Addis Ababa University, College of Health Sciences,

School of Public Health

Ethiopian Field Epidemiology Training Program (EFETP)

Compiled Body of Works in Field Epidemiology

By:

Tsigereda Amisalu

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

May, 2014

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Mentor

Prof. Makonnen Assefa

Dr Getahun Aynalem

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Tsigereda Amisalu

Ethiopian Field Epidemiology and Laboratory Training Program (EFETP)

School of Public Health, College of Health Sciences

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Approval by Examining Board

Chairman, School Graduate Committee

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Advisor

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Examiner

_____ _____

Examiner

Acknowledgements

First and for most my deepest thank extend to glory God for his priceless and unlimited support and gift throughout my life. I want to express my deepest appreciation to my mentor, Professor Makonnen Assefa for his kind and constructive review of this document. I would also want to thank my second mentor Dr Getahun Aynalem for his support on reference materials for my work. I would like to express my grateful to the Ethiopian Field Epidemiology Training Program former Resident advisor Dr. Lucy Boulanger and Dr Getahun Aynalem program directors, Dr. Zegeye Hailemariam Dr. Adamu Addisse and Dr. Desalegn Dechasa Academic coordinator of the program for their unreserved technical and administrative support, advice and motivation in achieving this output. My recognition also goes to Mr. Alemayehu Bekelle program coordinator from Ethiopian public health association Mr. Belay Bezabih Regional PHEM core process owner, Mr. Getnet Abie field supervisors from Amhara regional health bureaus of PHEM core process for their support during all field attachment activities. I like to put across my great full appreciation to the organizations: Addis Ababa University, Federal Ministry of Health, CDC/Ethiopia, Ethiopian Public Health Association, Amhara Regional Health Bureau, District Health Offices, Health facilities and all other sectors who gave me all technical as well as financial support during my all residency time.

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List of Abbreviation

AFI	Acute febrile illness
AHRI	Armauer Hansen Research Institute
AIDS	Acquired immune deficiency virus
ANC	Anti natal care
AOD	Adjusted Odds Ratio
ART	Anti retroviral therapy
AWD	Acute watery diarrhea
CHD	Community health day
CL	Cutaneous Leishmaniasis
COR	Crude Odds Ratio
DCL	Diffused Cutaneous Leishmaniasis
EHNRI	Ethiopian health and nutrition institute
EPHI	Ethiopian Public Health institute
EPI	Expanded Program on Immunization
FMOH	Federal ministry of health
HC	Health Center
HC	Health center
HEW	Health Extension workers
HH	House hold
HIT	Health information technology
HIV	Human Immune Virus
HP	Health Post
IGM	Immunoglobulin M
IRS	Indoor Residual Spray
ITNs	Insecticide treated Nets
JICA	Japan International cooperation agency
KG	Kinder Garten

L. major	Leishmania major
L. tropica	Leishmania tropica
LCL	Localized Cutaneous Leishmaniasis
LLINs	Long Lasting Insecticide nets
MAM	Moderate acute malnutrition
MCL	Mucocutaneous Leishmaniasis
MDG	Millennium Development goal
MMC	Malaria monitoring chart
NGO	Nongovernmental organization
OR	Odds Ratio
OTP	Outpatient therapeutic program
PF	Plasmodium falciparum
PHEM	Public Health Emergency Management
PITC	Patient identification, testing and counseling
PLW	Pregnant and lactating women
PMTCT	Prevention of mother to child transmission
PTB	Pulmonary Tuberculosis
PVP	Predictive value positive
RCH	Reproductive and child health
RDT	Rapid diagnosis test
SAM	Sever acute mal nutrition
SCs	Stabilization centers
SIA	Supplementary immunization
SPSS	Stastically Package for Social Science
TB	Tuberculosis
TSF	Therapeutic supplementary food
TT	Tetanus Toxoid
UNICEF	United Nation International Children Emergency Fund

URTI	Upper respiratory tract infection
UTI	Urinary tract infection
VCT	Voluntary Counseling
WHO	World Health Organization
WoHO	District Health Office

Preface

Field Epidemiology Training Program (FETP) is an in-service training program adapted from the United States Centers for Disease Control and Prevention (CDC) Epidemic Intelligence Service (EIS) program. The program is designed to assist the Ministry of Health in building or strengthening health systems by producing public health professionals with skills and competencies developed through applied learning. FETP consists of 25% class-based learning and 75% at a field base where residents are expected to apply the principles learned in class to solve real world public health issues. It is different than traditional MPH program that has a didactic portion followed by a thesis project.

Ethiopia adapted the Field Epidemiology Training Program to strengthen the Ethiopian Public Health Emergency Management (PHEM). The EFETP provides residents a Master of Public Health degree in Field Epidemiology after they complete two years of supervised work in applied or field epidemiology. The EFETP residents spent 2 years in a field epidemiology training program focused on investigating outbreaks, analysis and evaluation of surveillance systems, and other public health activities and residents compile a body of works consisting of their outbreak investigation reports, surveillance analyses, etc.

This compiled body of works has nine main sections or chapters which under taken during the residency time of the program. The first eight sections are expected outputs during the residency time; outbreak investigation, surveillance data analysis, evaluation of the surveillance system, health profile report, writing of finalized scientific manuscript for peer review journals, abstracts submitted to scientific conferences, writing protocol/proposal of epidemiologic research project , narrative summary of laboratory activities , summary of disaster situation visited/risk assessment and other additional works are included.

The outputs of the two years field residency are presented in a summarized way. In the outbreak investigations chapter or section three outbreaks were investigated. These were measles outbreak in Dembia District, January/2014, Cutaneous leishmaniasis outbreak in Ankesha District, October/2013 and cutaneous anthrax outbreak in Waghmira Zone February/2013. The health profile description and Surveillance system evaluation were done in

North Gondar zone, Amhara region, in April and June 2013 respectively. One finalized scientific manuscript was submitted for peer reviewed journal. Three abstracts were also prepared and submitted for scientific conferences. A report on need assessment (risk assessment) on prioritized districts of Amhara regional state was also conducted with other team members from food security center and WHO. A finalized epidemiologic research project proposal titled :- "*Factors influencing the occurrence of measles outbreak among under five children in North Gondar Zone*/ 2014" and narrative summary of Bahir Dar regional laboratory Amhara Region, Ethiopia are presented.

Chapter I – Outbreak/Epidemic Investigations

1.1 Measles outbreak investigation in Dembia District, Amhara, Ethiopia January/2014

Summary

Background: Measles is one of the vaccine preventable diseases causing preventable morbidity and mortality among children in the World. Ethiopia established immunization program in 1980 and delivers service through fixed and outreach sites nationally. Measles vaccination coverage for Ethiopia indicates an increase from 37% (2000) to around 80% (2010). However, Measles account 3-6 % of childhood mortality in Ethiopia. The highest case-fatality rate happens in infants 6 to 11 months of age and malnutrition has the greater risk.

Method:-We conducted case control study with case control: ratio of 1:2. We collected data by face to face interview of cases and controls through semi structured questionnaires. We define cases using WHO case definition. Mothers /care givers were interviewed for children who cannot able to respond. Bivariate and multi variate analysis was done using epi info and SPSS.

Result: - 181 cases and no deaths were detected. 5 samples were sent for confirmation and all were IgM positive for measles. The median age of cases was 11 years (8 months to 35 years).Females and under 15 years age group were most affected. The overall attack rate of the District was 6/10,000. The attack rate of 0-4 and 5-14 years olds were 7.5/10,000 and 7.6/10,000 respectively. Being not vaccinated, contact with cases and the presence of cases in the house hold, neighbor and school were significantly associated with developing the disease.

Conclusion:-Most of the cases were unvaccinated school age children who had contact history with other measles case at school or with neighbors. This indicates that in addition to not vaccination, contact with cases increase transmission of the disease. Awareness creation for the community and at school is needed to limit the disease transmission during the outbreak time.

Introduction

Measles is highly contagious, serious respiratory viral disease which affects mostly children. It is characterized by fever, and generalized maculopapular erythematous rash. Other symptoms are cough, coryza and conjunctivitis. The primary site of infection is the respiratory epithelium of the nasopharynx (2). Measles infection can result in serious complications such as encephalitis, blindness, or severe respiratory infections such as pneumonia and death (3).

The incubation period is approximately 10–12 days from exposure to onset of fever and other nonspecific symptoms and 14 days (with a range of 7–18 days),from exposure to rash onset (2) . The disease can be transmitted via droplets from the nose, mouth or throat of infected persons four days prior rash onset (i.e., one to two days before fever onset) to four days after rash onset. The virus remains active and contagious in the air or on infected surfaces for up to two hours. Humans are the only hosts for measles virus (2). Unvaccinated young children are at high risk of measles, its complications and death. Pregnant women are also at risk. Any non immune person (who are not vaccinated or vaccinated but not develop immunity) can become infected (4).

Despite the availability of a safe and effective vaccine, measles remains one of the leading causes of death among young children around the world (4). Approximately 158 000 people died from measles in 2011, most of them were under five years old children (WHO/2013). Measles remains an important cause of morbidity and mortality in developing countries including Ethiopia (5).

According to WHO 2013 report more than 95% of measles deaths occur in low-income countries that have weak health infrastructures. In Africa before the introduction of measles vaccination, measles was primarily a disease affecting young children, and >1 million cases were reported annually (6). In 2010, there were 327,305 measles cases reported and an estimated 139,300 measles deaths (i.e., approximately 380 deaths/day) in the world (3). In 2010 the WHO African region accounted 36% of Measles mortality (7)

In Ethiopia measles is one of the vaccine preventable disease causing preventable morbidity and mortality among children. Ethiopia established immunization program in 1980 and delivers service through fixed and outreach sites nationally. Measles vaccination coverage for Ethiopia indicates an increase from 37% (2000) to around 80% (2010). However, Measles account 3-6 % of childhood mortality in Ethiopia. The highest case-fatality rate happens in infants 6 to 11 months of age and malnutrition has the greater risk (2).

Ethiopia has adopted strategies to control and finally to eliminate measles by 2020 (8).To achieve this strategies it has implemented routine immunization of children aged 9 to 11 months, case based measles surveillance and improving case management through the provision of vitamin A.

Dembia District health office notified the presence of measles outbreak to Regional PHEM core process by phone call in January 01/2013. Twenty two cases and no deaths in four kebeles were reported firstly. The District health office PHEM department notifies the outbreak and asks support on human and vehicle to control the epidemic as early as possible. After receiving the message and observing the data the regional PHEM core process sent a team to support and investigate the epidemic.

Objective

General objective: To investigate the measles outbreak in Dembia District and provide possible interventions to control and prevent the disease

Specific objective

- To investigate the reported outbreak
- To describe the outbreak by time, place and person
- To identify the possible risk factors of the outbreak
- To recommend possible control measures

Methods

Study area and population

The study was conducted in Dembia District. Dembia District is located 35km from Gondar town, 191 km from the Regional town Bahir Dar and it is one of the Districts found in North Gondar Zone, Amhara, Ethiopia. The District has catchment area of 148,958 square km with altitude range of 1700-2600m above sea level. The total population of the District was 306,458 of which females constitute 153,761 (50.5%). Districts that share boundaries with Dembia District are Lay Armachiho at the North, Lake Tana at the South, Gondar town and Gondar Zuria District at the East and Takusa District at the West. The District has 45 kebeles, 10 HCs, 40 HPs, 140 health care providers and 92 HEWs. The annual report of the District indicates measles vaccination coverage of Dembia District was 88% in 2013.

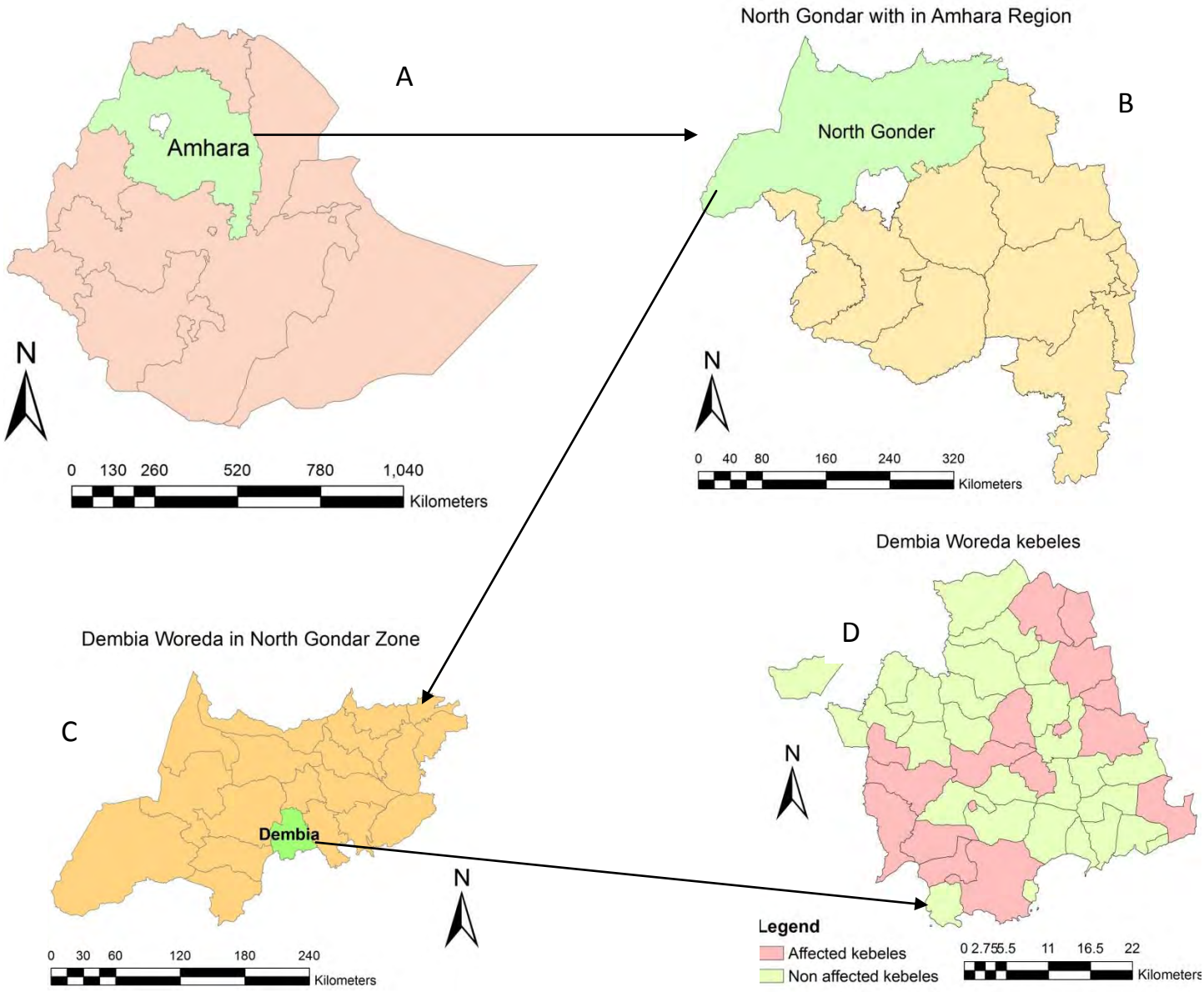

Figure 1: A – Map of Ethiopia showing Amhara region; B – Map of Amhara locating North Gondar; C – Map of North Gondar Zone that locates Dembia District; D – Map of Dembia District showing the measles outbreak affected and non affected kebeles; 2014.

