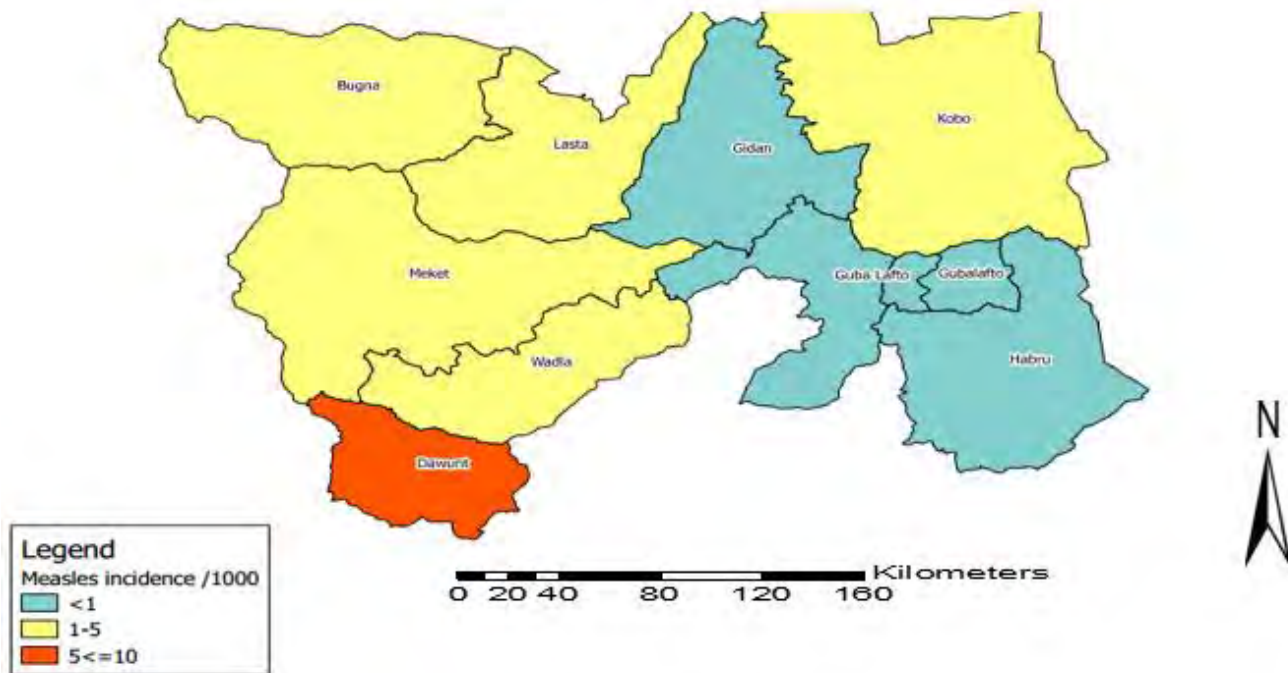


Figure 26 Measles incidence /1000 in North Wollo from January to May 2014

Compiled Body of Works

During our visit, we found woredas that were run out of emergency supplies. Guba Lafto woreda was stocked out of anti-malarial drugs as well as rapid diagnostic test /RDT kit and doxycycline. Wadila and Lasta were stocked out of doxycycline too.

In all of the visited woredas, though there were rumors of diseases, none of them were recorded on rumor registration logbook; there was rumors of suspected cases of rabies in Guba Lafto yet nothing was recoded on rumor log book. Apart from this we didn't see up-to-date analysis practice and there was also no complete line list of all cases reported to the next level; the line list didn't include all the list of cases and the listed cases also lacked all the variables that are supposed to be complete. There was a report discrepancy between what there and reported to the zone or to the RHB; for instance, only 144(16%) cases were reported to the RHB from Meket Woreda and death was reported to be zero despite the woreda PHEM officer told us there were seven deaths from measles however the weekly report completeness and timeliness in the zone and in the in the selected woredas was more than 90%.

Malaria Situation

About 1,213,393 (97%) of the population in the zone was identified as malarious population and targeted for LLINS. Almost the entire population in the visited woredas except Lasta were identified to be at risk of the malaria. The malarious population of Lasta was estimated to be 951,444(73%).

Meket Woreda had reported the highest malaria cases among the five woredas and the second largest cases reported in the zone in the five months' time (January to May). It reported 585 (15%) malaria cases of the total 3827 cases reported in the zone of whom 250 (43%) were plasmodium

falciparum. The remaining four woredas: Dawunt, Lasta, Guba Lafto and Wadila accounted for for five percent and below of the cases reported by the zone in the indicated period.

According to the key informants the malaria prevention activities, which the community used to practice such as: draining, filling and harvesting the bushes and grasses had become deteriorated more over the LLIN coverage in the visited woredas was below 80%.

Expanded Program on Immunization (EPI)

The measles coverage in the zone was found to be 96.1% and the measles pentavalent drop out rate was 3.3%. The median measles coverage in the visited five woredas was found to be 95.4 % (with range of 85.8% to 100%) and the median measles dropout rate of 7.6% (with a range of 1.5 to 9.8%). The measles coverage in Meket and Wadila was 100%. The measles coverage in Dawunt, Guba Lafto and Lasta was 86.3, 85.8 and 86 % respectively .

Nutrition

Most of the woredas in the zone are food in secured .Different programs are under way to tackle the food security problem. Different technologies are being invented and implemented to improve the productivity of the farmers. Nutritional therapy programs are also provided in all of the health centers and health posts found in the woredas.

The total cases referred to therapeutic feeding program (TFP) in the five months' time period by the five woredas were 1079. Lasta and Meket accounted for more than two third of the cases which reported 391(36%) and 355(33%) respectively . (Figure 27 below)

Compiled Body of Works

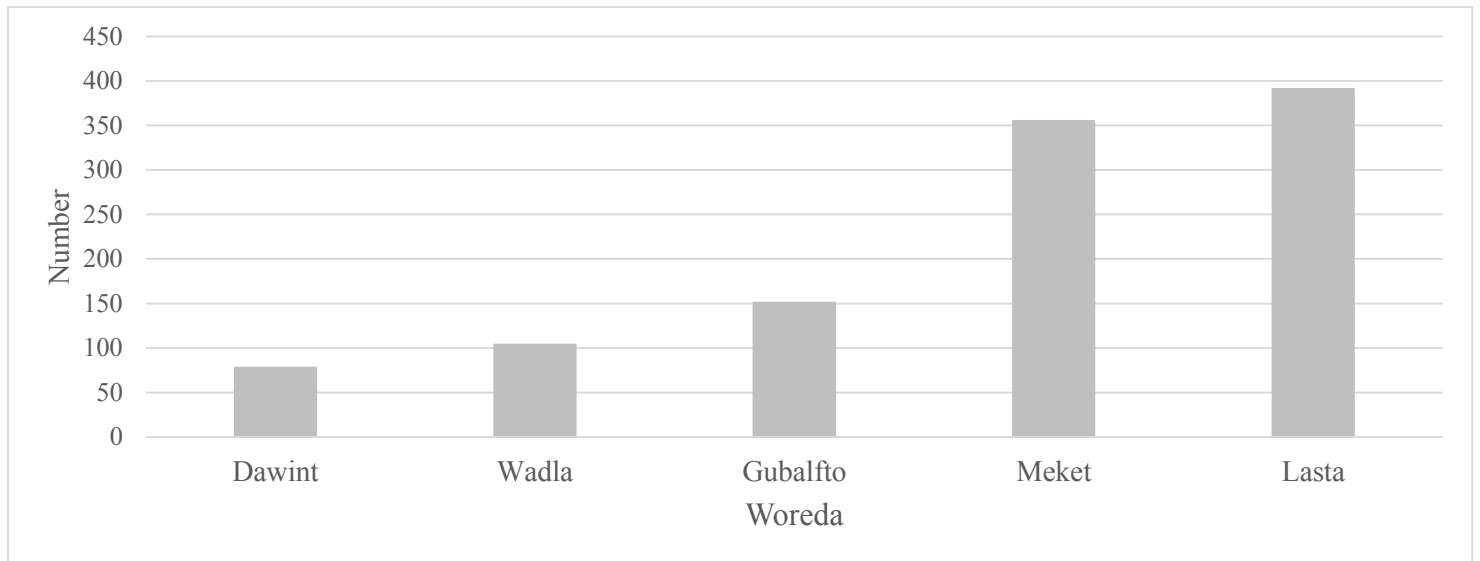


Figure 27: SAM cases referred to TFU in selected woredas of North Wollo Zone Amhara, January to May, 2014

The highest of the cases were reported in March which was 251(23%) of the total reported 1079. (Figure 28 below)

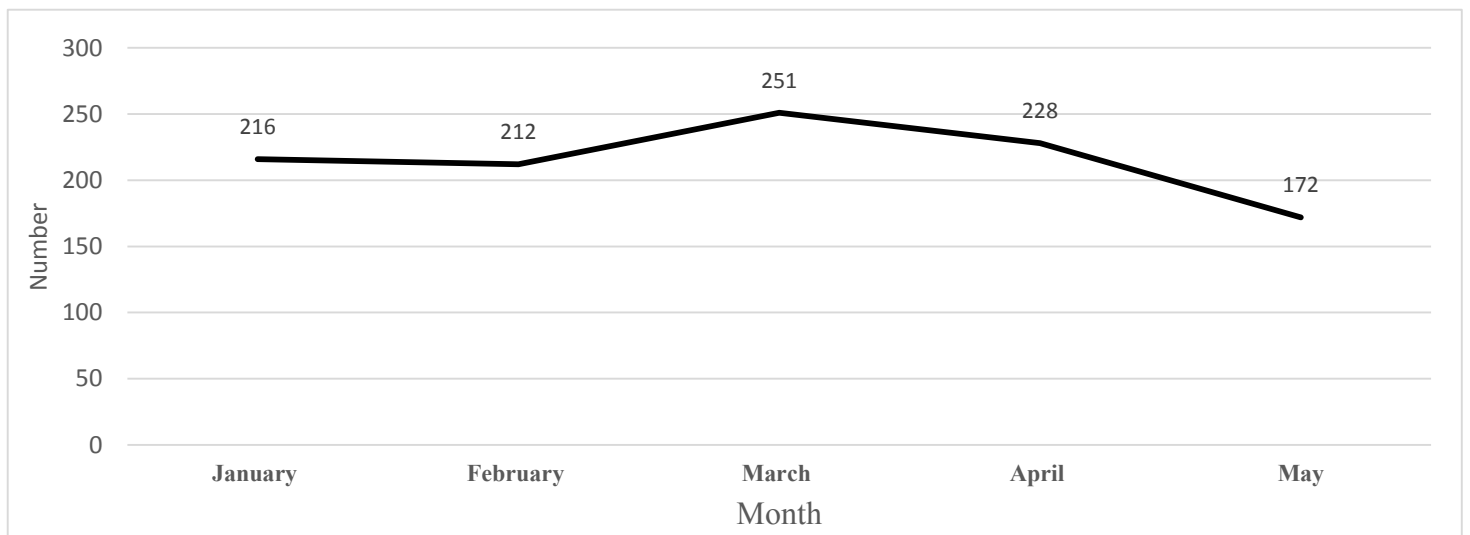


Figure 28: SAM cases referred to TFU, by month in selected woredas, North Wollo, Amhara 2014

Discussion

In spite of the fact there is prevailing food security problem in most of visited woredas that may increase the vulnerability of the population for different disease outbreaks the woredas failed to prepare the emergency preparedness and response plan, which is a corner stone to avoid the crises that may arise from lack of preparedness. In addition the woredas are not able to secure budget for the emergencies that are likely to occur in the area.