Study design

We used case control study design to investigate the outbreak and to identify possible risk factors.

Data collection methods

We collected data from cases and controls by moving house to house of exposed villages from January 06-15/2014. Participants were interviewed using structured questionnaires and primary data was collected from respondents by the investigator. The cases were identified by using WHO case definition. Data of children who were unable to respond was taken from their mothers (care givers). A total of 58 cases and 116 controls were interviewed to assess their vaccination status, exposure status, sociodemographic and other variables. Controls were enrolled from the area were cases enrolled without the history of measles during the study period.

Community case definition: - any person with rash and fever

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

Data entry and analysis

Data was analyzed by using Epi Info version 7.1.0.6 and SPSS

Result

Descriptive

A total of181 measles cases and no deaths were reported from Dembia District of 11 kebeles. Out of 181 total cases 95 (52.5%) were females and the other 86 (47.5%) were males. The median age of the case was 11 years (8 months to 35 years). 19 kebeles were affected by the disease. The overall attack rate of the District was 0.05%. Those who are 0-4 and 5-14 years age groups were equally affected by the disease with attack rate of 0.08%. Fifty one (28%) of the cases were vaccinated. From the total of 58 cases and116 controls interviewed for exposure status, 39 (68%) of the cases and 66(57%) of the controls had contact history with suspected or confirmed measles cases either at school, home or neighbors. Only 6 (10.3 %) of the cases and 39 (33.6%) of the controls were vaccinated with a single dose of measles vaccine.

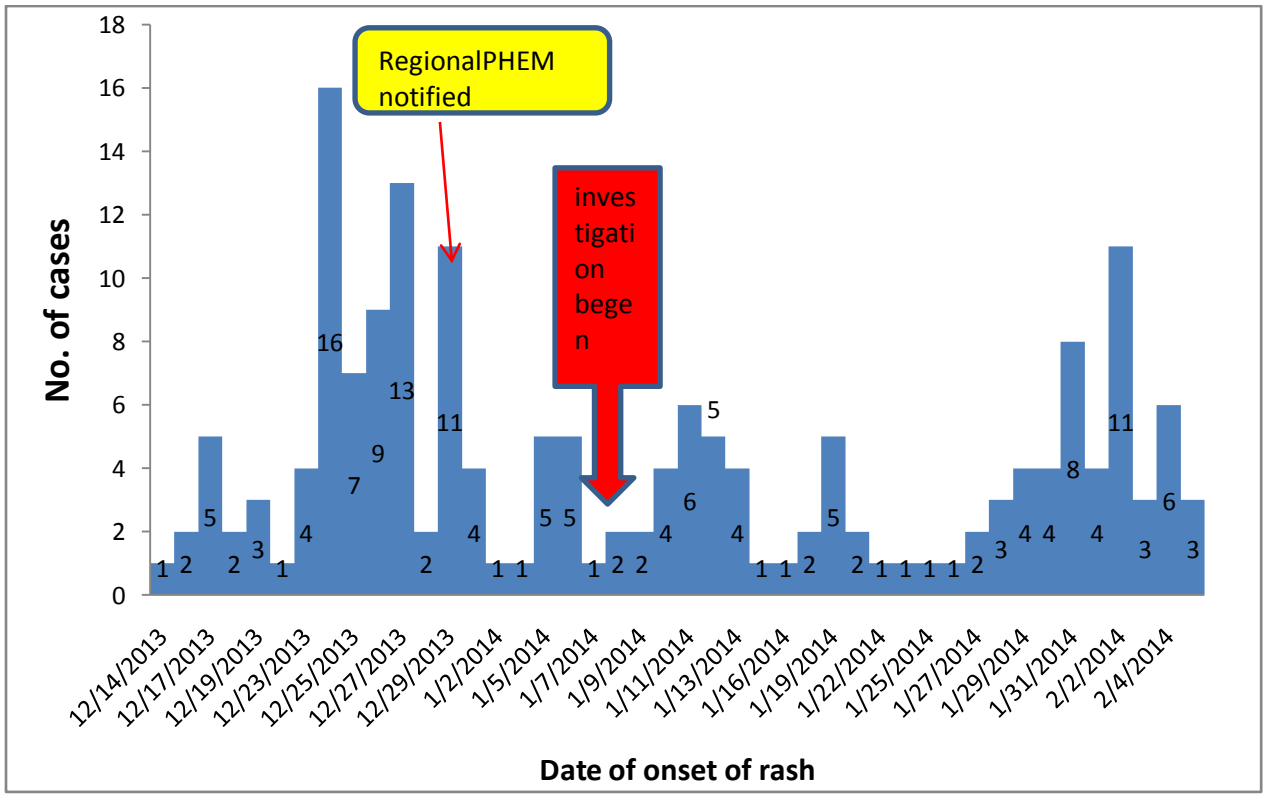

Figure 2: Measles cases by date of onset of rash in Dembia District, N.Gondar, Ethiopia, 2014

The date of onset of the first case was during the week of December 14/2013. The presumed index case was a 10 years girl from Jangua kebele who did not have travel history 10 to 12 days before onset of fever and 7 to 18 days before onset of rash. The dates of exposure are likely November 26 and December 7; by subtracting the minimum and maximum incubation period from the date of onset of rash of the first case. The peak cases were seen in December 25/2013.

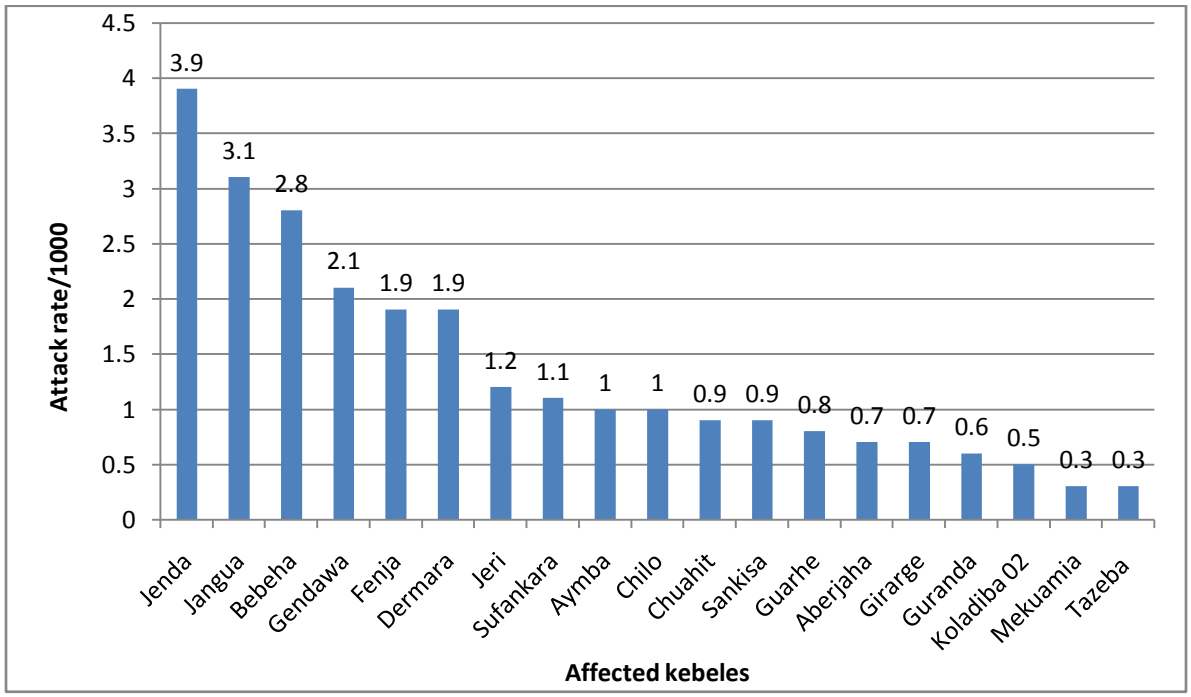

Figure 3: Measles attack rate by kebele of Dembia District, N.Gondar Zone, Amhara, Ethiopia/2014

Jenda kebele was more affected by the disease and Mekuamia and Tazeb kebeles were the list affected kebeles in the District by the outbreak.

All suspected cases had epidemiological link with laboratory confirmed cases. They share schools, church and market places. In addition during that time the community socializes more than the other time to celebrate Religious and other social ceremonies like weeding.

Table 1 : Frequency of clinical presentation of measles in Dembia District, N.Gondar, Amhara Ethiopia/2014

Clinical presentation	Frequency (N=58)
Fever	58 (100%)
Rash	58 (100%)
Cough	56(96.6%)
Running nose	50(86%)
Conjunctivitis	45(77.6%)

All cases had a clinical symptom of fever and rash and half of the cases had coryza /running nose.

LABORATORY INVESTIGATION

Blood specimen were collected from five cases and sent to EHNRI/National Polio and measles laboratory for Measles antibody detection and all the specimens collected and analyzed were positive for measles specific antibody (IGM).

Analytical investigation

We enroll 58 cases and 116 controls. The median age of the study (cases and controls) was 13, the median age of cases 11 (8 months to 35 years) and controls 14 (1 to 40 years old). In the Bivariate analysis illness was statistically significantly associated with: vaccination status (OR 0.23, CI, 0.09-0.6); contact history with cases (OR 4.8, CI, 1.9-12.1); presence of cases in the house hold (OR 7.5, CI, 3.7-15.4); and presence of case in the school (OR, 2.6; 95% CI, 1.3-5.3).

Table 2: Bivariate analysis of risk factors of measles in Dembia District, N.Gondar, Amhara, Ethiopia/2014

Variables		Cases	Controls	COR(95%CI)
Vaccination status	Yes	6	39	0.22(0.09-0.6),P=0.001

	No	52	77	
Cases in the school	Yes	44	64	2.6(1.3-5.3),p=0.01
	No	14	52	
Contact with cases	Yes	52	74	4.8(1.9-12.1),P=<0.001
	No	6	41	
Sex	Male	30	59	1.0(0.6-1.9),P=0.95
	Female	28	57	
Age Group	<0-4 years old	14	19	1.6 (0.7-3.5),P=0.29
	5+ years old	44	97	
Cases in the HH	Yes	43	32	7.5(3.7-15.3),P=0.00
	No	15	84	
Cases in neighbor hood	Yes	133		1.3(0.6-2.70,P=0.53
	No	43		

All variables that were statistically significantly associated with development of measles in the bivariate analysis are also significantly associated with illness by multi-variate logistic regression analysis. Being vaccinated was protective for development of measles and presence of cases in the house hold, school and having contact history with cases were risk factors for the occurrence of measles. Individuals who had contact with cases were 4.8 times more likely to develop the disease than those who did not; and those individuals who cases were present in the house and school were 2.7 and 2.2 times more likely to develop measles than those who did not have cases in their household and in the school respectively.

Table 3: Multi variate analyses of risk factors of measles outbreak in Dembia District, N.Gondar, Amhara, Ethiopia/2014

Variables		Case	Control	AOR(95%CI)
Vaccination status	Vaccinated	6	39	0.2(0.1-0.6)
	Not vaccinated	52	77	
Cases in the house hold	Yes	43	32	2.7(1.3-5.5)
	No	15	84	
Contact with cases	Yes	52	74	4.8(1.8-12.6)
	No	6	41	
Cases in the school	Yes	44	64	2.2(1.0-4.7)
	No	14	52	

Response

Notification for the administration of N.Gondar Zone and Dembia District was made by Regional PHEM team that includes the core process owner to give emphasis on early detection and management of cases. Activate RRT at all level and assign health professionals at each kebele to follow, manage the cases and report the situation daily to respective person. Case management was done in appropriate way by searching cases house to house. Health information was given at schools and for the community. Active case search, contact tracing and line listing and daily follow up at all level were strengthening. Finally since the disease became spread to other kebeles, vaccination campaign was made in 40 kebeles of Dembia District and- adjacent kebeles.

Discussion

Our study shows most (89.7%) of the cases and 66.6 % of the controls were not vaccinated for measles. The routine measles vaccination coverage of the District in 2013 was 88 % (Dembia WoHO): According to the measles national guide line to prevent measles morbidity and

mortality measles vaccination coverage is expected to be 90% and above. On the other hand only 85% of vaccinated children develop protective immunity from the total (100%) children vaccinated at nine month; the remaining 15% will be susceptible for the disease (2). With this low (88%) coverage and accumulation of susceptible children the outbreak is expected.

Measles is highly contagious and transmitted by respiratory droplet or aerobically. It has high (75-90%) secondary attack rate among susceptible house hold contact (2). Our study also revealed that contact with either suspected or confirmed cases was risk factor to acquire the disease and it is similar with natural mode of transmission of measles. In our study having contact with measles cases were around 5 times more likely to develop measles than who do not have. Similar study conducted in Meta Robi, Ethiopia and Zimbabwe revealed that contact with measles cases was a risk factor for contracting measles (12, 14). Being unvaccinated is significantly associated with the occurrence of measles and it is similar with other studies done in Arsi, Axum, Gesha, and Meta Robi Ethiopia (9, 10, 11, 12). Our study revealed that under 15 years old were more affected which is similar with study done in Meta Robi District, Central Ethiopia (12). But, similar study in Axum, Tigray, Ethiopia revealed above 15 years old were more affected by the disease (10). There was no death in the District this is because intervention activities were carried out on time. We search cases by moving house to house and treat the cases that need treatment, Vit A was administered for all cases and complicated cases were referred to health centers.

Limitation

The study has some limitations. Vaccination card is not available and information on vaccination status was obtained by asking the mothers or care givers for children and by asking themselves for adults therefore; recall bias could have occurred. Unable to remember the exact date of vaccination for those vaccinated and unable to remember the exact onset date of rash was also another limitation.