The deterioration of vector control activities along with the fact that the LLINS had not yet been replaced for more than three years along with the development of irrigation schemes to tackle the food security may favor malaria transmissions.

The overall surveillance activities, regarding reporting specially weekly reporting was very satisfactory; the completeness and the timeliness of report in the woredas was above the target set by WHO however the data quality specially inconsistency of the reports (under reporting)specially for immediately reportable diseases such as measles may make the problem to be over looked at higher levels such as zone and regional level this may prevent the undertaking of proper and timely containment actions .

Meket woreda was the one with the highest measles cases among the five woredas ,despite high measles vaccination coverage this may be because of the fact that the administrative coverage reported might be by far higher than what is actually exist or low population immunity /herd immunity which increase the susceptibility of individuals to the disease

The high proportion of malnutrition in March may be because of the reporting pattern as Child Health Days/CHD, when screening for malnutrition is undertaken in the form campaign hence the

number of children who got screened during this is expected to be higher than the number of SAM cases get screened routinely .

Conclusion: The woredas have no budgeted emergency preparedness and response plan for containment of emergencies despite there is there is measles outbreak.

Recommendation

Emergency preparedness Plan: Emergency Preparedness plan that includes all the emergencies that are anticipated to occur and the containment activities should be prepared by Public Health Emergency Management committee. It should be also supported by budget

LLIN replacement: LLIN replacement should be considered. Proposals should be prepared and communicated with partners working on malaria prevention and control activities.

Supportive supervision: there should be incessant supervision in place to figure out and to take corrective actions on problems such as related to under reporting and data quality.

Improve immunization: Finding left outs and tracking those defaulters from immunization service should be undertaken to increase population immunity.

Stock pile: The availability of logistics and medical supplies in terms of type and quantity should be monitored and prompt actions should be taken to replenish the stocked out items.

Chapter VIII – Protocol/Proposal for Epidemiologic Research Project

ADDIS ABABA UNIVERSITY
COLLEGE OF HEALTH SCIENCES
SCHOOL OF PUBLIC HEALTH

RESEARCH PROJECT SUBMISSION FORM

Name of investigator	Ashenafi Ayalew Worku
Name of Advisor(s)	Dr. Fikre Enquoselassie
Full title of the research project	Contributing factors for low IRS coverage and the perception and practice of malaria surveillance among health workers in Jile Timuga Woreda, Amhara, Ethiopia, 2015
Duration of project	October 10,2015 to March 10,2016
Study Area	Jile Timuga Woreda ,Oromia Zone ,Amhara Region
Total Cost of the project	\$ 5,002.46
Address of investigator	Tel:+251912157105 Mail:ashunets@gmail.com

Summary

Background

Jile Timuga Woreda is one of the seven woredas found in Oromia Zone, Amhara Region. It has a total population of 84,983 of whom only 5915 (17%) of the population reside in urban. The woreda is 1542 above sea level. It has total kebeles of 21 of which 15 are targeted for Indoor Residual Spray (IRS). Globally, an estimated 3.2 billion people are at risk of being infected with malaria and developing disease. Indoor residual spraying is found to be one of the vector control measures for obtaining for large scale impact at affordable cost. The reluctance of house owners is one among the major constraints in implementing the IRS operation. About 68% of the population in Ethiopia is at risk of malaria. Despite tremendous progresses have been achieved in prevention and control of malaria it is still the leading causes of outpatient visit and admission.

Objectives: To identify the reasons for low indoor residual spray coverage, to explore the extent to which malaria surveillance is being exercised in order to produce information for evidence based decision making

Methodology

Study type: We will conduct a descriptive cross sectional survey. Variables that will be collected include: Background, knowledge, perception, behavior, IRS performance indicators, surveillance indicators.

Sample and Sampling procedure: The sample size was estimated using EPI info based on the assumption taken from MIS 2011. The sample size will be 842 households (20% non-respondent

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rate). Multi stage cluster sampling will be used to select the households. The selection will be randomly and probability proportional to size (PPS).

The second sampling procedure will be selection of health workers. Two health centers from the total four health centers found in the woreda will be selected and three health posts in the catchment of the selected woredas will be randomly selected. We will interview all the health workers and one of the two health extension workers in the selected health centers and health posts respectively

Data collection: Selected study subjects will be interviewed using a structured questionnaire designed with special platform, Open Data Kit (ODK). Smart Phones or tablets with android platform are used for data collection.

Plan for data processing and analysis: Data collected using smart phone will be downloaded from ODK aggregate and checked for completeness and data quality (inconsistency). The data will be analyzed using SPSS and Epi info.

Pre-testing: The data collection tool, questionnaire will be pre tested prior to the study in order to figure out the problems and to take corrective action

The project will be started from October 10, 2014 to March 10, 2016. The total budget required for the project is US\$ 5,002.46 which is equivalent to (102,600.50 ETB)

Background

Jile Timuga is one of the seven woreda found in Oromia Special Zone of Amhara Regional State. It is bordered by in the East and South by Afar Regional State, on West North Shoa Zone and on the North by Artuma Fursi Woreda. It is located 611 km away Bahir Dar Town, Amhara Regional Capital in southeastern direction. The altitude of the woreda is estimated to be 1542 m above sea level. The total population is 84983 of whom 5915(7%) of the population reside in urban. It has total kebeles of 21 of which 15 are targeted for Indoor Residual Spray (IRS).

Statement of the problem

Worldwide, an estimated 3.2 billion people are at risk of being infected with malaria and developing disease. In 2013, there were about 198 million and 584 000 cases and deaths of malaria respectively. The disease burden is highest in the continent of Africa, which accounted for 90% of all malaria deaths and 78% of deaths among children aged less than five years of age in 2013. Malaria control is one of the highest priorities on the international health agenda as it contributes a lot in achievement of most MDG goals.

Currently, there has not been in any vaccine against malaria moreover the prevailing drug resistances become a critical issue among international community; in such circumstances vector control plays a prominent role. Indoor Residual Spray (IRS) is found to be one of the vector control measures for obtaining for large scale impact at an affordable cost. It has been used for decades and has helped to greatly to reduce or eliminate malaria from many areas of the world. In 1970 in Nigerian Savanna infant mortality rate reduction of 25 to 30% was documented in sprayed villages as compared to unsprayed. The reluctance of homeowners is one among the major constraints in implementing the IRS program.

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Ethiopia is one among seven countries with high malaria transmission in East and Southern African region despite remarkable progress has been achieved in prevention and control of malaria is still the leading cause of outpatient visits and admissions. In 2011/2012 it accounted for 17% of the total outpatient visits and 8% of total admission. About 68% of the population in the country and 75% of the land mass is at risk of malaria. Areas with an altitude below 2000m above sea-level are significantly at risk of malaria. According to the national malaria strategic plan (2014-2020), community empowerment and social mobilization are given a high priority. The IRS specific objective of the strategic plan highlights increasing and maintaining the coverage to 100% in IRS targeted

Jile Timuga Woreda had annual malaria incidence rate in 2014 was 35/1000 population; it accounted for 4030 (27 %) of the total cases reported by the zone in 2013. In 2012 only 66% the spray able structures were sprayed which was by far less than targeted by WHO (80%.) and the target set by national strategic plan. Moreover while we had done surveillance evaluation in January 2015, we found out that data analysis and interpretation were not properly implemented in the visited health institutions; 75% of health posts sent weekly report in 2013/2014. Despite the commencement of community surveillance a couple of years ago less than 50% of community representatives / leaders were reporting however community empowerment is a priority agenda in the national strategic plan.

Literature review

Net and indoor Residual Spray are those vector interventions that are being widely implemented to the control of malaria together accounted for 60% the global malaria investment which in turn resulted in a decline of total mortality rate by 25% and 33% respectively (1) .

IRS contributed for malaria elimination if rigorously applied .Historically IRS contributed a lot for malaria elimination achievements in Europe, Asia and America (1) yet there are different negative perceptions on IRS; In the study conducted in Uganda about 84% among those who had negative perception believed that it causes cancer and respiratory infections(2) . What makes the problem to be critical is that the negative perception and limited knowledge were prevalent in rural areas where effective malaria control strategies are demanded (3, 4) . There are studies which show the community knowledge and perception of IRS program varied (4) however community perception and knowledge are very crucial for the successful implementation of vector control strategies (5).

The study conducted in one of the districts of Uganda a revealed that most of the people residing in malaria endemic area know malaria is serious and life threatening disease however most of the people malpractice the malaria prevention and control activities in place. Two third of the study participants believed that IRS is not important

In the study conducted in selected Zones of Amhara Regional State revealed that the acceptance rate of IRS as malaria prevention and control was found to be only 5.37%(6). The proportion of households /HHs received a net or IRS were 83% in Amhara Region (7).

To achieve the elimination of malaria in the future effective implementation of vector control measures play a vital role hence it is instrumental to figure of the bottle necks that hampers the

successful accomplishment of IRS .This study is the one that is going to be carried out in different socio demography and geographical setting .

The study conducted in selected regions of Amhara highlighted that the acceptance of IRS as a malaria prevention and control was very low

Objective

General Objective: to identify the reasons for low indoor residual spray coverage, to explore the extent to which malaria surveillance is being exercised in order to produce information for evidence based decision making

Specific Objectives:

- To identify and describe factors that hampers IRS performance
- To estimate the knowledge ,belief and practice of the community towards vector control activities, IRS
- To determine knowledge ,attitude and practice of health workers regarding malaria surveillance
- To measure the access and coverage of IRS

Methodology

Study Variables

Dependent: Knowledge about IRS, frequency of IRS, plastering of sprayed walls, perception of IRS, number of sprayed structure practice before and after IRS ,plotting malaria morbidity monitoring chart ,interpreting malaria morbidity monitoring chart

Independent variable:

Sex, Age Educational level, wall type, religion, occupation, place of resident ,training on malaria ,service year ,

Study design

We will perform a descriptive cross-sectional survey. The variables that will be collected include: background variables, IRS performance monitoring indicators, behavior, knowledge, practice number of unit structures sprayed, people protected and surveillance indicators; timeliness, completeness

Sample and sampling procedures

We have calculated the sample size using the Epi info to do so ;the following assumptions have been taken into consideration: proportion of households protected by the IRS in Amhara, which were 53% according to a national malaria indicator survey (MIS 2011), design, effect to be 2 (MIS 2007), relative precision 5 % in 95 % confidence interval and with the assumption of the non-respondent rate to be 20 %. Based on these we have estimated the sample size to be 842 households.

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Multi-stage cluster sampling design will be used to select households; in the first stage the primary sampling unit is kebele. Ten of total 15 kebeles will be randomly selected; in the second procedure 34 gotes /villages will be randomly selected and then the households will be determined using probability proportional to size (PPS). The first house will be selected using lottery method and will be referred from census logbook prepared by community health information system that has been implemented in all regions of the country; there are logbooks that contain the list of head households in each kebele in by village. Then to the nearest household until the required HHs sizes are obtained.

The second sampling procedure for the malaria surveillance study will be performed; in the first stage we will select two of total four health centers found in the woreda and then three health posts within the catchment of each of the health centers will be randomly selected. All health workers who are on duty and one health extension worker in the health post will be selected and interviewed. The health extension worker will be selected using the lottery method.

Plan for data collection

Data collection: Selected study subjects will be interviewed using a structured questionnaire designed with special platform, Open Data Kit (ODK). Smart Phones or tablets with android platform are used for data collection more over key informant interview, focus group discussion, and observation reviewing available information such as Health Management Information System / (HMIS)and surveillance reports another recordings. Data collectors will be recruited and get trained theoretically and practically. We will develop field manual and instruction sheet on how to carry out data collection using smart phones and the overall project undertakings.

Plan for data analysis and processing

Sorting: The data that will be sent to the server will aggregate immediately. The data can will be exported to Microsoft Excel. The two files /data bases will be separately saved in the computer for further analysis.

Data quality control checks: As the data quality problem such as leaving the pertinent variables blank and other inconsistency problems will be addressed while designing the questionnaire on ODK build. Besides, this if there are issues that are missed during designing we will check the quality by inserting pivot tables on the Excel data base so that we can easily track the variables with the problem. Apart from these we will exclude data if we are doubtful of on the quality of the data.

Sorting and cleaning: we will add intelligence on the forms so that it can skip questions based on prior answers, display hint message, and prevent to proceed to next question whenever the answer is required. On top of this the supervisors will check for completeness, proper saving of forms. Once again at the end of each day the collected data will be sent to the server; the principal investigator will check out for completeness, inconsistency. The complete form that is sent to the server from the smart phones will be exported to a comma separated format (CSV) which can be open in Microsoft Excel format. The data then will be analyzed using SPSS and Epi Info.

Results Dissemination/Advocacy Plan:

The Preliminary and final report will be communicated with partners, program managers, and advocated to decision makers. We will disseminate the result at review meetings will be held at woreda zonal, regional and national level. Abstracts will be submitted to make oral and poster

presentations at scientific conferences within the country (EPHA annual conference) in the continent (AFENET) and across a globe (TEPHINET).

Ethical considerations

Prior to conducting the study the protocol will be submitted to the Regional Ethics Committee to get written approval and informed consent will be developed in Amharic and Afan -Oromo and we will ask for the interviewees their consent to take part in the study .They will be enrolled in the study if they decide to do so . They have also the right and the freedom to withdraw themselves from the study and are not obliged to answer all of the questions. Deploying of data collectors will take the local language spoken in the study area into consideration. Besides this the time for interview will be scheduled in such a way that it exempt the times of praying. We will keep the privacy of the participants throughout the investigation .Every household in the study area has equal chance being chosen irrespective socioeconomic, accessibility and other factors.

Pre -testing the methodology

We will pretest the method to figure out the problems regarding overall project undertaking procedures so that remedial actions are taken. The appropriateness and coherence of questions, techniques of interviewing, the use of smart phone for collection will be the prime objective of the pretesting .The challenges and limitations observed during exercising the procedures .We will thoroughly discuss and make corrective actions right away. We will perform the pilot test on 100 HHS.

Desired outcomes

The anticipated outcomes from the project include:

- a) After the completion of the project ,there will be an improvement on malaria data analysis and interpretation practice among health care workers and health extension workers
- b) The factors for low IRS performance will be clearly defined and known
- c) There will be an increase in utilization and proper interpretation of malaria monitoring charts.

Work plan

Major tasks	October10-15/2015	October 25/2015	November01 -03/2015	November04 -06/2015	November 10 -08/2015	December	January	February	March 10-11/2016
Questionnaire and manual design									
Obtaining Ethical Clearance									
Training research team									
Pre testing									
Data collection									
Data analysis									
Write up the report									
Preliminary report									
Preliminary finding dissemination									

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Budget

Costs involved in field work and preliminary result dissemination of the study

Category	Unit cost (USD)	Quantity	days	Amount requested
1.Personnel				
Data collectors	\$ 15.00	10	13	\$ 1,950.00
Leaders	\$ 10.00	10	8	\$ 800.00
Supervisors	\$ 20.00	3	13	\$ 780.00
Principal investigator	\$ 20.00	1	15	\$ 300.00
Head of Zonal Health Department and woreda Health office	\$ 15.00	2	1	\$ 30.00
Head of Health centers	\$ 15.00	4	1	\$ 60.00
carter center officer	\$ 15.00	1	1	\$ 15.00
Malaria officers	\$ 15.00	4	1	\$ 60.00
Secretariat	\$ 10.00	2	3	\$ 60.00
Driver	\$ 15.00	1	10	\$ 150.00
Sub total				\$ 4,205.00
2.Transportation				
Fuel field work	\$0.166/liter	70km/day	8	\$ 92.96
Fuel for motor bike work	\$1.25/liter	30km/day	6	\$ 225.00
Sub-total				\$ 317.96
3. Equipment				
Power bank	\$ 9.00	5 each		\$ 45.00

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Category	Unit cost (USD)	Quantity	days	Amount requested
Sub total				\$ 45.00
4.Supplies				
Cartridge	\$ 140.00	2each		\$ 280.00
Note book	\$ 0.50	1 each	80	\$ 0.50
Pen	\$0.25	13each	1	\$ 3.25
Photo copy paper	\$ 8.00	4 ream		\$ 32.00
Sub total				\$ 315.75
5.Others				
Mobile card for cellphone for data collectors	\$ 0.75	10	5	\$ 37.50
Mobile card for supervisors	\$ 0.75	3	5	\$ 11.25
Mobile card for principal investigator	\$ 1.25	1	8	\$ 10.00
Hotel room rent with fast internet connection	\$ 30.00	1	2	\$ 60.00
Sub total				\$ 118.75
Grand Total				\$ 5,002.46

Budget justifications

The principal investigator will arrive at the study area two days prior to the research team to arrange the training and administrative issues and in addition he must have internet access to upload questioners to the server, monitor the overall progress of the project. He visits the server to check out the proper submission and the performance of each team.

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The mobile power banks are used to charge the smart phones /tablets so that they get charged whenever there is power outages. The phone bills for the data collectors is mainly to send the collected data to the server. Guides from the community are not participated on the training. We have taken these into consideration while budgeting.

In addition to we will obtain vehicle, motor bike, office from woreda health office .Tablets /android for data collection will be borrowed from FETP and residents in Amhara field base.

Reference

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ASSURANCE OF PRINCIPAL INVESTIGATOR

The undersigned agrees to accept responsibility for the scientific ethical and technical
Conduct of the research project and for provision of required progress reports as
Per terms and conditions of the Research Publications Office in effect at the time of
Grant is forwarded as the result of this application.

Name of the student: Ashenafi Ayalew

Date. _____ Signature _____

Approval of the primary Advisor

Name of the primary advisor: Dr. Fikre Enquoselassie

Date. _____ Signature _____

Chapter IX – Other Additional Output Reports

Introduction

Ebola Virus disease preparedness

Ebola viruses are found in several African countries. The first outbreaks in 1976 in Zaire (now Congo (Kinshasa) and The Sudan resulted in more than 400 deaths. Since then, outbreaks of Ebola among humans have appeared sporadically in Africa particularly in Sub Saharan Africa .Risk assessment in disease endemic areas is difficult because the natural reservoir host of Ebola viruses the manner in which transmission of the virus to humans occurs remain unknown. There are five identified Bundibugyo, Côte d’Ivoire, Reston, Sudan, and Zaïre. Ebola-Reston, has caused disease in nonhuman primates, but not in humans.

Person-to-person transmission of Ebola and Marburg virus occurs through direct contact with the Blood, secretions, organs, or other body fluids of infected persons, putting health-care workers and the community at risk. To date, approximately 9% of Ebola or Marburg

Currently Ebola outbreak affected countries as of September 15, 2014 include: DRC, Guinea, Liberia, Sierra Leon, Senegal and Nigeria. The occurrence of Ebola outbreak is sporadic and unpredicted.

Ethiopia is one of the countries which are identified to be at risk of EVD. Land ports in the four corners of the country are more likely to be at risk. The preparedness activities are being undertaken by Federal Minster of Health since EVD has been declared to be international Public Health Emergency by WHO.

The Public Health Institute intended to reinforce the surveillance activities in the major land ports of the country apart from the airport. On September 1, 2014 Field Epidemiology Training Program

/EFETP coordinators and the resident advisors gave us orientation on what was going to be done. The aim of the assessment was to assess the preparedness, to provide health information, and to initiate and support the commencement of screening in the land port.

Description of the site

Benshangule Regional States is one of the nine ethnic divisions of Ethiopia .The name of the region is derived from the two major ethnic groups Berta (also called Benshangule) and Gumuze the region has an estimated area of 49289.46 square kilometer.

Kurmuk Woreda is one of the 20 woredas found in Benshangule Regional States .It was founded in 1948 .The ancient name of the woreda during its establishment was” Kurnuk” which is an Arabic term to mean hut .The woreda is bounded in the North by Homesha Woreda, in the East, by Homesha and Mengie woredas, in the west by Sherkole Woreda in the South by Assosa Woreda. The woreda has a total population size of 23000. The majority about 98% of the residents are from Berta ethnic group. The mother tongue of the people in the woreda is Berta; other languages spoken in the woreda include: Amharic, Afan Oromo and Tigrigna. The woreda has a total of 16 kebeles of which 2 are urban .The capital town of the woreda is Hora Azihab which is located seven

kilometer away from the land port, Kurmuk . The woreda has altitude that ranges from 570 to 1300m above sea level.

Materials and Methods

Preparation for Field: On September 2, 2014 we made discussions with EFETP coordinators and resident advisor on the tasks to be implemented ; on the next day ,September 3,2014 we collected

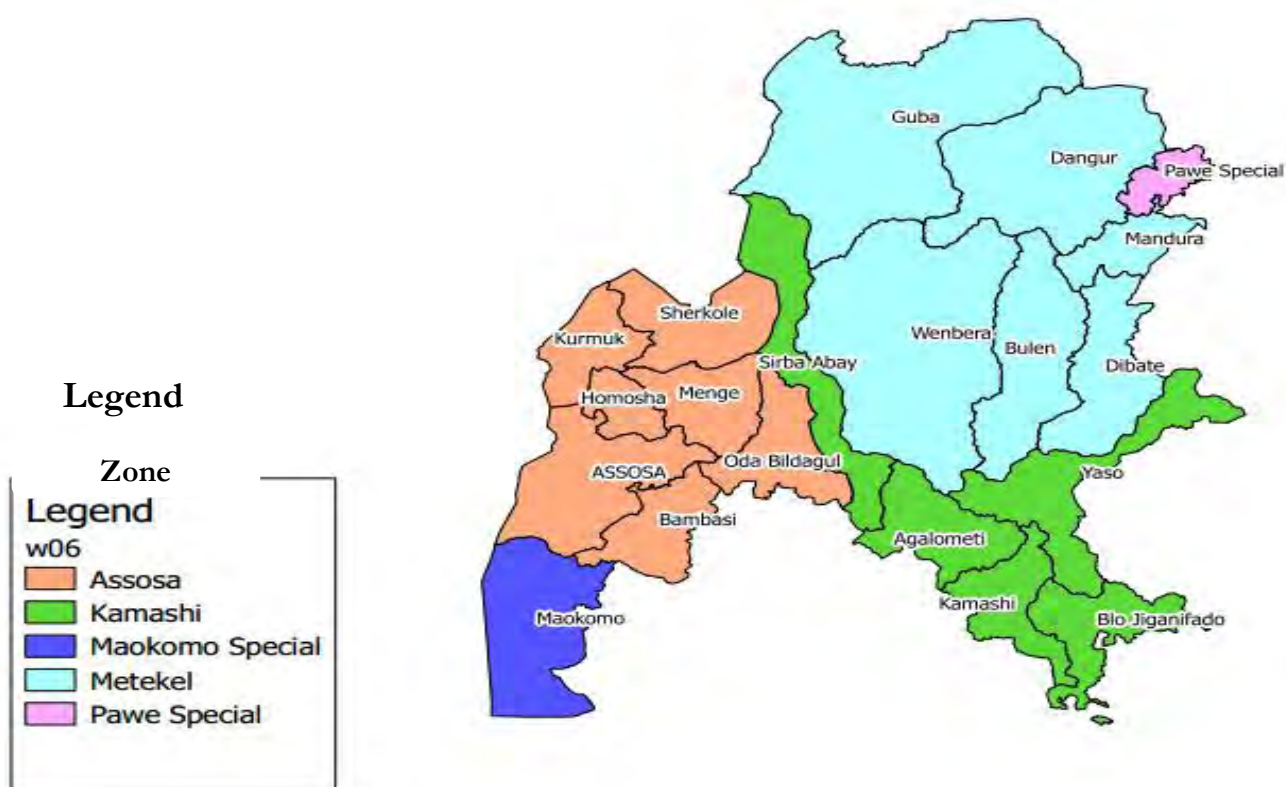


Figure 29: Map of Benshangule Gumeze Region, Ethiopia

Brushers and support letter from Public Health Institution /EPHI. It was in the same day in the afternoon that we departed from Addis Ababa to Assosa, Regional capital of Benshangule Gumuze Regional states, we had arrived at Assosa on Friday September 5, 2014.