Conclusion

Most of the cases were school age children who had contact history with other measles case at school or with neighbors and were unvaccinated. This indicates that in addition to not being vaccinated, contact with cases increase transmission of the disease. Awareness creation for the community and at school about the transmission, prevention and control mechanisms is needed to limit the disease transmission when the cases present. The routine measles vaccination coverage of the district was below (88%) the expected.

Recommendation

- The District health office should strength the EPI and increases measles vaccination coverage to prevent future outbreak.
- Notification of any emergency for administrative body by the District health office should be strengthen
- The District health office should improve the awareness of the community on measles prevention and control mechanism

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Annex: 1

Annex 1Measles outbreak investigation questionnaire, Dembia District, Amhara /2014

Measles Outbreak investigation checklist (tools)

I Measles outbreak investigation checklist (For District health Office) date_____

Respondent Name_____

Names of investigators: _____, _____

_____,_____

Interviewer: _____

I. Identification:

1. Name of Health facility /District/zone: _____

2. Number of Epidemic sites: _____

3. List name of sites:_____

4. Total population of Epidemic site:

A _____ Male: _____ Female: _____,

B_____ Male: _____ Female: _____

C_____ Male: _____ Female: _____

D_____ Male: _____ Female: _____

E_____ Male: _____ Female: _____.

5. A. <1 year children: ___1-4 years___5-14years _____15-44 years ____45+ year_____

B<1 year children: ___1-4 years___5-14years _____15-44 years ____45+ year_____

C<1 year children: ___1-4 years___5-14years _____15-44 years ____45+ year_____

D <1 year children: ___1-4 years___5-14years _____15-44 years ____45+ year_____

E<1 year children: ___1-4 years___5-14years _____15-44 years ____45+ year_____

6. On set of epidemics: _____date/month/year.

7. When did the rumor reported from the site? _____time/date/month/year.

8. Date of verification from district: _____ time/date/month/year.

9. Index case name:_____ sex ____age ____date____ address _____out come_____

9.1 Immunization status_____

10. Updated total Number of cases: _____M_____F_____

11. Cases by age distribution:

A. <1 year _____M_____F_____

B.1-4 year _____M _____F_____

C. 5-14year_____M_____F_____

D.15-44year_____M_____F_____

e.45+year _____M_____F_____

12. Do you have line list of cases? • Yes • No ; If yes have copies of it:

13. Updated total Number of deaths: _____M_____F_____

14. Facility deaths_____ Community deaths_____

15. Deaths by age distribution: A. <1 year _____M_____F_____

B. 1-4 year _____M _____F_____ C. 5-14year_____M_____F_____

D. 15-44 years _____M _____F_____. 45 and above years_____M_____F_____

16. Immunization coverage of epidemic site _____the District immunization coverage:_____

17. Immunization status of cases: - 1 dose_____ 3 dose_____

2 dose_____4 dose _____above4 dose_____

18. Immunization status of deaths: - 1 dose_____ 3 dose_____

2 dose_____4 dose _____above4 dose_____

19. Action taken:_____

_____

20. Number of neighboring Gotis/Kebeles at risk to epidemic site: _____

21. Is sample taken? ☐ Yes ☐ No

22. Number of sample taken? _____

23. Date of collection of blood sample: _____date/month/year.

24. Date of specimen received by the referral lab _____

25. Did result reported? ☐ Yes ☐ No

26. If yes, is it: A. positive, B. negative, C. Intermediate

II. Questionnaire for Measles case investigation (For cases and controls):

Date_____ ID NO_____

Respondent: ☐ Patient ☐ family member(Mother, Father, Brother or sister or other relatives close to patient.)

Investigators: _____, _____

Interviewer: _____

A. Identification:

1. Residence: District _____,Kebele_____, Got_____

2. Age _____sex_____

3. Occupation: _____ Status_____

4. Did the patient move to other areas? _____.

5. When? ---------- Date/month/year.

B. Clinical manifestations

Rash □ Fever □ Cough □ Conjunctivitis □ Coryza /running nose □

□ Others Symptoms_____

1. Date of rash on set: _____date/month/year

C. About Laboratory Issue:

27. Is sample taken? Yes □ No □

1. Date of collection of blood sample: _____

D. Vaccination history

1. Did he/she/you vaccinated for measles? Yes □ No □

2. If yes; could you tell me the date of last measles vaccination; _____

3. Number of dose received: _____

4. Was/were he/she/you ever been sick with such diseases? Yes □ No □

5. If yes when? ----------

E. Exposure:

1. Have moved any where during 7-21 days prior to rash onset? Yes ☐ No ☐

2. If yes, Where_____.

3. Did the patient exposed with other similar case? Yes ☐ No ☐

4. If yes; where?_____ when?_____ who was the patient? _____

F. Transmission to others:

1. Have you moved Some where four days prior to rash onset or four days after rash onset? Yes ☐ No ☐

2. If yes where _____

3. Is there other case in the neighborhood? Yes ☐ No ☐

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

5. Are there other cases within the household? Yes ☐ No ☐

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

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

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

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

10. Are there other cases in social groups? Yes ☐ No ☐

1.2 Cutaneous Leishmaniasis Outbreak Investigation in Ankesha District, Awi Zone, Amhara Region, Ethiopia 2013

Summary

Back ground:-Cutaneous leishmaniasis (CL) is found in more than 80 countries in the world. It is under reported due to absence of surveillance system in middle and low income countries. An estimated 0.7 million to 1.3 million new cases occur worldwide annually. Ethiopia is one of the ten high burden countries for CL. It is endemic in the highlands of Ethiopia and more than 99.9% is caused by Leishmania aethiopica. CL is not reported in Ankesha District before. The community did not know the cause, transmission and prevention mechanism of CL; and discriminate the cases because they believe that the disease is due to sin.

Method:-We conducted age and sex matched Case control study with the ratio of 1:2 and collected data by face to face interview of cases and controls through semi structured questionnaires. Bivariate and multi variate analysis was done using epi info and SPSS.

Result:-Cases were clinically detected and confirmed by identification of Leishmania parasites on smears from lesions. 37 cases and no deaths were detected. 16 samples were positive by smear (13), and culture (10).The median age of the cases was 16 years old with a range of 3 to 66. Males and 10-19 years age group were most affected. The proximity of the house to the habitat of hyraxes and spent evening time outdoor had significantly associated with developing the disease.

Conclusion: - The presence of hyrax in the kebele was the risk factor. The identified risk factor in the area need further study. The presence of CL in Ankesha, that was not known to be endemic for the disease, indicates the need of leishmaniasis control program in the District to limit its expansion.

Introduction

Leishmaniasis is a vector born disease caused by protozoa parasite of genus Leishmania. The disease spread by the bite of sand fly. There are three main forms of leishmaniasis; visceral, cutaneous and mucocutaneous (WHO 2013). Cutaneous leishmaniasis (CL) is the most common form of leishmaniasis and found in more than 80 countries in the world. About one-third of CL cases occur in the Americas, the Mediterranean basin, and the Middle East and Central Asia. An estimated 0.7 million to 1.3 million new cases occur worldwide annually (WHO 2013). 90% of CL infections occur in Afghanistan, Pakistan, Syria, Saudi Arabia, Algeria, Iran, Brazil, and Peru [(1)]

Leishmaniasis is zoonosis and the reservoir hosts are various species of Mammals. Rodents and hyraxes are reservoirs of wild cutaneous leishmaniasis. Hyraxes are main reservoir hosts of L. aethiopica in Ethiopia and Kenya [(2)].Some species of Leishmania are asymptomatic and can remain for long periods without becoming ill. In humans, the incubation period for cutaneous leishmaniasis can be as short as 1-2 weeks or as long as several months up to years [(3)].

Cutaneous leishmaniasis caused by Leishmania major and L. tropica is found in many countries of North Africa. Cutaneous leishmaniasis caused by L. major is distributed in a belt from Marrakech and Casablanca in Morocco through Algiers in Algeria, Tripoli in Libya to Cairo, Alexandria and to the Sinai in Egypt. On the other hand, CL due to L. tropica is also distributed in a similar belt across North Africa from the Canary Islands to Egypt [(4)].

Leishmaniasis represents a major public health problem in the Eastern Mediterranean Region (EMR) of the World Health Organization (WHO). Both visceral and cutaneous leishmaniasis are mainly seen in 14 of 22 countries of the region. Outbreak have clear tendency to occur at around of 10-year intervals in several of these countries. CL outbreak caused by L. major occurs in Afghanistan, Egypt, Iran, Iraq, Jordan, Libya, Morocco, Palestine, Pakistan, Saudi Arabia, Sudan, Syria, Tunisia, and Yemen [(5)]. There was also reported outbreak of CL in Ghana.

CL is considered mainly an occupational disease, infecting people involved in outdoor activities. Mineral workers, policemen, soldiers, farmers, and forest workers are at high risk for CL infection [(2)].

Both CL and VL are growing health problems in Ethiopia with endemic areas that spread continually. CL has been well known since 1913 in the country and it is neglected disease. There were an estimated 50,000 cases annually, but only 450 cases were reported in 2008 [(5)]. According to the 2012 WHO global Leishmaniasis estimate, Ethiopia is one of the ten high burden countries for CL [(1)].

Three clinical forms of the disease are found in Ethiopia: localized cutaneous (LCL) diffused cutaneous leishmaniasis (DCL) and mucocutaneous leishmaniasis (MCL). LCL lesions are often benign and self healing; occasionally resulting in severe and persistent lesions. Severe LCL, MCL and DCL lesions are disfiguring and often require long time treatment schedules. Relapse is common in case of DCL and it is difficult to achieve definite cure [(6)]. Depending on its size and location, the scar may cause disfigurement, psychological distress, stigma, and even disability if situated over a joint. More than 99.9% of CL is caused by Leishmania aethiopica [(1)]. The species is naturally harbored by rock hyraxes (Procavia spp., and Heterohyrax brucei) and transmitted by two members of the subgenus Larroussius: P. longipes and P. pedifer [(7)].

The disease is distributed mainly in the highlands on an elevation between 1,400–3,175 meters above sea level in Ethiopia.

Transmission occurs in Cuttaber (Dessie), Aleku (Wellega), and Ochollo (Gemu Gofa). In Ochollo the overall prevalence of localized CL was 3.6-4.0%, with a peak value of 8.55 in the 0-10 years old age group. Sporadic cases of CL have been diagnosed from many localities in the northern, central, and southern high lands of Ethiopia [(4)]. The disease is most common in children, with the highest prevalence occurring between 10 and 15 years of age [(5)]. There was an outbreak of CL occurred in Siltie district of Southern Nation Nationalities and people Region (SNNPR) in 2003–2005, Soddo (100km South of Addis Ababa) in February 2003 and Addis Ababa during January 2005 to may 2006 [(7)]. No cutaneous leishmaniasis cases had ever been reported in Ankesha District before.

Control methods

An effective strategy for reducing human leishmaniasis is to control sand fly vectors, especially in domestic and per domestic transmission habitats. A number of control methods are available, like chemicals, environmental management and personal protection (WHO 2010). It is highly recommended that Sand fly control should involve more than one method, in an integrated Vector management approach [(8)]. Leishmaniasis control has often been integrated with that of other vector borne diseases. For example, after intensive attempts to eradicate malaria in the 1950s and 1960s by indoor spraying with DDT, the prevalence of leishmaniasis decreases dramatically in many countries (WHO2010). Indoor residual spraying IRS) is the main methods for controlling sand flies, spraying of resting sites of sylvatic species and use of insecticide- impregnated materials such as bed nets are also used to control leishmaniasis (WHO 2010). A recent study in Sudan and Morocco indicate a potentially strong reduction in leishmaniasis incidence following a community distribution of Insecticide Treated Nets (ITNs) [(2, 9)]. Further studies indicated that the use of LLINs and going to bed early could provide a high degree of personal protection against the bite of sand flies [(9)]. But control of animal reservoir through environmental management is expensive and difficult to implement [(2)].

Treatment

There are three options to treat cutaneous leishmaniasis. The type of treatment is decided depend on the nature of lesion and the ability of the patient to attend for treatment and to return for follow up. To withhold treatment, topical or local treatment and treatment with systemic drugs are treatment options. The aims of therapy are to kill the parasite, to control its spread, especially in the mucosal disease, to accelerate healing and to reduce scarring, especially in cosmetic sites. If the patient treated adequately the patient can cure and prevent relapse [(1)]. In Ethiopia the treatment of leishmaniasis is accessed by WHO and there is shortage of the treatment especially for cutaneous leishmaniasis. Due to this and absence of trained man power in Ankesha District cases did not treat in the area.

Awi Zone health department sent a letter that explains the presence of unknown communicable skin disease as an outbreak. The disease attacks both sexes and all ages. The

cases were seen at health facility but the disease was different from the commonly found diseases in the District; the health center could not help them. As a result the ZHD ask Regional PHEM to investigate the unknown disease condition by attaching with the pictures of cases. By observing this the Regional PHEM sent a team that constitutes physician, laboratory personnel (parasitologysit) and field epidemiology residents to investigate the epidemic on October 6/2013.

Figure 4: some of the cutaneous leishmaniasis cases in Ankesha, Awi Zone,Amhara, Ethiopia/2013

Figure 5: Intervention activity/ health education given for Women development army by the investigating team at meeting in Ankesha District, Awi Zone, Amhara, Ethiopia/2013

Figure 6: Discussion with the community members about the disease in Ankesha District, Awi Zone, Amhara, Ethiopia/2013

Objective

General objective

The objective of this study was to investigate the reported outbreak and to guide possible interventions.

Specific objectives

To confirm the outbreak

- To describe the outbreak by time, place and person
- To identify potential triggering factors
- To identify the causative agent
- To guide possible intervention

Methods and subjects

Study area and population

Ankesha District is located in Western parts of Amhara Region and it is one of the Districts in Awi Zone, Amhara Region, Ethiopia. The District has the catchment area of 95,503 hectare and a total population of 225,734 (203,755 urban and 21,928 rural) which females constitute 113,506. The district is located at a distance of 139km from Bahirdar and 421km from Addis Ababa. The district shares boundaries with 3 districts: Banja district to North and West, Burie to the South and Guagusa shekudad to the East. The median temperature of the District was 17 0C (15-200C range), Altitudes with range of 1500-2800mm and median annual rain fall 1500 mm (1000- 2000 mm range). The ethnic composition of the district was 78.5% Agew, 21% Amhara and 0.5% Gumze. The religious composition is above 99.96% Orthodox tewahido followers & the rest 0.04% are followers of other religious. There are 33 kebeles: 30 rural and 3 urban with a HP of 31 and 7 HCs. The number of HEWs in the district was 87.