We supported the undertakings into two phases; first phase preliminary assessment / scanning on the preparedness and surveillance activities in the region especially related to Ebola Virus

Compiled Body of Works

Disease/EVD; the second phase was aimed at the commencement of screening at one of the major land ports of the country, Kurmuk Benshangule Gumeze Regional states Ethiopia .

Data collection: We collected data by observation, interviewing the key informants and discussing; we used checklist to make observation and to interview the key informants.

We made discussions with Public health emergency management officers, Disease prevention and health promotion process owner, head of the health bureau and Public emergency management committee members. We also tried to discuss with Sudanese health workers and military officials on Ebola. We told them the purpose of the visit and asked them what had been done by their government regarding the deadly virus.

Result

During our stay in the field we observed and figured out the strength, weakness and existing opportunities. Besides this we got some of the preparedness activities started.

We made discussion with Kurmuk Woreda Deputy Administrator, Assosa Zonal Health Department Head, and Kurmuk Town Municipality Head. They told us that they were also concerned of the disease and they highlighted that the people of the two nation had strong socioeconomic relations since many years ago. Thousands of Ethiopians go to Sudanese Kurmuk twice in a week (Thursday and Sunday) which are market days there ; The Ethiopian get most of the factory products such as oil, sugar, detergents ,cosmetics (specially perfume),etc. .In turn the Sudanese enter to territories to buy vegetables like tomatoes, lemon etc. Unlike Ethiopians the Sudanese have freedom to enter territory seven days a week. On average it is estimated that about 50 to 60 Sudanese enter to Kurmuk every day; most of whom are men. The prime reason that they usually enter to is to visit commercial sex workers (CSWs) and to have a drink (alcohol) .No one

Compiled Body of Works

from the two nations is allowed to spend the night out of their country's territory unless he/she has official permission. Almost all of them who cross the land port from the two nations are those native residents; not coming from other countries. According to the Benshangule Gumeze Regional Health Bureau; Kurmuk was not the only land port of entry, others include Guba and Gizen.

The health workers who were working in the Kurmuk health center were not clearly aware of Ebola. The head of the health center told us that no one had given them information about Ebola and he added that the health workers were scared whenever they see someone bleeding.

According to the Sudanese health workers; by the time we arrived in the land port the Sudanese health workers told us that nothing had been communicated regarding EVD from Minister of Health despite there was a history of Ebola epidemic in the present day of south Sudan. More over from what we had noticed the surveillance system in the zone seemed to be not robust enough; there had not been regular feedback on public health surveillance from the woreda health office.

The Sudanese physicians told us that the hospital provide health care service not only for Sudanese but also for s; they had estimated that the patients may accounted for from 40 to 60% of the total outpatient visit. The most common causes for morbidity in the area were malaria and diarrhea.

Sensitization not commenced: According to the disease prevention and health promotion and Disease prevention process owner alert letters on EVD had been sent to all health institutions however trainings /sensitization had not been commenced.

Public Health Emergency Management Committee /PHEMC: Neither PHEMC nor the Rapid Response Team /RRT had not properly functioning at all levels. The RRT in the nearby health

center was not properly functioning after the woreda PHEM officer, who was vigilance, had left the position .

Fail to integrate activities: Unlike other regional states in the country the Health Development army establishment had not been accomplished. All officers at all level had been deployed to kebeles to support Health Development Army (HAD) establishment campaign. During the campaign week the issue of EVD should have been addressed together yet they couldn't use that opportunity to do so.

Identified opportunities

Availability of clinical nurses at health posts: Unlike the other Regional States in the country in addition to health extension workers there is at least one clinical nurse in each of the health posts. This may play a crucial role in detecting cases as the nurses do have better understanding of case definitions for priority diseases.

Health Developmental Army; the establishment of HDA had been underway this is a glorious opportunity to implement Community based Surveillance if it has been well established.

What had been done?

Revitalizing coordination and collaboration: we had briefed Kurmuk woreda Administrator about the aim of the visit; we told him about the need for revitalizing EVD task force, the members to be involved and the main duties and responsibilities of each member.

Sensitization

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We gave orientation on EVD for all Kurmuk health center staffs and workers from most of the sectors in the woreda. The themes in our talk were: Current Update on EVD (as of October 2/2014), screening algorithm, EVD task force, duties and responsibilities of October 2/2014), screening algorithm, EVD task force, duties and responsibilities of Stakeholders in undertaking preparedness activities.



Figure 30 Health workers attending sensitization on EVD, Kurmuk Health Center, Benshangule Gumeze, Ethiopia 2014

Delivering materials

- ✓ Personal Protective Equipment /PPE
- ✓ Glove
- ✓ Mask
- ✓ Goggle
- ✓ Overhead Infrared remote thermometer



Figure 31: Screening at Kurmuk land port, Benshangule Gummeze Regional States, Ethiopia 2015

The prime purpose of the screening was to detection isolate risk individuals entering into the country via land crossings, thus reporting is very important so as to monitor the risk status of individuals who enters. To do so, we emphasized to develop report format and we have also agreed with the regional health bureau that the reporting frequency to be daily and weekly. The screening sites started reporting. For instance, from October 13 to 26, 2014 about 4131 individuals were screened of whom most 2974 (72%) were screened in two market days Thursday, 866 (21%) and Sunday 2108 (52%). (Figure 32 Individuals screened at Kurmuk Land port October 13 -October 26, 2014Figure 32 below)Half, 2062 (51%) of them were Sudanese and the remaining were Ethiopians. All except four individual were with body temperature less than 38⁰c. Four of them

Compiled Body of Works

had been found positive for malaria (*Plasmodium vivax*); two of whom were Sudanese and the rest two were, an Ethiopian and a South Sudanese.

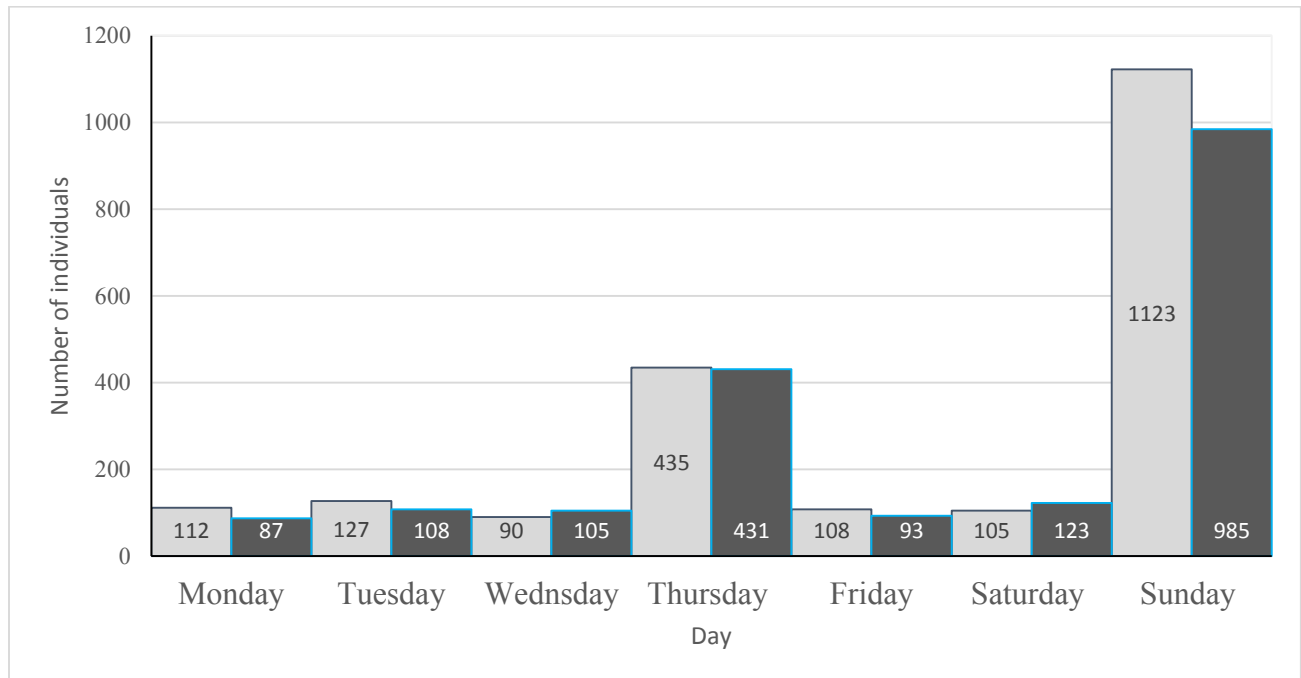


Figure 32 Individuals screened at Kurmuk Land port October 13 -October 26, 2014

Ebola Task Force /ETF Meeting

Benshangule Gumeze Regional States Health Bureau has led its second meeting with Ebola task force members which was chaired by Regional Health Bureau Deputy Head on Saturday, October 25, 2014.

The fundamental role behind the meeting was to introduce the Term of Reference /TOR among the task force members, to call for resource mobilization

- ✓ To introduce TOR to the members
- ✓ To initiate / call for resource mobilization
- ✓ To get the members acquainted with the under way EVD tasks

Terms of References Regional Ebola Task Force

The Regional Ebola task force has been set up in such a direction that it does possess two arms:

Technical and Non -technical

Technical Team: Members from Health Sector and NGOs working on health and related issues

Nontechnical: consists of members from sectors other than Health.

The task force is going to be chaired by the president of the Regional state and has four subcommittees

The purpose of the task force: to guide, oversee and coordinate preparedness, early detection of epidemics and to coordinate the response and recovery activates in the aftermath of public health emergency occurrence.

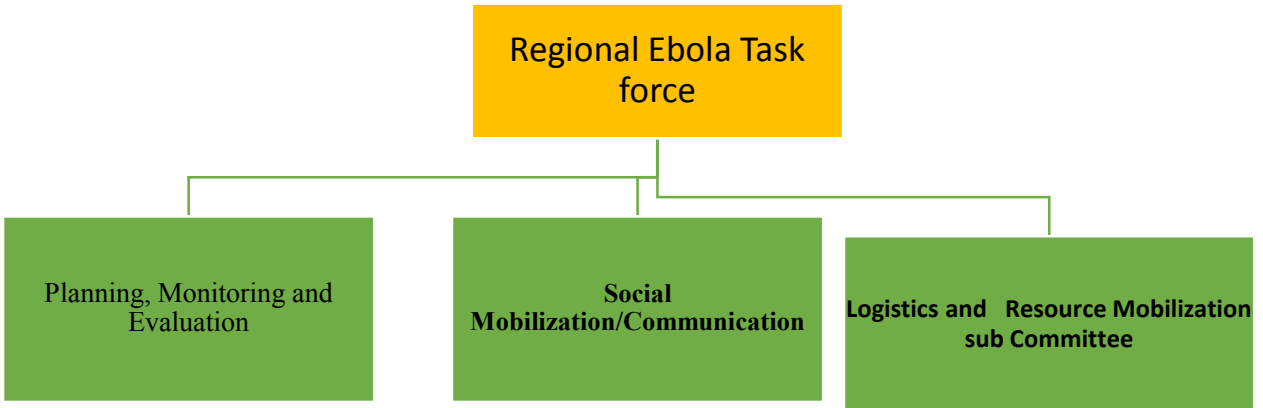


Figure 33: Chart showing subcommittee of regional Ebola task force Regional Ebola Task force in Benshangule Gumeze Regional States

Membership:

The task force comprises of representatives from governmental and non-governmental organizations these include:

- The Benishangul Gumuz Regional Health Bureau /BGRHB
- Benishangul Gumuze Regional
- Education Bureau
- Benishangul Gumuez Agriculture, Bureau
- A regional disaster risk management and food security bureau
- Regional Government communication office
- Red cross
- Save the children
- World Vision

- United Nations Children's Fund/UNICEF
- International Rescue Committee/IRC
- Benshangule Police Commission

Roles and Responsibilities of Ebola task force

- ✓ Risk Mapping risk areas
- ✓ Developing EPRP
- ✓ Provide training, orientation to general health workers and others/public
- ✓ Assist the lower structures to form a technical working group
- ✓ Prepare sites for quarantine and isolation of cases having EVD
- ✓ Adopt and distribute guidelines, SOPs and reporting formats to lower levels for enhancing surveillance activities
- ✓ Prepare and distribute IEC materials

(Brochures, flyers, banners....)

- ✓ Disseminate updated information and risk assessments on the EVD outbreak to stakeholders.
- ✓ Prepare reports and submit to the steering committee
- ✓ Conduct rapid inventory
- ✓ Avail standard PPE at EVD screening and Isolation area
- ✓ Estimate and forecasting of drugs, medical supplies and equipment needed
- ✓ Prepare essential logistics, supplies (materials) for screening

Major issues achieved at the meeting

Incorporate EVD in Trainings: It is obvious that it is impossible to train all Health workers at a time on EVD thus the participants have raised and agreed that the issue that EVD is going to be contained in any of the trainings organized by the Regional Health Bureau and partners. So far about 90 Health care workers have been sensitized on EVD while attending training on nutrition.

Chair Person of the Task force: The meeting has been conducted for the second time in the absence of the Regional States president .We and other participants stressed that the meeting should be chaired by the Regional States president as in the same fashion as the national task force which is chaired by the prime minster .The regional Health Bureau Head Mr. Salah assured the participants that the Regional states Government is committed to support this critical matter .He added that the regional Health Bureau had an appointment with the president to convene the committee on Friday, October 30,2014 .In his speech he also admitted that it had been very difficult to convene the Regional cabinet as most of them had been busy in doing commitments that were related to preparation to host the 9th Nations and Nationality Festival day which would be celebrated the regional capital ,Assosa Town .

Frequency of Meeting: it has been already decided that the subcommittee meets once every week and the task force will meet every other week yet meeting could be conducted in less than the indicated time whenever there are circumstances that needs prompt action

Call for Support: The chair person explained that currently they had commenced screening in two sites and added that they had planned to increase the total screening sites to four by starting two screening sites at the major land ports Gizen and Guba .Finally He remarked that partners should do the very best they could for the full fill accomplishments of EVD preparedness tasks .The partners promised to do their best as far as the Regional Health Bureau come up with sound Emergency Preparedness Plan .



Figure 34: Some of Ebola task force meeting participants

Recommendations

Thermometer: Additional overhead infrared thermometer is essential to scale up the performance of the current functioning screening posts and also to commence screening in other two major land crossings in which many individuals enter the country following the end of the rainy season which has hampered their movement during the rainy season.

Facilitate Employment process – The Food and Medical supplies control Agency was in apposition to employ regulatory officers who would facilitate the screening activities at these land crossings thus the employment procedure should be sped up as much as possible.

Cross border collaboration: The Ebola preparedness tasks in Sudanese Government seemed to not strong as compared to Ethiopia; most of the Sudanese knows very little regarding Ebola.

Despite the local residents have habituated the screening procedure, the higher military officials were refusing to get screened before entering into the soil because of the fact that they perceived as if their dignity were degraded thus the Federal Ministry of Health and Ministry of Defense of Ethiopia should communicate their Sudanese counterparts.

During my residency I took part in a activities apart from outbreak investigation and Surveillance activities; to mention the key activities in which I was actively involved.

PHEM pocket guideline development (June 06-15/2014)

The regional health bureau PHEM core process had made tremendous improvement since its establishment in 2009 following the implementation of reform; timeliness and completeness of reports had been increased. The core process developed PHEM pocket guideline in Amharic, this was the extraordinary success. I actively participated in the development of this the guideline which is a mile stone in the history of PHEM.

Training

EVD preparedness and response training (January 3-4/2015): I trained health workers and PHEM officers from Amhara and Benshangule Gumeze regional states on Ebola preparedness and response organized by EPHI and was held in Bahir Dar town.

Skill transfer on Open Data Kit /ODK (December 24, 2014): After we had been introduced the concept of ODK, I tried to teach myself further through reading on internet. I shared my little knowledge and skill to cohort six residents; I lectured in the class for about a couple of hours. I also helped my colleagues in the field base on different software specially Arc and Quantum GIS applications. I had also participated in scientific conferences, review meetings and international trainings.

Table 14: List of trainings and conferences

Conference /Training	Organizer	Theme /Topic	Period	Venue
African Epidemiological Network Scientific conference	AFENET	Addressing Public Health Priorities in Africa through FELTPS	November 17 to 21 ,2013	Addiss Ababa
National PHEM Annual Review meeting	EPHI		16 -17 August 2014	Hawassa
Biannual PHEM review meeting	ARSHB		May , 2015	Dangila
26th Annual Conference and Meeting	EPHA		From Feb 25 to 28, 2015	Bahir Dar

GIS training	EPHA	March 7 to 13 2015	Addiss Ababa
Malaria and other vector borne disease prevention and control	MENTOR imitative	March 23 to 27	Dubai

Coordinating and supporting vaccination campaigns

Measles outbreak response vaccination: to contain the widely distributed measles outbreak the regional PHEM core process had conducted vaccination in 2014 and 2015. I participated in the two campaigns .I coordinated and supported the vaccination campaign in Yilma ena Densa Woreda in February 2014 and involved in the planning of the vaccination that was be conducted in selected Woredas of South Gondar ,West Gojam and Awi zones .

Malaria Trachoma /MALTRA campaign: Amhara Regional Health Bureau in collaboration with carter center Maltra project conducts mass drug administration for trachoma and testing and treating for malaria in the two different parts of the region, Western and Eastern part of the region in different times so as to combat the two tropical diseases which are the public health burden of the disease

Provision of feedback

Alert notification: During our stay in the field base each of us had assignment zones to take care of. We followed the overall situation of the zone; we made communication with Zonal PHEM officers via phone and email. We also provided them written feedbacks. I sent feedback to my assignment zone by the time malaria morbidity revealed sort of increment. The indicator based surveillance in the Early warning sub process of PHEM has a weekly reporting system in place to monitor the the conditions /diseases that are notifiable in the system. The system uses Excel data base tool. I compiled ,analyzed and provided feedback to the reporting Zones.

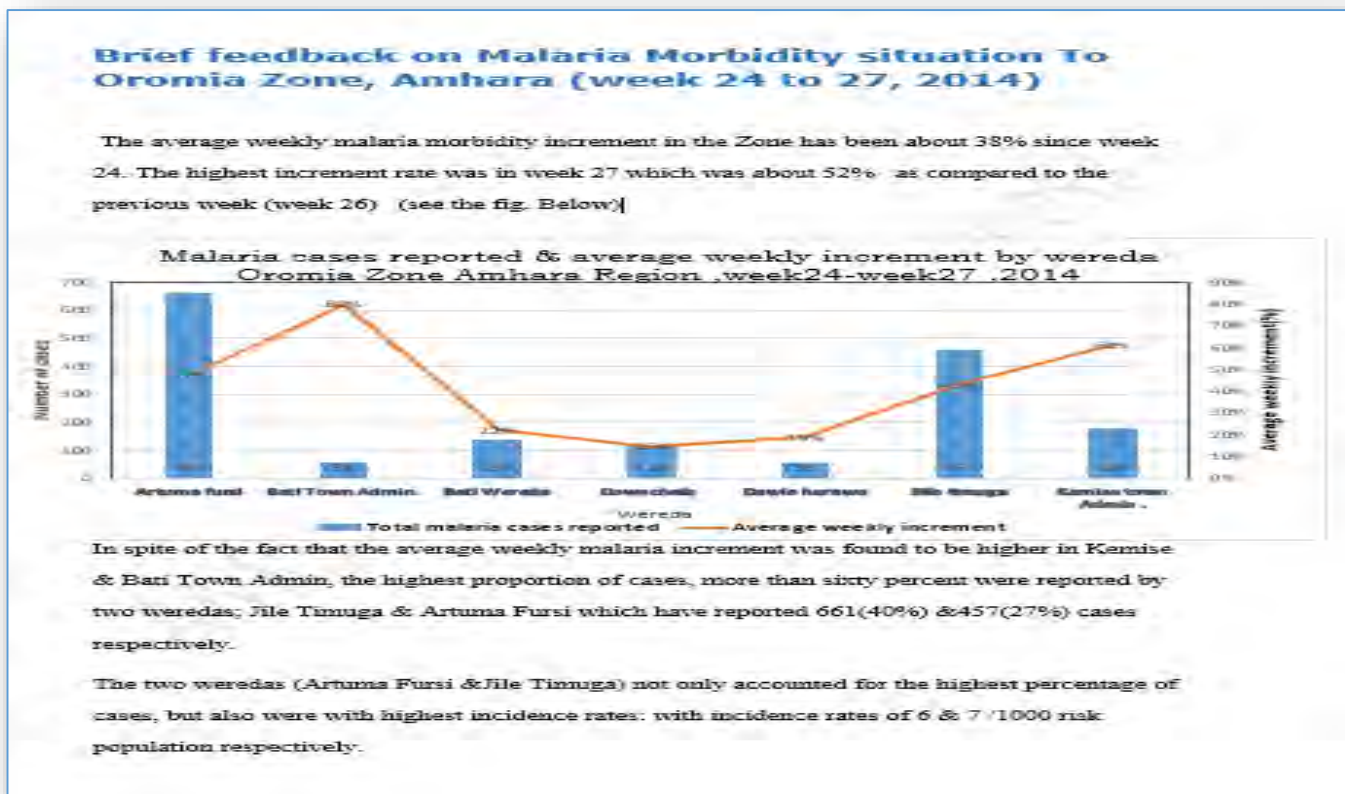


Figure 35 Sample feed back

Feedback on Weekly bulletin: the Regional Health Bureau PHEM core process communicate /disseminate the formation weekly through bulletin; it is shared with different stakeholders. I tried to comment on some of the issues which I thought to be addressed and to be taken into account.