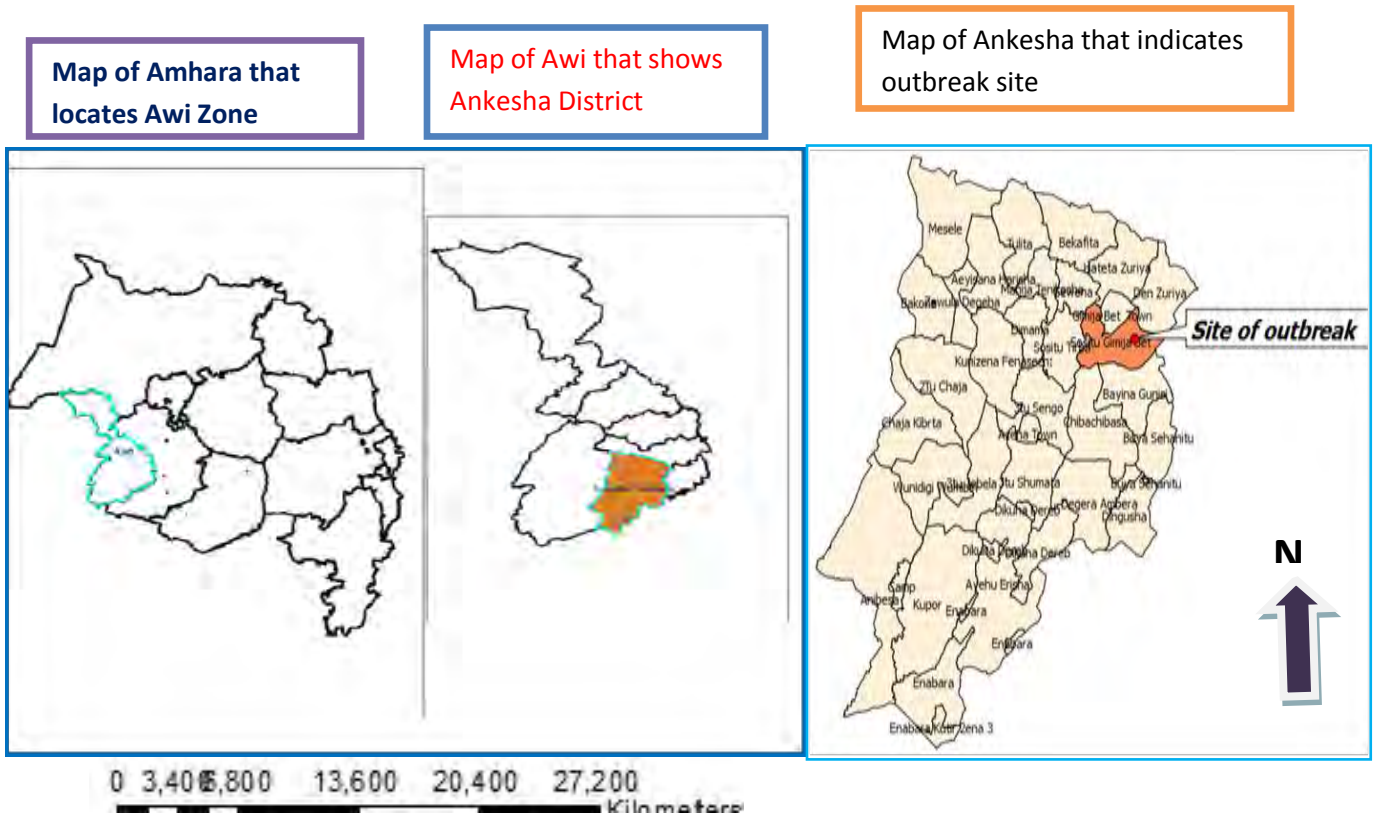

Figure 7: Location of cutaneous leishmaniasis outbreak in Ankesha, Awi Zone, Amhara, Ethiopia/2013

Study design

Age and sex matched 1:2 Case control study design and quantitative and qualitative data collection method were used. We enroll controls from the community in which the cases came.

Observation

Observational assessment like the occurrence of hyraxes in the compound of the church and the housing condition of cases and controls was made.

Data collection methods

Quantitative data

We collected data by interview of cases and controls using structured questionnaire. The cases were identified by using WHO case definition. Data of children who were unable to respond

was taken from their mothers (care givers). A total of 37 cases and 74 controls were interviewed for their exposure status and socio demographic variables.

Case definition

Suspected case: Any person that have a single or multiple lesions that starts as a small red papule and enlarges gradually up to 2cm in diameter and forms nodules or ulcer.

Confirmed case: A suspected case confirmed by microscopy or culture

Laboratory investigation: skin slit was taken from the suspected cases. 25 direct smear and 13 cultures was done.

Qualitative data collection

Discussion with the community

Discussion was made with key informants such as kebele administrations, priest, elders, women development army, cases and families of the cases. The discussion was about the occurrence of the disease previously, the presence of deforestation, the source of the disease, the availability of traditional medicine and the presence of risk factors to spread the disease.

Data entry and analysis

Data was entered into micro soft excel and Epi Info and analyzed using Epi Info and SPSS.

Result

Totally 37cases and no deaths were detected from November 06 to 09/2013 in Sositu Gimjabet kebele of Sinqua got. The median age of the cases was 16 years old with a range of 3 to 66. Out of 37 total cases 23 (62%) were males and 14 (38%) females. All cases were orthodox religion followers. The occupation of the cases were 18 (49%) and, 10 (27%) student and farmer respectively. The remaining 9 (24%) were house wife, self employed elders and children. 19(51%) of the cases were uneducated. 33 (89%) of the cases had a clinical presentation of localized Cutaneous leishmaniasis and the remaining 4(11%) cases had diffused Cutaneous leishmaniasis. All the cases came from one kebele called Sositu Gimjabet and the attack rate was 10/1000. All of the cases did not have travel history and the disease was not reported in that kebele as well as in the District before. Both the cases and controls of this study did not know the cause, transmission, prevention and treatment of cutaneous leishmaniasis.

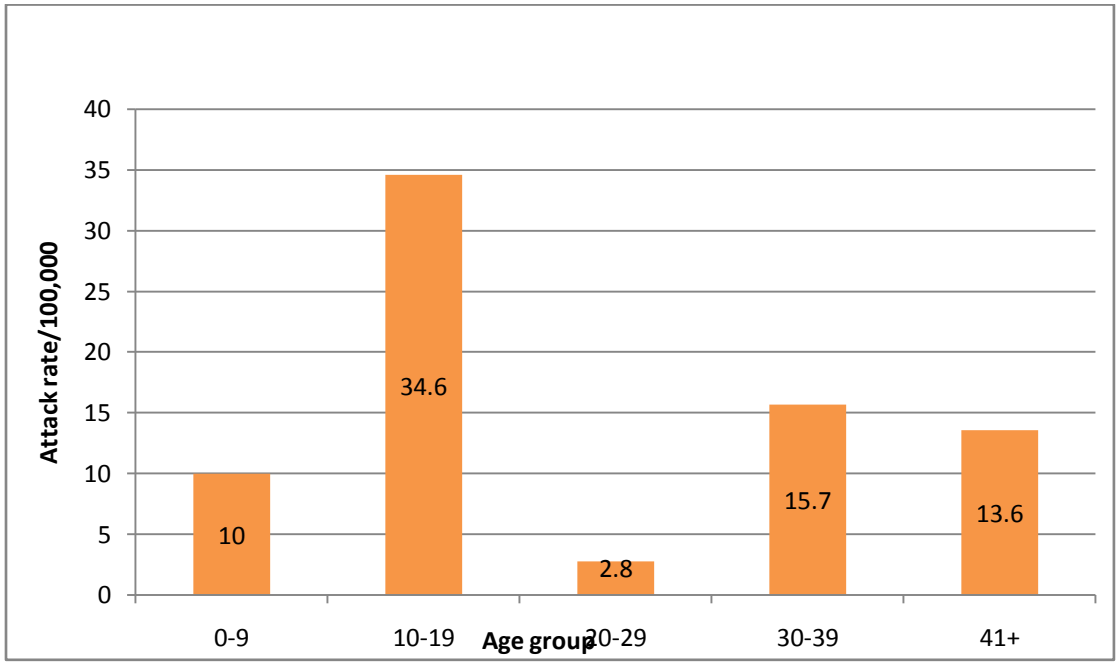

Figure 8: Age Specific attack rate of CL in Ankesha District, Awi Zone, Amhara, Ethiopia, October -2013

The age group 10-19 years old was the most (40.5%) affected and 20-29 years old were less (2.7%) affected age group.

Table 4: Educational status of cutaneous leishmaniasis cases in Ankesha District, Awi Zone, Amhara, Ethiopia, October - 2013

S. No.	Educational status	Frequency (No.)	Percent (%)
1	Illiterate	17	46%
2	Basic education	13	35%
3	Primary education	5	14%
4	Secondary education	2	5%
Total		37	100%

Around half 17(46%) of the cases were illiterate and only 2(5%) from the educated cases had an educational status of secondary school.

Clinical findings

Regarding the clinical findings of this study, all of CL lesions were observed on the exposed parts of the body such as the face and upper and lower limbs. The majority 32 (86.5%) of the lesion occurred on the faces. Leg was the list, 4 (11%) exposed site. One case can have more than one lesion on different lesion sites of that mentioned above. Two clinical form of CL were observed; localized cutaneous leishmaniasis (LCL) 33 (89%) and diffused cutaneous leishmaniasis (DCL) 4 (11%).

Table 5: Site of lesions of cutaneous leishmaniasis cases in Ankesha District, Awi Zone, Amhara, Ethiopia, October/2013

	Frequency	
Site of lesion	Number	Percent
Ear	5	13.5%
Eye	5	13.5%
Face	32	86.5%
Hand	9	24%
Leg	4	11%
Nose	18	49%

Number of lesion ranged from 1 to multiple (more than 3). A single lesion was found in 10(27%) of the cases, greater than half 25 (67.5%) of the cases had 2-3 lesions and only 2 (5.5%) cases showed multiple (more than 3) lesion.

Table 6: Number of lesions of cases cutaneous leishmaniasis in Ankesha District, Awi Zone, Amhara, Ethiopia-October 2013

	Frequency	
Number of lesion	Number	Percent
1	10	27
2	12	32.5%
3	13	35%
Greater than 3	2	5.5%
TOTAL	37	100.00%

Laboratory result

Sample was taken from 25 suspected cases that have active skin lesion. Out of these direct smear was done for all (25) cases and 13 samples were cultured in Bahir Dar Regional laboratory. From the direct smear samples taken 13 were positive. 11 cultured samples from 13 samples cultured were positive. Among 11 cultures positive samples 8 were positive for both smear and culture and three samples were smears negative but positive for culture. Totally 16 samples were positive by smear and culture. PCR amplification was done in Armauer Hansen Research Institute (AHRI) for positive cultured samples to identify the species that causes the outbreak and L. aethiopica was the causative agent of the outbreak.

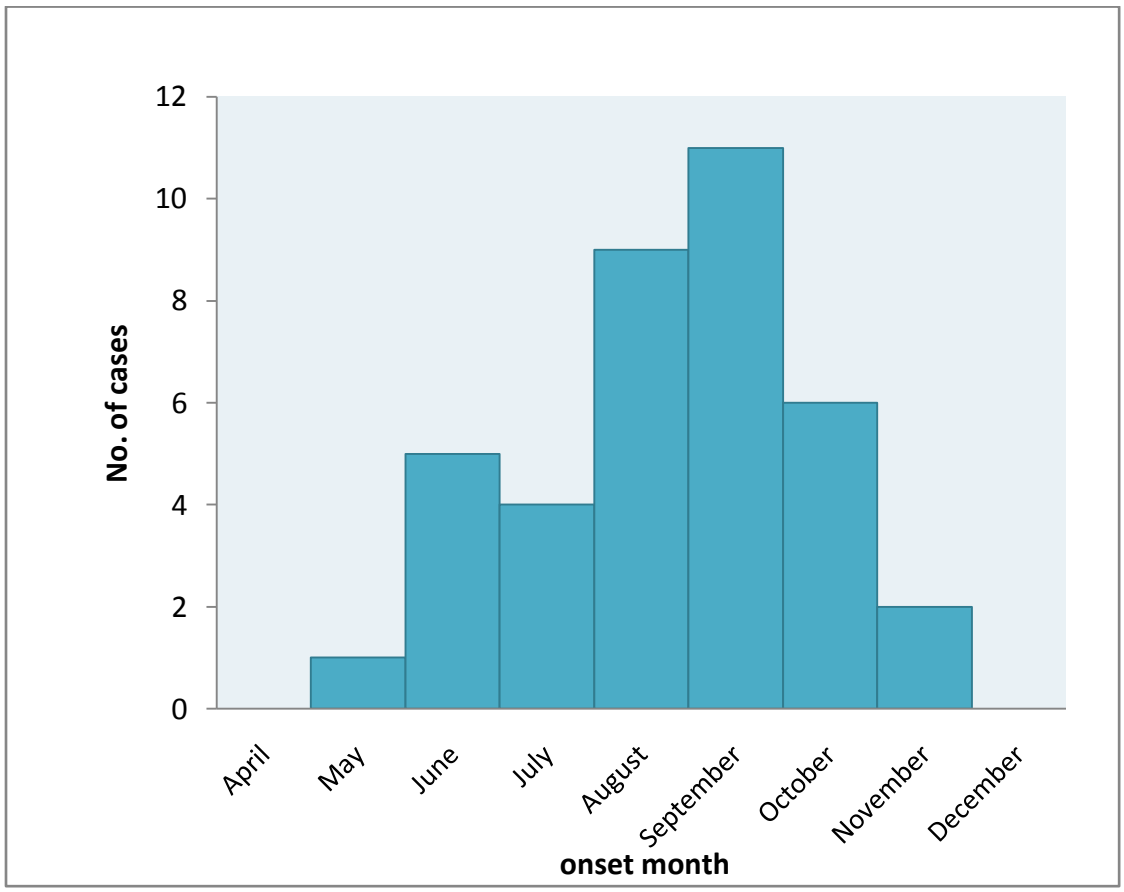

Figure 9: Epidemic curve of cutaneous leishmaniasis in Ankesha District, Amhara, Ethiopia/2013

The onset of the outbreak was on May 2013. Peak cases were seen in September 2013. All cases found in one Got and had epidemiologically linked with laboratory confirmed cases.

Analytical investigation

We enroll 37 cases and 74 controls. The median age of cases and controls was 22 with the range of 3 to 66. In Bivariate analysis developing cutaneous leishmaniasis was statistically significantly associated with hyraxes live near residence area, hyraxes moved to residence area, and spent most time outdoor and proximity of church where the habitat of hyrax from home.