I would like to thank those of you who have taken the lead in preparing this wonderful bulletin; it is a milestone in the history of public health surveillance in the region .you, colleagues are doing a good job.

After having said this; I would like to comment on some issues that I think to be undertaken into to account;

Assessing the utilization; to what extent the bulletin is being used by Zonal health departments &their role in communicating it with respective districts. This should be the critical agenda to be addressed during supervision &also included in criteria for ranking Zones.

Increasing coverage; from what I know the bulletins have not yet sent to the districts despite the fact that districts are the nucleus of PHEM/public health surveillance hence it should be emailed to those districts which have internet access .

Use rates rather than absolute numbers

Malaria by district –it is good to depict the number of malaria cases by district using bar charts however in my opinion it should have been best if incidence were displayed along with maps /using GIS

Malnutrition- besides the number it is best and sound to include the rate of malnutrition among children less than five years of age as the total or catchment population is quite different among districts &health facilities.

Using thresholds

while displaying malaria morbidity using line graph it's better to include the threshold (double the preceding year morbidity whenever five years data are not available) instead of showing weekly morbidity of successive years .

To sum up; what you are doing is pretty good; the research articles that are incorporated in the bulletin are very impressive &can be spring boards for further researches. Generally you are on the right track of being best captain of the ship called "PHEM"

Have a nice weekend!

Ashenafi

Annexes

Outbreak Investigation

1. Measles outbreak investigation Questionnaire

Interviewee status: Case Control Date _____ ID NO _____

A. Identification information

1. Name-----Region -----Zone-----Kebele----- Village -----

---B. Demography

2. Age----- Sex----- Occupation-----3. Educational status; unable to read and write primary secondary

Vocational/Technical Higher

4. Marital status; -----C. Possible sources of infection

1. Have you travelled to somewhere in the previous 7 to 18 days before the eruption of the rash
yes No

2. If yes where -----Contact with another confirmed case in the 7 to 18 preceding days? Yes No

If yes, Where -----who-----D. Clinical information.

Symptoms and signs; rash fever cough coryza (runny nose) conjunctivitis

(Red eyes)

Date of onset of rash ___/___/___/ date seen at health facility___/___/___/

E. Laboratory data

Sample taken? Yes No

If yes, Date taken ___/___/___/

F. Vaccination history

Vaccinated for measles? Yes No

If yes, date of last vaccination date -----Total measles vaccine received? -----
---. Transmission to others

1. Have you traveled to somewhere before and after four days the rash erupt? Yes No

2. Is there other case in the neighborhood? Yes No

3. If Yes, Who are He/ She? _____

4. Are there other cases within the household? Yes No

5. If Yes, Who is He/ She? _____

6. Total families in the HH-----7. Diameter of the house -----8.

Total children<5yrs old-----vaccinated -----not vaccinated-----reason

for not vaccinated-----

9. Where does the patient work/study? _____.

10. Are there other cases in the workplace/school? Yes No

11. Where does the patient socialize (market, church, club, school, other _____

12. Are there other similar cases in social groups/school/work place---? Yes No

13. If yes, where -----

Field investigator name _____ position _____ signature _____

2. ⁶House to house rapid monitoring of measles vaccine coverage

Reporting Health facility :				
Woreda:		Zone :		Region :
Kebele		Date of Assessment :		
Sr.No.	less than five years of children in the house	children vaccinated (card .HxOther)	Reasons for not vaccinated	Observation

3. Check list for assessing emergency preparedness and response activities
Surveillance Evaluation

4. Public Health Surveillance system Evaluation checklist (Woreda/Zone)

Date ----- Name of Interviewee ----- Position /Post -----

Name of Health facility ----- type of Health Facility -----Woreda -----

Zone _____ Distance from the Zonal Capital

1. List stake holders in AFP Surveillance

2. Socio Demographic information

Total population ----- Male ----- Female ----- Pregnant-----<5 years Children –

----- Children < 15 years of age ----- Urban ----- Rural -----

Total Kebeles ----- Urban ----- Rural -----

1. Performance Information

	2012	2013	2014
Expected AFP /Annum			
Total reported AFP cases			
Total AFP cases investigated within 14 days of onset			
Total number AFP cases reported with Adulate specimen			

Total AFP cases reported and investigated after 14 days (between 14 – to 60 days)			
For how many of the specimens you sent to central laboratory you have received laboratory feedback on time (within 28 days)			
Report completeness			
The OPD attendants			
OPV ₁	----- (----- %)	----- (----- %)	----- (----- %)
OPV ₃ coverage	----- (----- %)	----- (----- %)	----- (----- %)

3. Sites for active case search prioritized? Yes No
 - 3.1. Do PHEM officers' conduct active case search Yes No
 - 3.1.1. If yes How often -----
4. Are there blank stand ard reporting format (weekly and case based)? Yes No
5. How do you report: Mail Fax Telephone Radio Electronic
Other? Specify -----
6. Do you take back up of report? Yes No
7. If yes how? Documentation hard copy CD Rom USB External Hard disk
Other /specify -----
8. How data is entered Computer manually other specify? -----
Record management practice; Are the following properly documented
Weekly report Yes No
Line list Yes No
Case files (For Each case) Yes No
9. Is there sufficient blank report format(Weekly report format ,line list and case based) for data collection Yes No
10. From where do you collect report? HC HP hospital community private clinics
other/Specify?
11. weekly reports summited to the next level/year -----

12. Data Analyzed Yes No

12.1. If so, How often weekly Monthly Quarterly Biannually annually

12.2. What type of data out puts produced? Bar graphs Pie charts line graphs histograms table Map other /specify -----

12.3. Data described by place Yes No

12.4. Data described by person Yes No

12.5. Data described by Time? Yes No

13. How do you disseminate the data? Internet Newsletter Weekly Bulletin Annual reports peer reviewed journals Oral presentation poster presentation other /specify -----

13.1. To whom you disseminate the information ----- -

14. Is there funding for AFP surveillance system?

14.1. If yes, Budget source -----

14.2. If No, How do you manage the absence of budget -----?

15. PHEM officers currently at work _____

15.1. Number trained _____

15.2. When _____

16. What is your internet connection fee per month -----?

17. How many computer do you have? ----- Desk top ----- Lap top -----

18. Logistics

	Yes	No	Unknown	NA	If yes number
Electricity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Motor cycle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vehicle /car	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Telephone service	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fax	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Computers with modem	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

19. How do you rate the benefit of AFP surveillance? -----

20. Do you agree that the reportable data elements /variables that are being collected are so important? Yes No

21. In your experience/judgment do you believe any part of the surveillance system is unnecessarily complicated?

21.1. If so which? Collection , reporting analysis other specify -----

21.2. To how many levels do you submit report? -----

21.3. Is the case based report format report format simple /user friendly to be filled?
Yes No

22. Total weekly reports reviewed -----

22.1. weekly reports which left blank “—“for AFP -----

23. Total case based report formats reviewed-----

23.1. incomplete report case based report formats -----

23.2. variables reported as” unknown “on case based report format

23.2.1. variables missed or left “unknown “in the following data

Demographic ----- Notification /investigation ----- risk factor /vaccination history-
----- other /specify -----

24. What do you think is the probable cause of data quality? Lack of knowledge lack of
commitment Quality of supervision other/specify -----

25. How many feedback has been received in previous years -----?

26. Case definition available:

26.1. Office Yes No

- 26.2. OPD (Adult) Yes No
- 26.3. MCH Yes No
- 26.4. Laboratory Yes No
- 26.5. Other /specify ----- Yes No

27. Is there regular active case search conducted? Yes /No

If yes, How often? ----- If not why? -----

28. Do you think that the surveillance system will function as it is functioning now in the absence of WHO? Yes No

29. Is there regular supervision in place to monitor? Yes No

30. feedbacks

- 30.1. that has been sent to the lower level -----
- 30.2. Received from Higher level

31. Do you have stool cup for specimen collection? Yes No

- 31.1. Attrition
- 31.2. PHEM officers trained -----
 - 31.2.1. trained officers who has left -----
 - 31.2.2. PHEM focal Persons trained -----
 - 31.2.3. trained focal persons left-----

32. What reasons do you think that may hamper the surveillance system? -----

33. What should be done to mitigate these problems -----

5. Public Health Surveillance system Evaluation checklist (Health Facility)

Date ----- Name of Interviewee ----- Case Team -----

Telephone: Office----- Mobile: -----

Name of Health facility ----- Type of Health Facility -----Woreda -----

Zone _____ Distance from the Woreda -----

Health posts in the cluster -----

1. Socio Demographic information

Catchment population: -----

Total population: Urban ----- Rural ----- Male ----- Female -----

Pregnant-----<5 years Children ----- Children < 15 years of age -----

Total Kebeles in the catchment ----- Urban ----- Rural -----

2. Performance Information

	2012	2013	2014
Expected AFP /Annum			
Total reported AFP cases			
Total AFP cases investigated within 14 days of onset			
Total number AFP cases reported with Adulate specimen			
Total AFP cases reported and investigated after 14 days (between 14 – to 60 days)			
For how many of the specimens you sent to central laboratory you have received laboratory feedback on time (within 28 days)			

Reporting rate			
The OPD attendants			
OPV ₁	------(-----%)	------(----- %)	------(----- %)
OPV ₃ coverage	------(-----%)	------(----- %)	------(----- %)

3. Sites for active case search prioritized? Yes No
4. How do you report: Mail Fax Telephone Radio Electronic Other?
Specify -----
5. Do you take back up of report? Yes No
6. If yes how? Documentation hard copy CD Rom USB External Hard disk
Other /specify -----
7. How data is entered Computer manually other specify? -----
8. Record management practice; Are the following properly documented

Weekly report Yes No

Line list Yes No

Case files (for each case) Yes No

9. Is there sufficient weekly report format for data collection Yes No

9.1. Sufficient for how long (months)-----

10. Is there sufficient case based report format Yes No

11. Do you collect data from HDA representatives Yes No

If so, how -----

12. Data analyzed Yes No

If so, How often weekly monthly quarterly biannually annually

13. What type of data out puts produced? Bar graphs Pie charts line graphs histograms

table Map other /specify -----

13.1. Data described by place Yes No

13.2. Data described by person Yes No

13.3. Data described by Time? Yes No

How do you disseminate the data? Internet Newsletter Weekly Bulletin Annual reports peer reviewed journals Oral presentation poster presentation other /specify -----

13.4. To whom you disseminate the information -----

14. Is there PHEM focal person Yes No

14.1. Has /she /he been trained? Yes No

14.2. If Yes ,When _____

15. What is your telephone bill -----

16. How many computer do you have? ----- Desk top ----- Lap top -----

17. Logistics

	Yes	No	Unknown	NA	If yes number
Electricity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Motor cycle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vehicle /car	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Telephone service	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fax	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Computers with modem	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

18. How do you rate the benefit of AFP surveillance? -----

18.1. Do you agree that the reportable data elements /variables that are being collected are so important? Yes No

18.2. If yes, in what way -----

18.3. If no why? -----

19. In your experience/judgment do you believe any part of the surveillance system is unnecessarily complicated? Yes No

19.1. If so which? Collection reporting analysis other specify -----

19.2. To how many levels do you submit report? -----

19.3. Is the case based report format simple /user friendly to be filled? Yes No

20. Total weekly reports reviewed -----

20.1. weekly reports which left blank or “—“for AFP -----

21. Total case based report formats reviewed-----

21.1. incomplete report case based report formats -----

21.2. variables reported as” unknown “on case based report format -----

21.2.1. variables missed or left “unknown “in the following data

Demographic ----- Notification /investigation ----- risk factor /vaccination history----- other /specify -----

22. What do you think is the probable cause of data quality? Lack of knowledge lack of commitment Quality of supervision other/specify -----

23. How many feedback has been received in previous years -----?

24. Case definition available:

24.1. Office Yes No

24.2. OPD (Adult) Yes No

24.3. MCH Yes No

24.4.

24.5. Laboratory Yes No

24.6. Other /specify ----- Yes No

25. Is there regular active case search conducted? Yes No

If yes, How often? ----- By whom: ----- If not why? -----

- 25.1. Do you think that the surveillance system will function as it is functioning now in the absence of WHO? Yes No
26. Is there regular supervision in place to monitor? Yes No
27. If so, How often ----- By Whom _____ If not, why -----

28. What reasons do you think that may hamper the surveillance system? -----

29. What should be done to mitigate these problems -----

Public Health Surveillance system Evaluation checklist (Health Post)

Date ----- Name of Interviewee ----- case Team -----

Telephone: office ----- Mobile -----

Zone ----- Woreda -----Name of Health facility ----- Distance from-----
----- the Woreda: _____

1. Socio Demographic information

Total population ----- Male ----- Female ----- Pregnant-----<5 years
Children ----- Children < 15 years of age ----- Urban -----
Rural -----

Total Gotes ----- Urban ----- Rural -----

2. Performance Information

	2012	2013	2014
Total reported AFP cases			
Total AFP cases investigated within 14 days of onset			

Total number AFP cases reported with Adulate specimen				
Total AFP cases reported and investigated after 14 days (between 14 – to 60 days)				
For how many of the specimens you sent to central laboratory you have received laboratory feedback on time (within 28 days)				
Reporting rate				
Reporting rate of HDAS	Expected			
	Reporting			
The OPD attendants				
OPV ₁		------(----- %)	------(----- %)	------(----- %)
OPV ₃ coverage		------(----- %)	------(----- %)	------(----- %)

3. Sites for active case search prioritized? Yes No
4. How do you report: Mail Fax Telephone Radio Electronic Other?
Specify -----
5. Do you take back up of report? Yes No
6. If yes how? Documentation hard copy CD Rom USB External Hard disk
 Other /specify -----
7. How data is entered Computer manually other specify? -----
8. Record management practice; Are the following properly documented
 - Weekly report Yes No
 - Line list Yes No
 - Case files (For Each case) Yes No
9. Is there sufficient weekly report format for data collection Yes No

9.1. Sufficient for How long (months)-----

10. Is there enough case based report format Yes No

11. Do you collect data from HDA representatives :Yes No

If so, how -----

12. Data analyzed Yes No

If so, How often weekly Monthly Quarterly Biannually annually

13. What type of data out puts produced? Bar graphs Pie charts line graphs histograms
table Map other /specify -----

13.1. Data described by place Yes No

13.2. Data described by person Yes No

13.3. Data described by Time Yes No

How do you disseminate the data? Internet Newsletter Weekly Bulletin Annual reports peer reviewed journals Oral presentation poster presentation other /specify -----

13.4. To whom you disseminate the information ----- -

14. Have ever trained on surveillance /PHEM? Yes No

14.1. If Yes ,When _____

15. How many computer do you have? ----- Desk top ----- Lap top -----

16. Logistics

	Yes	No	Unknown	NA	If yes number
Electricity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Motor cycle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- Vehicle /car
- Telephone service
- Fax
- Computers with
- modem

17. How do you rate the benefit of AFP surveillance? -----

17.1. Do you agree that the reportable data elements /variables that are being collected are so important? Yes No

17.2. If yes, in what way -----

17.3. If no why? -----

18. In your experience/judgment do you believe any part of the surveillance system is unnecessarily complicated? Yes No

18.1. If so which? collection reporting analysis other specify -----

18.2. To how many levels do you submit report? -----

18.3. Is the case based report format simple /user friendly to be filled? Yes No

19. Total weekly reports reviewed -----

19.1. weekly reports which left blank or “—“for AFP -----

20. Total case based report formats reviewed-----

20.1. incomplete report case based report formats -----

20.2. variables reported as” unknown “on case based report format -----

20.2.1. variables missed or left “unknown “in the following data

Demographic ----- Notification /investigation ----- risk factor /vaccination history----- other /specify -----

21. What do you think is the probable cause of data quality? Lack of knowledge lack of commitment Quality of supervision other/specify -----

22. How many feedback has been received in previous years -----?

23. Case definition available in the health post? Yes No

23.1. If yes, Amharic English

23.2. Which one do you think is best and why? -----

24. Is there regular active case search conducted? Yes No

If yes, How often? ----- By whom----- If not why? -----

25. Is there regular supervision in place to monitor? Yes No

25.1. If so, How often ----- By Whom _____ if not ,why -----

26. What reasons do you think that may hamper the surveillance system? -----

27. What should be done to mitigate these problems -----

Health profile assessment checklist

6. Checklist for Health profile assessment

Region _____

Zone-----

Woreda-----

Respondent _____ Interviewer _____

1. Historical back ground of the area

- Woreda Name -----
- How and why the name given _____
- How and when the woreda was formed /founded? _____
- Any other historical aspect _____

2. Geography and Climate (including map, altitudes, agro ecological zones etc.)

- Woreda map _____
- Location(distance) _____ Direction _____
- Altitude _____
- Surface Area Size of the Woreda _____ (_____) % from the zone)
- Town _____ rural _____ (land)
- Geographical coordinate
 - ✓ Latitude _____ Longitude -----
 - ✓ Annual rain fall(average) _____ Annual temp(average) _____
 - ✓ Climatic zones _____ (%) _____ (%) _____ (%)
- Woreda boundaries
 - North _____ South _____
 - East _____ West _____

3. Political and Administrative Organization

- Total no. of kebeles:
 - rural _____ Urban _____

4. Population and Population structures

A. Demographic data

- Total Population _____ Male _____ Female _____ sex ratio _____
- Urban Total _____ Male _____ Female _____
- Rural Total _____ Male _____ Female _____
- Population under 1 yrs _____
- Population under five yrs. _____
- Population < 15 years _____
- Population >64 years _____
- Women 15_49 years of age _____
- Total population by kebele(each kebele pop) _____
- Population enumerated by woreda using CHIS /H.E.Ws _____

(Population pyramid)

Population data by age and sex								
Male	<1	1-5	6-14	15-24	25-34	35-49	50-64	>65
Female	<1	1-5	6-14	15-24	25-34	35-49	50-64	>65

B. Ethnic/language

_____ (%) _____ (%) _____ (%)

C. Religion

- Orthodox _____ (_____ %), Muslim _____ (_____ %),
- Protestant _____ (_____ %), Other _____ (_____ %)

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

• **Main economic activities in the Woreda**

✓ Agriculture (Crop) (%) -----

- Cultivated area _____
- Grazing area _____
- Cropping seasons _____
- Land density _____

✓ Livestock (Animal husband ry) (%) yes ----- No

✓ Truism (%) yes ----- No

✓ Trade (%) yes ----- No

✓ Other business(%) yes ----- No

• **House hold income source**

✓ Government Employee _____(No.)

✓ Private Employee _____(No.)

✓ Daily Laborer _____(No.)

✓ Different business _____ (No.)

✓ Jobless _____ (No.)

• **Average Income** _____

6. Education and school Health

• **Educational institution**

✓ K.G. _____ Primarily School _____ Secondary _____

✓ Preparatory _____ TVET _____

- Total School Age Children (target) _____
 - ✓ Total Enrolment _____ Male _____ Female _____
 - ✓ School dropout in year 2005 _____
 - Current year -----
 - ✓ If there is school dropout why _____

 - Educational status of the community
 - Total Educated people _____ Male _____ Female _____
 - level of education
 - Illiterate _____ Read and write _____ 12 completed-----
 - Diploma _____ Degree and above _____
 - School health activities:
 - schools with water supply _____
 - schools with functional latrine-----
 - Schools with functional latrines (male and female) _____
- Schools with HIV/other Health clubs _____

7. Facilities

A. Transport

- Accessibility (main roads) _____
- Type of road _____

- How many kebeles have access to transportation _____
- Flow of transportation (Public transportation)per day by kebles

In Table below, list, in the order of frequency of use, the means of transport commonly used in the Woreda for Woreda management (i.e. for supervision, distribution of drugs and supplies etc.).

Means of transport	Available year all round		If no, for how long is it not available? (weeks per year)
	Yes	No	

- Are any parts of the Woreda inaccessible from the Woreda office (for supervision, provision of supplies etc.) for one week or more in a year? (Inaccessibility means that the area cannot be reached by any available means of transport) **Yes /No**

If the above question is yes fill the following list

- List the main geographical areas of the Woreda affected and the weeks per Year that they are inaccessible

Geographical area	Reason for inaccessibility	Geographical area	Reason for inaccessibility	weeks per year)	Period of the year
-------------------	----------------------------	-------------------	----------------------------	-----------------	--------------------

- What percentage of the Woreda population lives in the affected areas? -----

B. Power supply

- How many house hold get power supply_____?

C. Water

- Total safe water coverage _____ (%)
- Safe water supply coverage by kebele _____
- Main source of water supply _____
- Kebeles getting safe water____ (_ %)
- Population getting safe water____ (_ %)
- Daily water consumption per capita per day _____

8. Disaster situation in the woreda

- Was there any disaster (natural or manmade) in the woreda in the last one year?

- Any recent disease outbreak/other public health emergency_____
- If yes cases_____ and deaths_____

9. Social situation:

NGO working on public health_____

List the NGOS that are currently working

1. ----- 2. ----- 3. ----- 4. -----

Youth clubs _____

10. Health service institutions and infrastructure

S.N	Type of health institution	No of institutions	
1	Hospitals	NA	
2	with sustainable/ 24 hour /electric power	NA	
	without sustainable/ 24 hour /electric power	NA	
	with telephone service(cable based/mobile)	NA	
	without telephone service (cable based/mobile)	NA	
	with piped water supply	NA	
	Without piped water supply	NA	
3	Health centers		
4	with sustainable/ 24 hour /electric power		
	without sustainable/ 24 hour /electric power		
	with telephone service (cable based/mobile)		

		without telephone service (cable based/mobile)		
		with piped water supply		
		Without piped water supply		
5	Health post			
	with sustainable/ 24 hour /electric power			
	without sustainable/ 24 hour /electric power			
	with telephone service (cable based/mobile)			
	without telephone service (cable based/mobile)			
	with piped water supply			
6	Without piped water supply	Lower		
		Medium		
		Higher		
7	Drug vendors			
8	Drug stores			
9	Pharmacies			
10	Diagnostic laboratories			
11	Hospital to population ratio			

12	Health center to population ratio		
13	Health posts to population ratio		
14	Physical health service coverage		

Health budget allocation:

- **Government**

- ✓ Total budget allocated for the Woreda _____
- ✓ Total budget allocated for health _____ (____ %)
- ✓ Total budget allocated for emergency _____

- **Funds from NGO**

- ✓ Total _____ (purpose/programs) _____

Community Health Services;

- Status of services provided by community health workers namely

- ✓ No. of TBAs/TTBA _____ and their responsibility _____
- ✓ No. of HDA _____ and their responsibility _____
- ✓ one to five structure -----
- ✓ Community health workers involved in community based surveillance -----