Table 7: Bivariate analysis of factors that have association with development of cutaneous leishmaniasis in Ankesha District, Awi Zone, Amhara, Ethiopia, October-2013

Variables		Cases	Controls	COR(95%CI)
Occupation	Farmer	21	18	1.3(0.3-6.0),P=0.8
	Not farmer	16	56	
Population of hyraxes increase	Yes	32	55	2.2(0.7-6.4),P=0.22
	No	5	19	
Screened window and door	Yes	8	11	1.5(0.5-4.3),P=0.53
	No	29	63	
Spent time out door	Yes	29	31	5.0(2.0 -12.5), P=0.0002
	No	8	43	
Education	Not educated	16	30	1.1(0.5-2.1),P=0.78
	Educated	21	44	
Hyrax moved to residence area	Yes	23	18	5.1(2.2-12),P<0.001
	No	14	56	
Distance of habitat of hyrax from home	0-1KM	30	15	16.8(6.2-45.7), P=0.00
	>1KM	7	59	

Table 8: Multi variate analysis of factors that have association with development of cutaneous leishmaniasis in Ankesha District, Awi Zone, Amhara, Ethiopia, October-2013

Variables		Case	Control	AOR(95%CI)	P value
Distance of hyrax from home	0-1KM	30	15	17(6.2-45.8)	P=0.001
	>1KM	7	59	1	
Hyrax moved to residence area	Yes	23	18	0.3(0.07-1.2)	
	No	14	56	1	P=0.09
Spent time outside the door	No	11	72	1	
	Yes	29	31	10.8(2.6-45.2)	P=0.001
	No	8	43	1	

The multivariate analysis result showed that proximity of the house to the church where hyraxes reside and spent time outdoor at evening time has stastically significantly associated with developing cutaneous leishmaniasis. Those individuals whose house is less than 2 Kms from the habitat of the hyrax are 16.9 (95% CI 6.2-45.8) times more likely to develop cutaneous leishmaniasis than individuals whose house is far from habitat of hyrax 2 kms and above. Individuals that stay most time outdoor are 10.8 (95% CI2.6-45.2) times more affected than those did not spent time outside door.

Qualitative analysis

Discussion was made with cases, families of the cases, key informants such as kebele administrations, priest, elders and women development army. The results found during the discussion were the following. The disease is new and the community did not know the cause, transmission and prevention of the disease. As a result some of the population perceives that the disease is caused as a result of sin and the others believe the transmission is by direct contact of cases; they discriminate and stigmatize the cases. There was a 48 years old men that had a lesion on his lip and said he became case due to he talked about the cases become case as result of their sin '' I became infected because of my talk about the cases on my mouse". One mother burn the lesion of her son with onion. There was also another one mother treat her daughter by traditional methods like coffee ceremony because she believed that the disease is measles. There was also observational investigation. Since one of the risk factors of cutaneous leishmaniasis is the presence of hyraxes in the environment, we observe the presence of hyraxes in the compound of the church that is found in the Got where the cases live. All cases live near the church and use the church for their religious purpose since all of them were Christian orthodox by religion. And one case with multiple lesions was the guard of the church. Because the kebele is not malarious there was no LLINs distribution in that kebele and IRS also not implemented. There was farming places near their house and the housing condition was comfortable for the entrance of sand flies that is doors and windows not screened. The environment is also comfortable for sand fly breading because, the animals' shelter is near the main house and there are plants in the compound of the houses.

Intervention

Health education about the cause, transmission and prevention of the suspected disease (CL) was given for the cases, families of the cases, health extension workers, women development army, and kebele administration found at meeting at Sinqua Got of Sositu Gimjabet kebele and Bekefta kebele.

Discussion

CL is new in Ankesha District and the community did not know the name of the disease, cause, transmission, prevention, control and treatment of cutaneous leishmaniasis before the investigation of the outbreak done. Some of them believe that the disease is caused as a result of sin and others thought the transmission is due to contact. Due to these perceptions they discriminate cases and the cases affected psychologically. Because of not knowing the treatment of CL one mother burn the lesion of her daughter with onion and another one mother treat by traditional method like by preparing coffee ceremony and the like.

In our study males were most affected than females which is similar with the study done in Al-jabal Al-gharbi Libya (14). However in other studies that were done in Addis Ababa, Ethiopia (6) both sexes were equally affected by the disease. Though all ages were affected 10-19 years age group were significantly affected and this is similar with the study done in Silti, Ethiopia (13). This could be due to that older people may be more resistant to the bites of sand flies than younger children and the young have more outdoor activities which more exposes to the bites of sand flies. Most of the cases had LCL and the lesion of majority of the cases were 2-3 and found on face of the cases which is similar with the study that was conducted in Addis Ababa, Ethiopia (13). We observed that houses of most cases were found closer to the church where the hyraxes live and it has stastically significantly association 16.9(95%CI, 6.2-45.8) with cases and it is similar with studies that was done in Silti and Addis Ababa, Ethiopia (6,13). Despite Leishmaniasis control has often been integrated with that of other vector borne diseases like malaria (WHO 2010) We also observed there was no LLINS distribution in the kebele and IRS was not implemented. A recent study in Sudan and Morocco indicate a potentially strong reduction in leishmaniasis incidence following a community distribution of Insecticide Treated Nets (ITNs) (2, 17). Individuals that spent more time outdoor were more exposed by the disease than those not spent time outdoor with10.8 (95%CI 2.6-45.2). This may be that individuals that spent evening time outdoor are more exposed for the bite of sand fly than individuals that spent indoor.

Limitation

The limitation of this study was unavailability of treatment to treat cases and prevent further spread of the disease and absence of study for vector and reservoir hosts. Recall bias was also one limitation to remember the onset date. The cases remember the month of the disease occurrence not dates.

Conclusion

Cutaneous leishmaniasis is new and not reported in Ankesha district previously. The community did not have awareness about the cause, transmission, prevention and treatment of the disease. The presence of hyraxes, sand flies and the presence of animal shelters near the house makes the environment suitable for cutaneous Leishmaniasis to spread. Staying outdoors for long periods and till night times, proximity of houses to the residence of hyrax and the presence of hyrax in the compound increases the risk of encountering Leishmania infection. There is no integrated prevention mechanism with malaria, like using LLINs and IRS implementation in the District. Males, under 20 years old, and farmers were more affected by CL.

Recommendation

- Regional health bureau incollaboration with partners should establish treatment center at the affected district.
- Distribution of bed nets and IRS implementation should be carried out for the affected kebeles to prevent further transmission.

District health office

- Should mobilize the community and create awareness about cause, transmission, and prevention and control mechanisms of the disease.
- Should trace cases in other kebeles.
- Further investigation to verify presence of the vectors and reservoirs responsible for the transmission of the disease.

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Annex II

Annex 2 Questionnaire for Cutaneous Leishmaniasis In Ankesha District, Amhara, Ethiopia/2013

Code No _____

Basic data

Name _____

Age _____

Sex [1] Male [2] Female

Address:

Zone_____District_____Kebele_____
Got_____

Educational status, 1=Illiterate 2=basic education 3= Primary school

4= Secondary school 5= College

Religion, 1= Orthodox 2= Protestant 3= Muslim 4= others

Socioeconomic data

Family size (number) _____

Income source: 1= agriculture 2= trade 3= civil servant 4= other If, other specify_____

If your income source is agriculture, the location of the farmland is: 1= near home
2= Far

Housing condition

10.1. Type of roof: 1=. Corrugated iron 2= Straw 3=Hidmo (soil & wood)

4=Concrete 5= Cement shingles

10.2. Type of floor: 1= cemented 2= pasted with cow dung/mud

3= covered with straw 4= other

If other, specify _____

10.3. Is there any cave or gorge near your house? 1 = yes 2= no

10.4. If Q. 9.3 is yes, Distance from gorge/cave (approximate) meters_____

10.5. If Q. 9.3 is yes, Gates /windows 1= directly facing (opened) to the gorge/cave

2= opposite to the gorge/cave 3=No window

11. Habits

11.1 Pit near house: 1= yes 2= no

11.2. Sitting in the home yard in the evenings/early morning: 1= yes 2= no

11.3. If question 10.2.is yes, how often?

1= always 2= frequently 3= sometimes 4= rarely

11.4. Sleeping in the home yard: 1= yes 2= no

11.5. Using impregnated bed nets: 1= yes 2= no

11.6. If yes (Q.10.5) the source is: 1=donation 2= purchase

11.7. If donation, name of the donor ----------

11.8. Do you sleep your face/hands covered: 1= yes 2= no

11.9. Have you moved house in the 12 months preceding the diagnosis of the illness?

[1] Yes [2] No [3] Don't know

If you have: Previous address _____

Date of move _____

12. Area around the house

12.1. Farm present within 300 meters radius (approximate): 1= yes 2= no

12.2. Damping animal dung near house: 1= yes 2= no

12.3. Presence of animal burrow around house (approximately within 300 mtrs.radius): 1= yes 2= no

12.4. Waste disposal around house: 1 = open 2= closed

12.5. Latrine: 1= present 2= absent

Indigenous knowledge of the respondent and general information

13. Can you identify cutaneous leishmaniasis lesion from other lesions?

1= Yes 2=No

14. If Q.12 is yes, how do you identify CL lesions from other lesions? _____

15. Do you know the cause for CL lesion? 1= Yes 2=No

16. If, Q. 14 is yes, what do you think the cause for CL? _____

17. Is there any traditional treatment for this disease? 1= Yes 2=No 3= I do not know

18. Have you seen hyraxes living near your house? 1= Yes 2=No

19. If there are hyraxes near your house, do they come to your compound? 1= Yes 2=No

20. Do you have known how about any relation between CL and Hyrax? 1=yes 2=No

Clinical and laboratory information

21. Lesion (Cutaneous leishmaniasis): 1= present 2= absent

22. Number of lesion: 1=one 2=two 3 = three or more

23. Duration of lesion/s since first appeared (months) _____

24. Location of active lesion:

7.1. Cheek 1= yes 2= no

7.2. Ear 1= yes 2= no

7. 3. Lip 1= yes 2= no

7. 4. Leg 1= yes 2= no

7.5. Hand 1= yes 2= no

7.6. Chin 1= yes 2= no

7.7. Nose 1= yes 2= no

7.8. Neck 1= yes 2= no

7.9. Fore head 1= yes 2= no

7.10. Other; Specify_____

25. Nature of lesion

Ulcer [1] Yes [2] No

Nodule [1] Yes [2] No

26. Suspected leishmaniasis:

1= CL 2= MCL 3= DCL

27. Scars suggestive of healed leishmaniasis: 1= present 2= absent

28. If cutaneous scar/s present, the location is

1= Cheek 2= Ear 3= Lip 4= Leg 5= Hand

6= Chin 7= Nose 8= Neck 9= Fore

10= Other; Specify_____

29. Have you been treated for CL? 1= yes 2=no

30. If yes, where were you treated?

1= Traditional healer`s house 2= at health center/hospital

31. If Q. 13 is yes, how much does the treatment cost in birr per person _____

32. Was a laboratory diagnosis made? [1] Yes [2] No [3] Do not know

If so, what were the results of the following tests? Please record as follows:

[1] Positive result [2] Negative result [3] Not carried out

	Test Result	Date of test
1. Direct smear	[ ]	__/__/____
2. Culture	[ ]	__/__/____
3 . PCR	[ ]	__/__/____

33. Do you use personal protective measures against mosquito, sand fly, or other insect bites?

(1)Bed nets (2) repellant (3) spraying

34. Are there screens on the windows and doors in your home? [1] Yes [2] Partial [3] No

If yes, are they intact and in good condition? [1] Yes [2] No

35. Do you tend to spend time outdoors: in the farm, near your home, in the neighborhood?

[1] Yes [2] No [3] Don't know

36. If yes, during what hours of the day? [1] Morning [2] Afternoon [3] Evening [4] After sunset or at night

1.3 Suspected Anthrax Outbreak Investigation in Waghmira, Amhara, Ethiopia, Jul 2012-Feb 2013

Summary

Background: - There are approximately 10-100 thousand human incidences of anthrax annually throughout the world with significant numbers of cases in Chad, Ethiopia, Zambia, Zimbabwe and India. Human Cutaneous anthrax results from skin exposure to *B. Anthracis*, primarily due to occupational exposure. Anthrax is endemic throughout Africa, causing considerable livestock and wildlife losses and severe, sometimes fatal, infection in humans. Anthrax is a public health problem in Ethiopia. The burden of the disease is high in Amhara Region, Waghmira zone.

Method: - Descriptive study design was done from July 2012-January 2013. Data was collected from log book and patient card of the selected district health centers by using Line list and standardized questionnaire was used to interview the health professionals to know their knowledge about the clinical manifestation and standard case definition of anthrax.

Result: - A total of 133 Anthrax suspected cases were identified in six assessed health center. There were six active cases which were found in Ziquala district of Tsitska health center during the assessment time (January 30and 31 2013). All of them were females and five cases were children three of the cases came from the same kebele called Addis Fire and two of them were in one family. From the six cases interviewed four of them had fever, headache, and edema and skin lesion. All the cases reported and identified were cutaneous Anthrax and there was no death. The mean age of the cases was 20.4.

Discussion: - The mean age of this study is 20.4 which is almost similar with study done in Bangladesh have mean age 21.4. There was a problem on surveillance system in the Zone. The increment of cases is due to living condition of the community, lack of awareness, low coverage of vaccinated animals, drought and shortage of vaccine in some Districts.

Anthrax is a serious public health problem in Waghmira Zone both in animals and humans. There is poor surveillance and data handling system in Zone and Districts. Zone and District should strength one health.

Introduction

Anthrax is a Zoonotic disease caused by Bacillus Anthraces which is gram positive rod, resistance to extreme heat, cold, PH, and chemicals. The bacteria exist in two forms, vegetative and spore (1). The spore requires poor nutrient conditions and presence of oxygen (2). It is very resistance and can survive for decades in soil that has high calcium content, moisture, organic content and alkaline PH (2). Heavy rains, alternating with dry periods, may concentrate the spores and result in outbreaks among grazing animals (1).

There are 3 types of anthrax, cutaneous, gastro intestinal and inhalational. The most common type of human anthrax infection is cutaneous anthrax which accounts for nearly 95% of all anthrax cases worldwide (3). Cutaneous anthrax occurs when either the spores or the bacteria itself enter the body through a cut or abrasion. In most cases, symptoms begin to develop within 48 hours, although a range of 2-7 days has been found. Cutaneous anthrax begins as a small, red, itchy papule at the site of infection. Within about 2 days, it develops into a fluid-filled blister that eventually ruptures. The lesion ultimately dries into a coal-black scab (known as Eschar) that covers an area of dead skin (1). The case fatality rate of Cutaneous Anthrax is 5% (4).

Gastrointestinal: - occurs when eating raw or undercooked contaminated meat containing anthrax spores. The incubation period is 1-7 days. The symptoms are severe gastroenteritis consisting of nausea, vomiting, fever, and abdominal pain progressing rapidly to severe, bloody diarrhea.

Inhalational: - It occurs when anthrax spores are inhaled. In inhalational (pulmonary) anthrax, symptoms are non specific prior to the onset of the final hyper acute phase and suspicion of anthrax depends on knowledge of the patient's history. Symptoms include fever or chills, sweats, fatigue or malaise, non-productive cough, dyspnea, changes in mental state including confusion, and nausea or vomiting. Chest X-rays reveal infiltrates, pleural effusion and mediastinal widening. The median incubation period is 4 days (range 4–6 days) but may be up

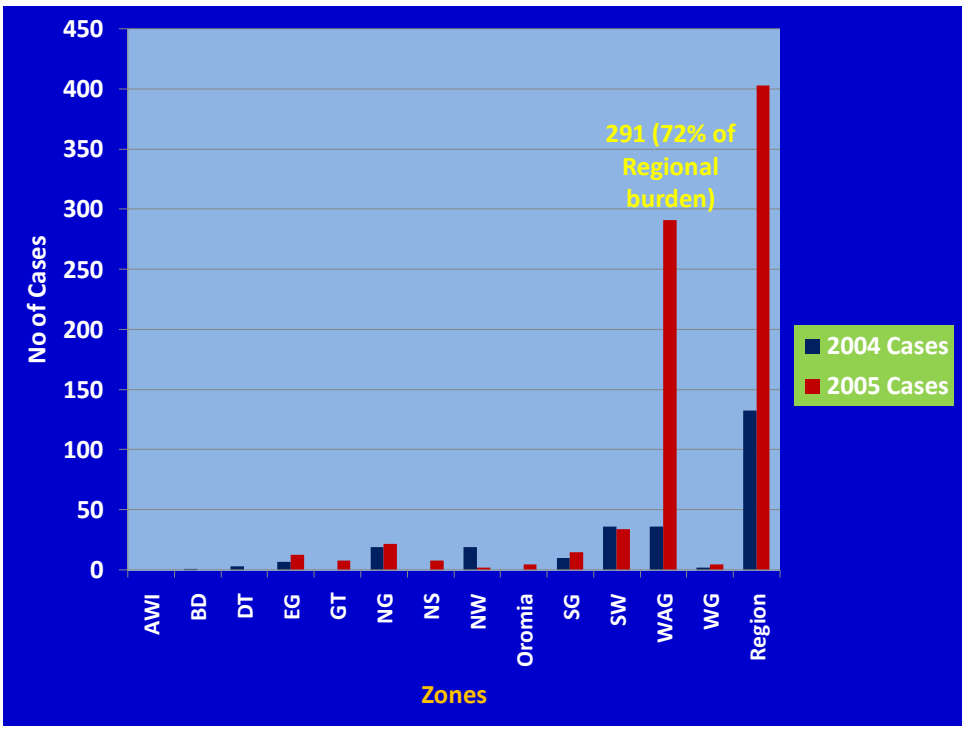
to 10 or 11days. Reflux of spores into the alimentary tract with development of lesions there may affect the time of onset of symptoms (5).

There were outbreak of Anthrax in the U.S. in 2001; a total of 22 cases of anthrax eleven inhalation and 11 Cutaneous. Five deaths occurred. There is no racial, sexual, or age predilection for anthrax (6).

Anthrax is endemic throughout Africa, causing considerable livestock and wildlife losses and severe, sometimes fatal, infection in humans. Predicting the risk of infection is therefore important for public health, wildlife conservation and livestock economies. However, because of the intermittent and variable nature of anthrax outbreaks, associated environmental and climatic conditions, and diversity of species affected, the ecology of this multi host pathogen is poorly understood (7).

In Ethiopia there was Anthrax outbreak in Afar region in 9 August 2000. WHO has received reports of clusters of cases of suspected anthrax in the Region. No systematic epidemiological investigation has been carried out (8).

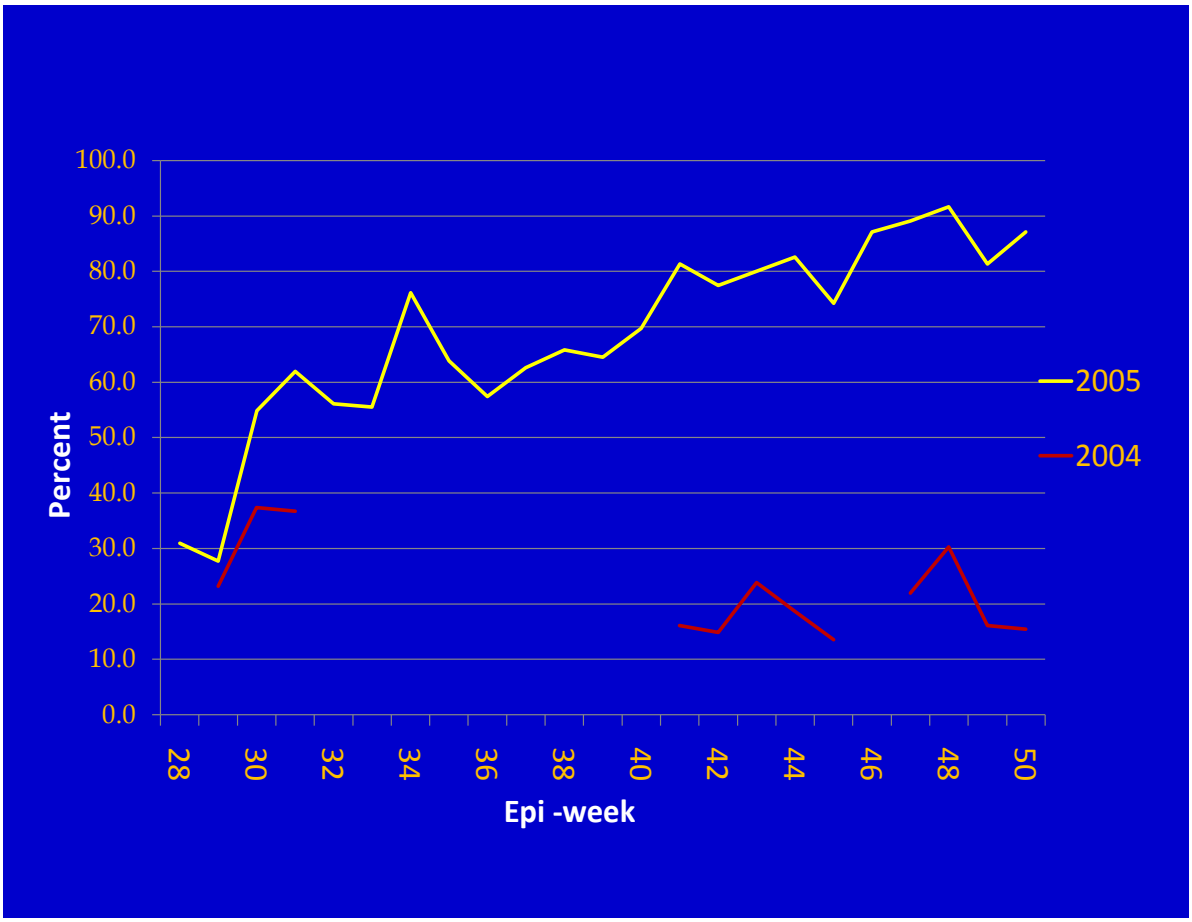
At the time of the weekly PHEM data analysis done in Amhara Region, 72% of the anthrax cases of the Region were reported from Waghmira Zone. By observing this the Regional PHEM office decides to send a team to the Zone to investigate the case. The burden of anthrax cases of the region is described by the next graph.



*Source: PHEM/ ARHB 2012 and 2013 anthrax cases reports

Figure 10: Suspected cutaneous anthrax cases by Zone Amhara Region July to December 2004 and 2005 E.C.

But when we observe the completeness of weekly report of the Zone it is improved compared to last year. Though the completeness of the Zone improves and the increment of cases may due to the improvement; according to the guide line one case of anthrax case is considered as an epidemic it was found that sending team to investigate the epidemic was necessary. The following graph shows the completeness of weekly report.



*Source: PHEM/ ARHB 20012 and 20013 anthrax cases reports

Figure 11: Completeness of weekly report in Waghmira Zone in 2004 and 2005 E.C.

Laboratory

There is no laboratory work done for human anthrax outbreak in Ethiopia, but there is laboratory service for animals. WHO, in collaboration with MSF/Epicenter and the Ministry of Health in Ethiopia, have planned to carry out an investigation in the time of outbreak in Afar region in order to confirm the diagnosis, assess the true extent and impact of the disease and plan and implement control measures [(8)].

Objective

General objective

The general objective of this study is to investigate and confirm the presence of anthrax in the area.

Specific objective

- To assess the most affected districts in the Zone
- To describe the data by time, place and person
- To identify the gaps on the health and agriculture office related to Anthrax.
- To assess the diagnosis of anthrax in health facilities.

Method

Case definition

Suspected case definition: - An illness with acute onset characterized by several distinct clinical forms

Cutaneous: a skin lesion evolving during a period of 1-6 days from a papule, through a vesicular stage, to a depressed black Eschar invariably accompanied by edema (Ethiopian PHEM guideline).

Study area

Waghmira Zone is located at a distance of 720 Km North West from Addis Ababa and 520 Km from the regional town Bahir-Dar. The zone has a total population of 456,585 with sex composition of 228,966 male and 227,620 female. The zone shares Geographical borders to the East and North with Tigray, South with North Wollo and West with South and North Gondar. The zone is administratively sub divided into 7 Districts. The Zone has one Hospital 29 health centers and 125 health posts.

Study design and sampling

We used cross-sectional descriptive study design method and the sampling method was purposive sapling method.

Data collection method

After discussion with Zone health office and PHEM (public health emergency management) officer we collect the data in all districts from July 2012-January 2013 from the Zone. We select a total of 4 districts that have high number of cases (Sekota zuria district, Dehana district, Abergele district and Ziquala district) and six health centers from the selected district were visited. Data was collected from six health centers that have high number of cases from the selected district on registration book and patient card by using line list from July 2012-January 2013. We interviewed six active cases about their contact history, symptom and place they came from. And also interview health professionals about their knowledge on anthrax clinical manifestation and standardized case definition using standard questionnaire. Finally we discussed with District, Zonal and Regional health and agriculture department to work together and exchange information.

Result

A total of 354 cutaneous anthrax suspected cases were reported from the four districts. Sekota district reported the majority of cases (153(43%)), Dehana district reported73 (21%), Ziquala district reported 70(20%) and Abergele district reported 58(16%) of cases. There were a total of 133 Anthrax suspected cases in six assessed health center. Six cases were active which were found in Ziquala district of Tsitska health center during the assessment time (January 30and 31 2013). All of them were females and five of them were less than 15 years old age .Three cases came from the same kebele called Addis Fire and two of them were in one family. From the six cases interviewed four of them had fever, headache, edema, skin lesion and have contact history with infected animals. All the cases reported and identified were cutaneous Anthrax and there were no deaths. The cases were identified by using the case definition and treated by antibiotic for seven days. All the cases treated showed progress and the cases that finished the treatment had cured.

Table 9: cutaneous anthrax cases by age group in Waghmira, Amhara, Ethiopia/2013

	Sex			
Age group	Male		Female	
	Frequency	Percent	Frequency	Percent
<5	9	12	8	14
5-14	16	21.5	12	20
>14-24	14	19	14	24
>24-34	19	26	13	22
>34	16	21.5	12	20
Total	74	100.00	59	100.00

The mean age was 20.4 years. Majority (26%) of the cases were males with the age group of 24-34 years old. Females were more exposed in the age group of 14-25 years old.

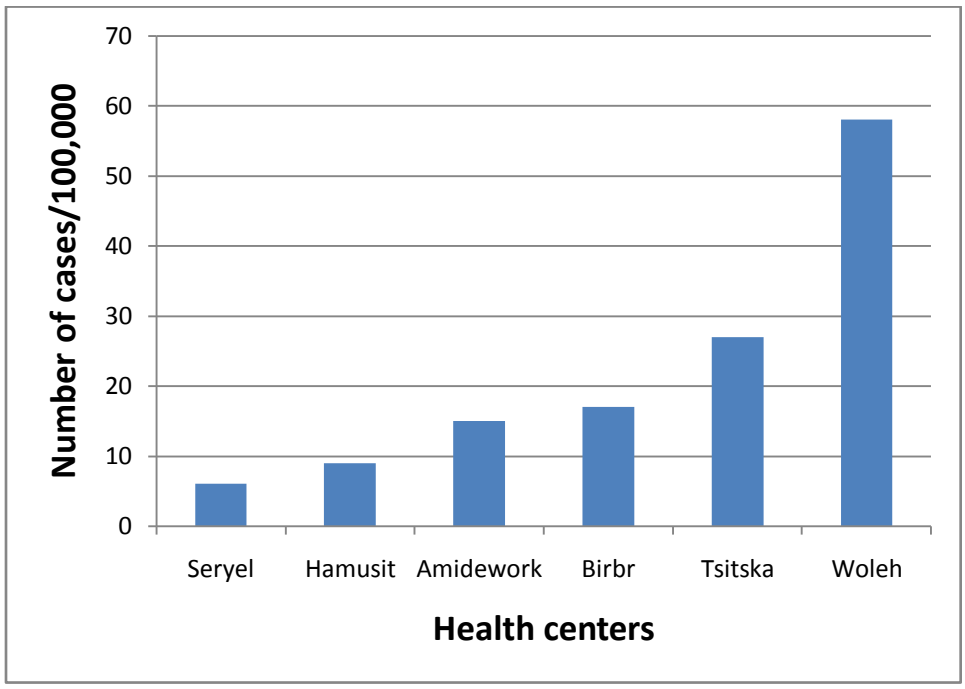


Figure 12: Cutaneous anthrax cases by health centers from selected Districts in Waghmira, Amhara, Ethiopia/2013

As the data show most of the cases were found in Woleh Health Center which is found in Sekota zuria district and Tsitska Health Center in Ziquala district.