- ✓ What were the merits of community based surveillance in the Woreda -----

11. Top 10 diseases of morbidity and mortality:-

Morbidity cases in adult OPD			Pediatrics/ <5 year		
Rank	Diseases	%	Rank	Disease	%
1			1		
2			2		
3			3		
4			4		
5			5		
6			6		
7			7		
8			8		
9			9		
10			10		

Top ten of admissions

Adult			Pediatrics/ <5 year	
Morbidity		Mortality	Morbidity	Mortality
1				
2				
3				

4				
5				
6				
7				
8				
9				
10				

12. Child Health

A. Health centers providing IMNCI service _____

C. Live births weighing < 2500gm _____

B. Moderate malnutrition in < 3yrs _____

D. Severe malnutrition in < 3yrs _____

13. Health staff to population ratio:

Health officers _____

All Nurses _____ Mid-wife Nurses _____

Medical lab _____ Pharmacy _____, Env'tal _____ Health education _____

Health extension workers _____ urban -----Rural

Other _____

Expected No of health staff based on BPR----- Gap-----

Cause of the gap-----

No of Health posts full filled HEW (2HEWS) _____

No of health posts without HEWs _____

No of health posts/kebeles with one HEW-----

14. Vital statistics and health indicators

S. No	Indicator	Rural	Urban	Total
1	Total population			
2	Male			
3	Female			
4	Under 1 years old			
5	Under 5 years old			
6	Under 15 years old			
7	Productive age female (15-49 years)			
8	Pregnant women			
9	Live births			
10	Total fertility rate			

11	Crude birth rate			
12	Crude death rate			
13	maternal mortality rate			
14	Child mortality			
15	Under 5 mortality rate			
16	Infant mortality rate			
17	Dependency ratio			
18	Average household size			

15. Immunization

Antigen /Indicator	Eligible	children vaccinated	Coverage	DOR	Unvaccinated children	Remark
Pent1						
Pent3						
Opv1						
Opv3						
Measles						

Fully vaccinated						
PAB						

16. Maternal health coverage

S.No	Type of service	Coverage (%)
1	Antenatal care (ANC) Coverage at least 1 visit (%)	
	Antenatal care (ANC) Coverage at least 4 visit (%)	
2	Contraceptive acceptance rate (CAR (%))	
3	Contraceptive prevalence rate (CPR (%))	
4	Post-natal care (PNC) Coverage	
5	Proportion of delivery attended by skilled personnel	

17. Environmental Health and sanitation.

- ✓ Latrine coverage_____ and utilization rate_____
- ✓ Solid waste management/HHS with solid waste disposal facilities -----
utilization -----
- ✓ Liquid waste management /HHs with liquid waste disposal facilities -----
Utilization
- Health Education (what, when, where, how and who conducted health education)

18. Endemic disease

A) Tuberculosis and Leprosy

S. No	Cases	Number		
		male	female	total
1) 5	TB cases detected (reported) All forms			
2)	Total PTB +ve cases			
3)	CDR			
4) 6	cases cured			
5)	Cure rate			
6) 7	TB cases completed treatment			
7)	Treatment compilation rate			
8) 8	Defaulters			
	No of Leprosy cases reported			

B) MALARIA

1) Malaria morbidity

	<5yr		>5yr		Pregnant women	Total	
	Male	Female	Male	Female		Male	Female
Total malaria cases							

P.f _____ p.v _____ mixed _____

Malaria morbidity by cluster

Sr. No.	Name of cluster	Catchment Population	Total malaria cases reported	Incidence of malaria/1000 risk pop
1.				
2.				
3.				
4.				
5.				

Malaria risk population ----- No of kebeles targeted for IRS-----

- No of Kebeles targeted for LLINS -----

IRS coverage ⁷ ; US sprayed ----- Not sprayed; UC ----- locked -----refusal -----

Total LLIN distributed in the last three years ----- Coverage ;(1 LLIN / 1.8 persons)

LLIN utilization rate⁸; in under five children ----- Pregnant women -----

LLIN ownership during Survey; Total HH surveyed -----HH with LLIN-----

C) HIV/AIDS

Activity /Program	Plan		Achievement		Positive
			No.	%	
VCT					
PITC					
PMTCT					
Partner involvement					

HIV Incidence _____

Mothers who received NVP from those tested positive _____

⁷ IRS coverage by targeted kebles is also should be considered

⁸ LLIN utilization assessment at any point in time or during IRS

Persons Ever Enrolled in HIV Care _____ Persons Ever Started on
ART _____

Persons Currently on ART _____

19. Nutrition and foods

Nutrition (malnutrition related OTPs, SC, TSF, CBN and PSNP 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 _____
- ✓ CBN program _____ PSNP _____ other _____
- ✓ beneficiaries -----
- ✓ General food security condition _____

Essential drugs (shortage):-

21. Discussion of the highlights and the main findings of the health profile assessment and description

22. Problem Identification and Priority Setting – set priority health problems based on the public health importance, magnitude, seriousness, community concern, feasibility -----

23. Conclusions made about the health status of the Woreda based on the findings

24. Action plan and recommendations- on how to address the problems identified clearly depicting responsibilities, required resource and timeline

**Proposal for Epidemiologic project
Factors affecting Indoor Residual Spraying undertakings**

7. Questionnaire for Households

Identification number _____

Hello, I am-----, I am working for -----

May I talk with you for a few minutes? Amhara Regional State Health Bureau is conducting study on malaria vector control. We will ask you a few questions. Would you please participate?

The whole thing we discuss will be treated confidentially but you should feel free to remain silent if you hesitate to answer a particular question and feel free to ask me have any question

/comment

1. Respondent's back ground information

1. Sex: Male Female
2. Region ----- Zone -----woreda----- Kebele
3. Age _____
4. Religion -----
5. Ethnicity: Amhara Oromo Tigray Other -----
6. Educational status: Primary Junior Secondary Above secondary
7. Marital status married not married divorced / separated Widowed
8. Occupation : Farmer House wife Government workers Daily laborer Student
Trader unemployed Other ,specify
9. Religion : Orthodox Catholic Protestant Muslim Traditional
Other-----
10. Number of family members ----- Total children less than five years of age-----

11. Are /is there pregnant woman /women in the house? Yes No How many pregnant women are there -----?
12. Does your household have? Radio television telephone? Refrigerator?
13. Have you tell me the main sign or symptoms of malaria Yes No
14. Can you tell me the main sign and symptoms of malaria? Fever Feeling cold Head ache Nausea and Vomiting Diarrhea Dizziness Loss of appetite Body ache Pale eye salty tasting palms body weakness Refusing to eat or to drink other (Specify)
15. In your opinion what causes malaria Mosquito bites Eating maize hunger eating dirty foods other/Specify -----
16. Where do you think
17. How many sleeping rooms are there -----?
18. How many sleeping structures are there -----?
19. Main material of wall
- No wall cane bamboo. Rudimentary
- Bamboo with mud Uncovered abode Cartoon Bricks
20. Do you have mosquito nets to sleep in Yes No
21. How many LLINS are there in the house -----?
22. Number of nets observed (by the interviewer) Nets observed -----
23. How long ago did your household obtain the mosquito net?
24. Did anyone sleep under any of mosquito net last night? Yes No
25. If yes who did sleep under nets _____
26. At any time in the past 12 months, has anyone sprayed the interior walls of your dwelling against mosquitoes? Yes No I don't know
27. Were you sensitized about IRS before the actual spray Yes No

28. If yes, in what forum? General community meetings During house visit by Health workers /HEWs Radio TV All Other specify-----
29. How many months ago was the house sprayed against mosquitoes? -----
30. At any time in the past 12 months, have the walls in your dwelling been plastered or painted
31. What were the key issues discussed during this sensitization session? Meaning of IRS IS
 Importance of IRS Chemical used in IRS? Protective measures Role of community All the above other :Specify
32. Was your house Sprayed? No Yes
33. What is your opinion on IRS : Not useful at all Fairly useful Very useful
34. What is the reason for your answer for question 28
- its negative side effects.
- is effective in controlling malaria
- Other /specify _____
- 35.
36. If yes in how many of the nets did they sleep under -----? Twice a year As often as possible Once a year Others: Specify-----
37. Why did no-one sleep under this mosquito net last night? No Malaria No Nuisance/Insects No Space for Net Irritation Suffocation / Too Hot Difficult hanging net shape Absence from home Other_____ don't know
38. What type of malaria messages/information did you see or hear Sleeping under net seek treatment for fever for fever within 24 Hours Importance of Spraying Not

plastering walls after spraying Environmental sanitation activities Other :Specify -----

Location -----

Interviewer-----

8. Dummy Tables

Background variables	Category	Number	(%)
Sex	Male	----- (--- %)	----- (--- %)
	Female	----- (--- %)	----- (--- %)
Ethnicity	Amhara	----- (--- %)	----- (--- %)
	Oromo	----- (--- %)	----- (--- %)
	Tigray	----- (--- %)	----- (--- %)
	Other	----- (--- %)	----- (--- %)
Educational status	No Education	----- (--- %)	----- (--- %)
	Primary		
	Junior	----- (--- %)	----- (--- %)
	Secondary	----- (--- %)	----- (--- %)
	Above secondary	----- (--- %)	----- (--- %)
Educational level		----- (--- %)	----- (--- %)
Marital status	married	----- (--- %)	----- (--- %)
	not married	----- (--- %)	----- (--- %)
	divorced	----- (--- %)	----- (--- %)
	Widowed	----- (--- %)	----- (--- %)
Occupation	Farmer	----- (--- %)	----- (--- %)
	House wife	----- (--- %)	----- (--- %)
	Government workers	----- (--- %)	----- (--- %)
	Daily laborer	----- (--- %)	----- (--- %)
	Student	----- (--- %)	----- (--- %)
	Trader	----- (--- %)	----- (--- %)
	unemployed	----- (--- %)	----- (--- %)
	Other	----- (--- %)	----- (--- %)

Number of unit structures sprayed and unsprayed

		No. Unit structured sprayed	No. Unit structures not
Kebeles	A	----- (--- %)	----- (--- %)
	B	----- (--- %)	----- (--- %)
	C	----- (--- %)	----- (--- %)
Total			

Table Reasons for not spraying

	Unsprayed unit structure	Reasons for no not sprayed			
		Locked	Under construction	Refused	Other
A	----- (--- %)	----- (--- %)	----- (--- %)	----- (--- %)	----- (--- %)
B	----- (--- %)	----- (--- %)	----- (--- %)	----- (--- %)	----- (--- %)
Kebeles C	----- (--- %)				----- (--- %)
Total	----- (--- %)	----- (--- %)		----- (--- %)	----- (--- %)

		Perception on the benefit of IRS		
		Not useful at all	Not useful at all	Not useful at all
	No Education			
	Primary			
Educational status	Junior			
	Secondary			
	Above secondary			
Sex	Male			
	Female			
Religion	Orthodox			
	Catholic			
	Protestant			
	Muslim			
	Traditional			
	Not useful at all			

CURRICULUM VITAE

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Language:

✚ Amharic and English

Work Experience

Duration; June 2009- September 2013

Position: PHEM Officer

Organization; Oromia Zonal Health Departments, Kemissie

October 2006 –June 2006 – Dewie Harewa Woreda Health Office


Position: EPI Officer, Communicable disease prevention and Control expert and Surveillance focal Person

Computer skills:

 Microsoft office

 Epi info

 Arc GIS

 Quantum GIS

 ODK

References

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Declaration

I, the undersigned, declare that this is my original work and has never been presented by another person in this or any other University and that all the source materials and references used for this thesis have been duly acknowledged.

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Date of Submission: _____

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

Name of advisor: _____

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