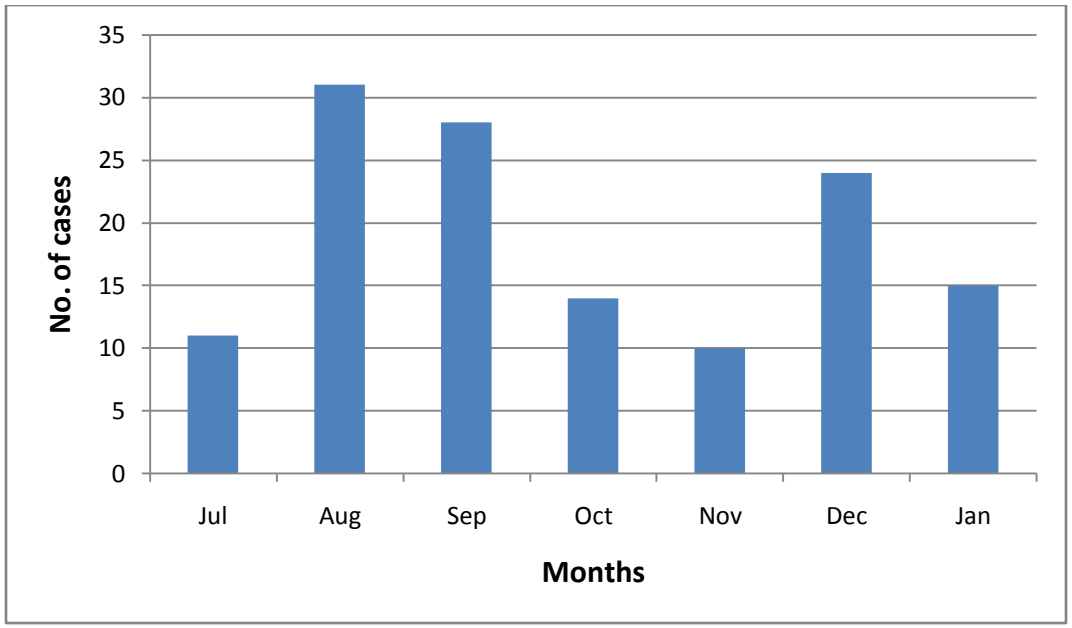


Figure 13: cutaneous anthrax cases by date of visit in six health centers in Waghmira, Amhara, Ethiopia /July 2012-Jnuary 2013

All health professionals interviewed in all assessed health centers know the clinical manifestation and case definition of cutaneous anthrax. But, no health center post both the community and standard case definition at work place. The documentation and management of data at all levels was poor and it was difficult to find the important variables and all recorded cases by lower level units. During the discussion with the veterinarians and the head of agriculture offices of both Districts and Zone the animal cases were found in the zone. The vaccination coverage of animals was low due to the shortage and payment of vaccine. As the food security office of the Zone the main (98%) income of the inhabitants of Waghmira Zone is animal, animal production and agriculture. In some districts like Sekota zuria and Ziquala cases are reported as skin infection which results under estimation of cases.

Discussion

Though there is vaccine for animals, there is a burden of cases and deaths of animals and humans due to lack of awareness, low coverage of vaccinated animals and shortage of vaccine in some Districts. As the officers, the health professionals and the veterinarians said the reason why anthrax is common in the area are presence of animal cases, contact of the community with animals, and lack of awareness of the community about mode of transmission. The study in Zimbabwe in November 24th 2011 and in Ethiopia, Afar Region 9 August 2000 had similar risk factors with this study (8, 9). Males were more affected by the disease than females and this may be due to that mostly males have more contact with animals than female.

The mean age of the cases was 20.4 which is almost similar with study done in Bangladesh have mean age 21.4(2). The clinical manifestation of this study is edema, itching sensation, with depressed Eschar, which is similar with the study done in India and Bangladesh (4). In this study and study done in India cases have contact history with infected animals.

There was a problem on surveillance system in the Zone. We did not found the complete data of all identified District of the six months. The health professionals in the assessed health facilities were interviewed about the clinical manifestation and standard case definition and

almost all of them know the standard case definition but they didn't post it the place where they detect cases.

As shown in Figure 9 there was no complete data in 2004, there is a big difference of the presence of data between 2004 and 2005 .In 2005 the data was complete during the six months but in 2004 there was only few weeks data, this implies the increased number of cases is due to the improvement of the surveillance system. Figure 11 shows high number of cases appeared during August, September and December than the other three months the data was collected.

The increased number of cases is improvement of the surveillance system, increase of awareness of the population to use health facility, increase the capacity of health professionals and true increase of number of cases.

Conclusion

Anthrax is a serious public health problem in Waghmira Zone both in animals and human. Cutaneous Anthrax is common and considered as endemic disease in all districts of the Zone. Though the disease is well known by both the health professionals and the community there is lack of awareness of the community about mode of transmission and the use of vaccinating animals. Due to this and payment for vaccination the coverage of vaccination of animals is low. In the health sectors there is poor data handling system. Though Anthrax is immediately reportable disease and one case is outbreak due to its high epidemic potential, it is reported weekly and considered as endemic disease in the Zone.

Recommendation

- Zone and Districts health office should increase the awareness of the community by Health education, using media and preparing teaching materials for health extension workers
- Zone and District health office and animal health department should exchange information and work together.
- Animal health department should have increase coverage of animal vaccination

- Both health and animal department of Zone and Districts should strength the surveillance system.
- The regional animal health department should access the vaccine for Districts.

Limitation

- Incompleteness of the data both at Zonal and District level
- Incomplete patient history at health center on patient card/log book
- Absence of important variables like date of onset of the disease
- Lack of laboratory confirmation

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Annex III

Annex 3Questioners on Anthrax outbreak investigation in Waghmira Zone, Amhara Ethiopia/2013

Patient name_____ Date of data collection_____Date seen at health facility_____

Region_____Zone_____District_____kebele_____

I Demographic characteristics

1. Sex Male ☐ Female ☐

2. Age_____

3. Occupation

3.1 Farmer 3.2 House wife 3.3 Student

3.4 Merchant 3.5 Shepherd 3.6 Employees (Government/NGO)

3.7 Unemployed 3.8 Other_____

4 Educational levels

4.1 Illiterate 4.2Read and writ 4.3 Primary

4.4 Secondary 4.5 Above secondary

5 Marital status

5.1 Single 5.2 Married 5.3Widowe 5.4 Divorced

6. Family size_____

II Clinical history of disease

1. Is there any other sick person in the family? Yes/No

1.1 If yes number of sick person_____

2. Did the patient take treatment? Yes/No

2.1. If yes type of treatment taken

2.1.1 Ciprofloxacilin 2.1.2 Doxycycline 2.1.3 Penicillin

2.1.4Combination of the above

2.1.5 Others_____

3. Does the patient have co-infection? Yes/ N

1 What was the symptom?

1.1 Cutaneous Anthrax

1.1.1 Skin lesion over 1-6 days 1.1.2 Black necrotic ulcer/ Eschar 1.1.3 Edema

1.2 Gastro intestinal

1.2.1 Abdominal pain 1.2.2 Nausea 1.2.3 Fever

1.2.4 Vomiting 1.2.5 Bloody diarrhea 1.2.6 Loss of appetite/anorexia

1.3 Inhalation anthrax

1.3.1 Fever

1.3.2 Difficulty in breathing/shortness of breath

1.3.3 Sore throat

1.3.4 Difficult in swallowing/dysphagia

III Risk factors

1 Does the patient have contact with animals that have blooding through anus, mouth, and nose? Yes/No

2. Does the patient have eaten uncooked meat of infected animal? Yes/No

IV Mode of transmission

1. Does the patient know the mode of transmission of anthrax? Yes/No

2. If yes

2.1 Handling contaminated animal products

2.2 Inhaling the spores from animal products

2.3 Eating contaminated under cooked food

2.4 Others_____

History taken when anthrax suspected cases come_____

	Check list for anthrax case detection									
S. No	Card No.	Patient name	Age	Sex	Address	Sign and symptom	Treatment taken	Co infection	Occupation	Date of onset
1										
2										
3										

Chapter II- Data Analysis Report

2.1 Traffic accident data analysis in Amhara, Ethiopia, 2010 to 2012

Summary

Background: - Road traffic accident is major public health problem all over the world. Most of it occurs in low and middle income countries including Ethiopia. According to road transport authority of Ethiopia in 2003 around 1,800 people died, more than 7000 people suffered different level of body injury and a property loss of about 400 million Ethiopian Birr lost as a result of road traffic accident. In Amhara Region from 1996-2001 years more than 380 people died, about 706 people had suffered different degree of bodily harm and there was loss of Birr 24,074,974 each year because of traffic accident.

Method: - We obtained secondary data registered by police from Amhara Region police commission. All data registered by police from 2002 to 2004 E. C. was taken. The data was entered into epi info and analyzed.

Result: - A total of 4460 cases were affected by traffic accident in the Region. 3225 (72%) were males. Around 5 million birr was destroyed due to traffic accident in the same years. There was a trend of gradual increase of traffic accident from year to year. As registered by the police drivers, pedestrians, vehicles and road problems were the cause of the accident. More than 75% of the accident was caused by the fault of drivers like, driving more than the recommended speed, not respecting pedestrians and not keeping right side drive. Over 90% of the accident was occurred during day time, on straight and flat surface, in good asphalt, all weather condition and dry road. Drivers who drive with high speed caused 70% of the accidents.

Conclusion: - There was a trend of increase in a number of accidents in subsequent years in the reviewed period. The result showed the main reason of the accident was drivers' problem. Intervention on drivers could decrease road traffic accident.

Introduction

Road traffic accident is a major public health problem all over the world. Most of it occurs in low- and middle-income countries including Ethiopia (1).

More than90% of the world's fatalities on the roads occurs in low and middle income countries that have only 48% of the world's vehicles (1). If appropriate action is not taken the overall global increase in car accident mortality is predicted to be 67% by 2020. Road traffic accidents in developing countries are largely due to human factors (approximately 80-90%) (2).

In Africa, a number of factors contribute to the high number of road traffic accidents. These are categorized into 3 main groups as road environment factors, vehicle factors, and human factors. From the three factors human factors covers the highest contribution (3).
According to Road Transport Authority of Ethiopia in 2003, above 1,800 people died, over 7,000 individuals injured and around 400 million Ethiopian Birr lost as a result of traffic accidents. Out of accidents registered in Ethiopia, Addis Ababa holds about 60% on average; with annual traffic accident growth is 31.4 percent (4).

According to road and transport agency of Amhara Region in 2001 E.C. budget year there were 8,857 vehicles registered and increase by 1082 in each year. For five consecutive years (1998-2002) greater than 500 people die, 2096 people harmed heavily and easily and about 24,074,974 birr was lost because of traffic accident in each year. There are also social, economical and psychological problems on the population because of traffic accident. The accident affects drivers, passengers and pedestrians within the age group of 18-50 years who have potential for work and affects the economy of the Region as well as the country.

Statement of the problem

Motor vehicle accident is a major public health problem which requires great efforts for effective and sustainable prevention. Injuries and deaths resulting from motor vehicle accidents are a major and growing public health problem in the world (2). A study by WHO on Global burden of disease predicts that deaths due to traffic accident will increase from 0.99 million to 2.34 million (3.4% of all deaths) and disability will increase from 34.3 million to 71.2 million

(5.1% of the global burden of disease) worldwide from 1990 to 2020. Projections indicate that these figures will increase by about 65% over the next 20 years unless there is new commitment for prevention measures (5).

Since Amhara Region is the big Region with the area of 170,152 km2 and population of 19,267,049 and there are money visiting areas like Lalibela, Fasilcastl, Tiss Abay, Tana etc and the Region is comfortable for business and development it has many travelers. About 48 million people travel in 2001. Because of this and other reasons there is a high traffic accident next to Oromia Region that leads to life lost, economical, social and Psychological problems. Therefore analyzing the data on traffic accident in Amhara Region from 2002 to 2004 years is used to assess the burden and to recommend based on the findings.

Objective

General objective: - The general objective of this data analysis is to assess the burden and cause of traffic accident in Amhara Region from 2002-2004 E.C.

Specific objectives

- To describe the problem by time, place and person
- To assess the burden of traffic accident Amhara Region
- To identify major causes and recommend prevention methods based on the finding

Methods

Study area and population

Amhara Region is a big Region with a total population of 19,267, 049 and has 10 Zones, three city administrations and 167 Districts. The region is located in South West Ethiopia.

Source of data

Secondary data was obtained from Amhara region police commission which is found in Bahirdar town from 2002-2004 years. The data is registered by police in all zones and city administrations and sent to Region.

Study Design

Cross sectional descriptive study design method was conducted.

Data entry and analysis

We entered the data through epi-info and excel and analyzed using epi-info. The data was analyzed and displayed by using different data displaying tools.

Operational definition

Road traffic accident: - In this study a road traffic accident (RTA) was defined as an accident that took place on the road between two or more objects, one of which must be any kind of a moving vehicle and falling of any vehicle without colliding with other object

Result

A total of 4,693 cases were affected by traffic accident in Amhara Region from 2002-2004 years E.C. From 4, 693 cases 3378 (72%) were males. Around 5 million birr was destroyed (3084 materials) due to traffic accident in the same years. Totally there were 7,777 human death, injury and material loss due to traffic accident within four years (2002-2004).

There were four types of outcomes of the accident: - death, heavy injury and minor injury were the three outcomes on human beings and the fourth one is material loss. More than 85% of drivers were males.

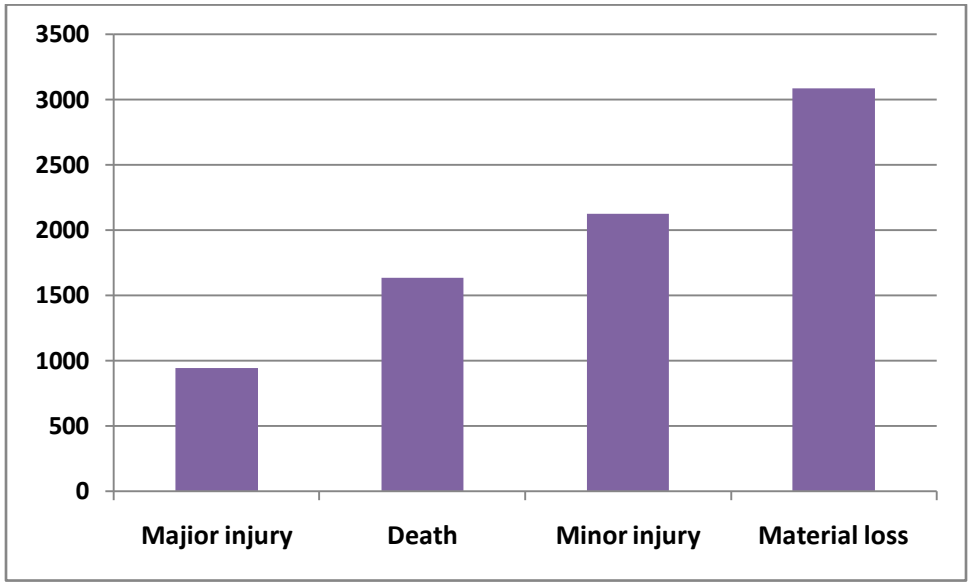

Figure 14: outcome of traffic accident in Amhara, Ethiopia from 2002 to2004 E.C.

As shown in the above figure the major outcome of traffic accident was material and major injury is the least outcome of traffic accident.

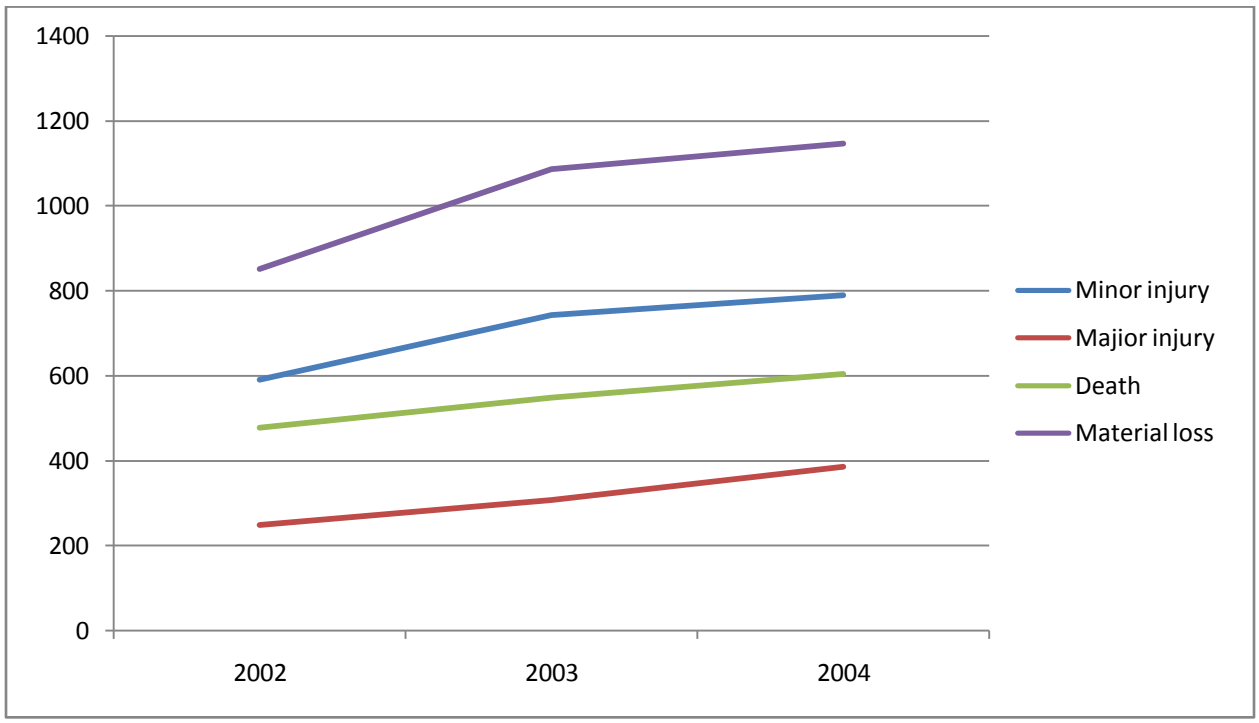

Figure 15: Trend of traffic accident registered by police in Amhara, Ethiopia from 2002 to 2004 EC

The trend indicates that number of traffic accident increases from year to year by all types of traffic accident outcomes in the Region.

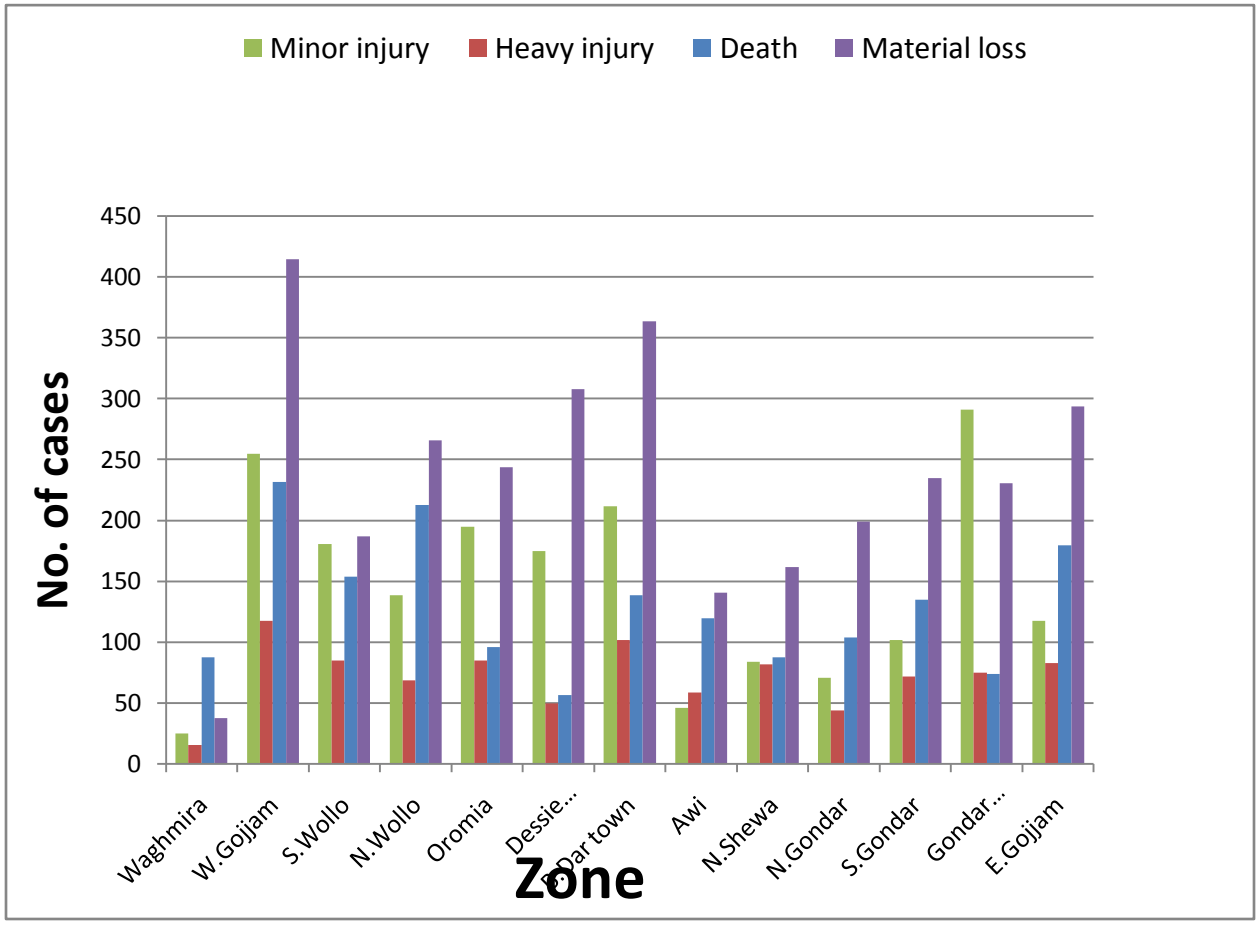

Figure 16: Traffic accident by Zone registered by police in Amhara, Ethiopia from 2002 to 2004 EC

The frequency of road traffic accident in Amhara Region varies from one Zone to the other. The burden of the accident was high in West Gojjam zone and Waghmira Zone was the least affected by traffic accident. All zones had high number of traffic accidents with material loss except Waghmira Zone that had highest number of deaths than other traffic accident outcomes.

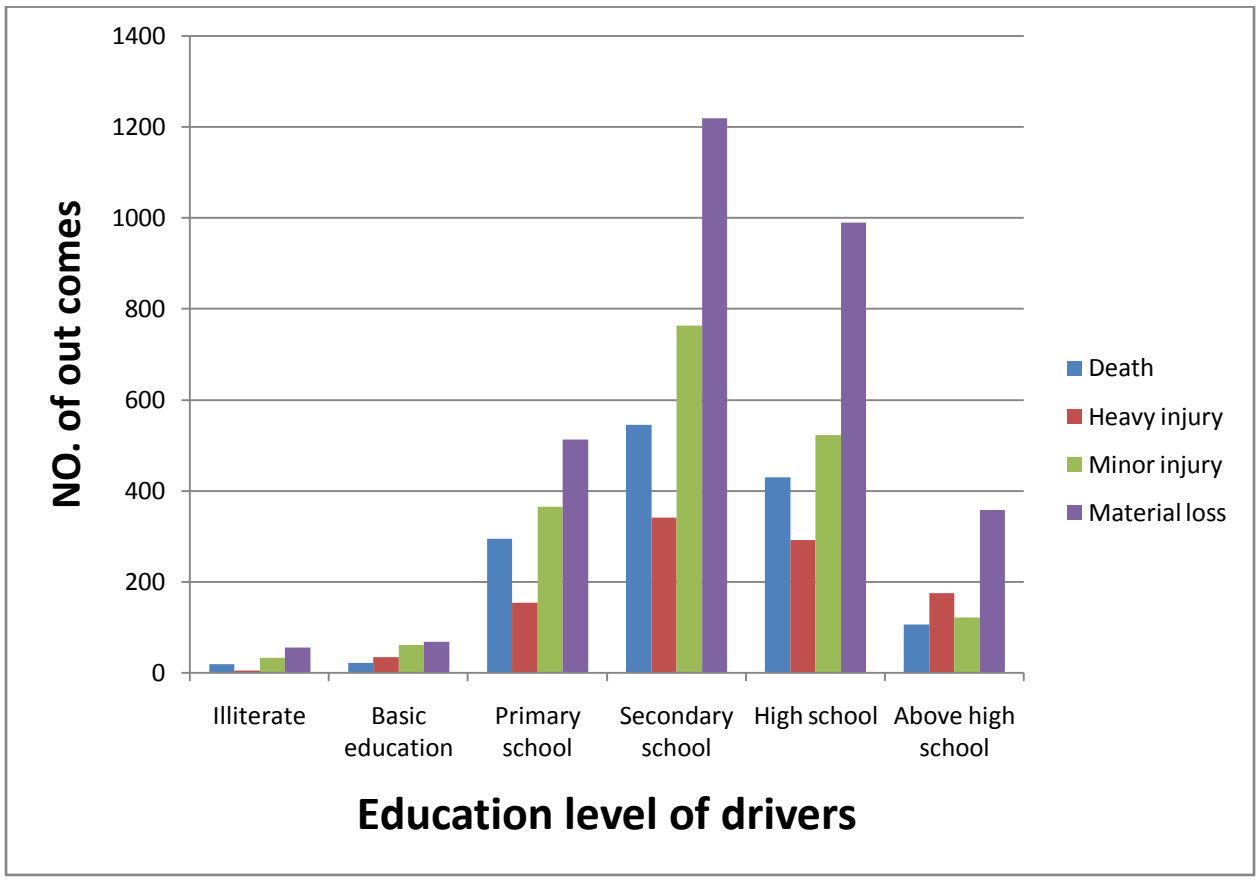

Figure 17: Educational level of drivers that cause traffic accident in Amhara, Ethiopia from 2002 to 2004 E.C

The above figure indicates most of the accidents were caused by drivers that complete secondary and high schools than drivers who had primary and college/university school.

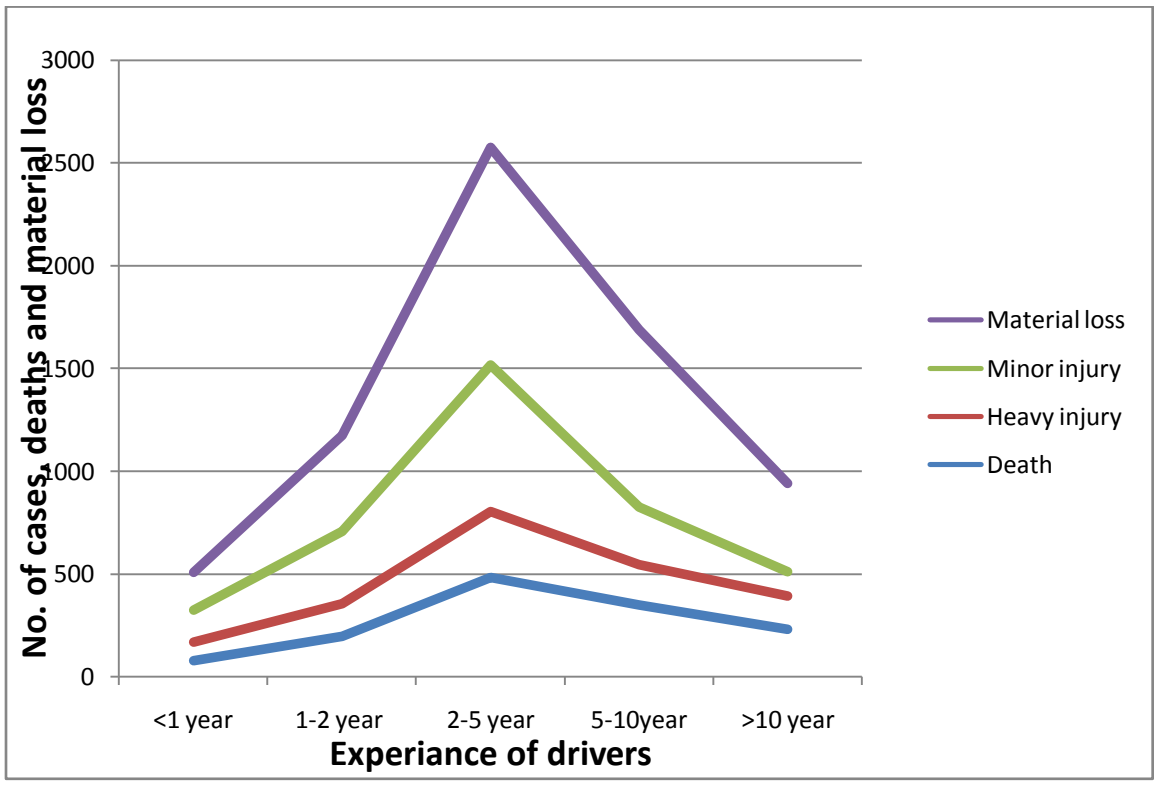

Figure 18: Experience of drivers and traffic accident in Amhara, Ethiopia from 2002 to 2004 E.C.

As the graph indicates drivers that have less than two year and greater than ten year experience did cause least accidents but drivers with 2-5 years experience did most of the traffic accidents.

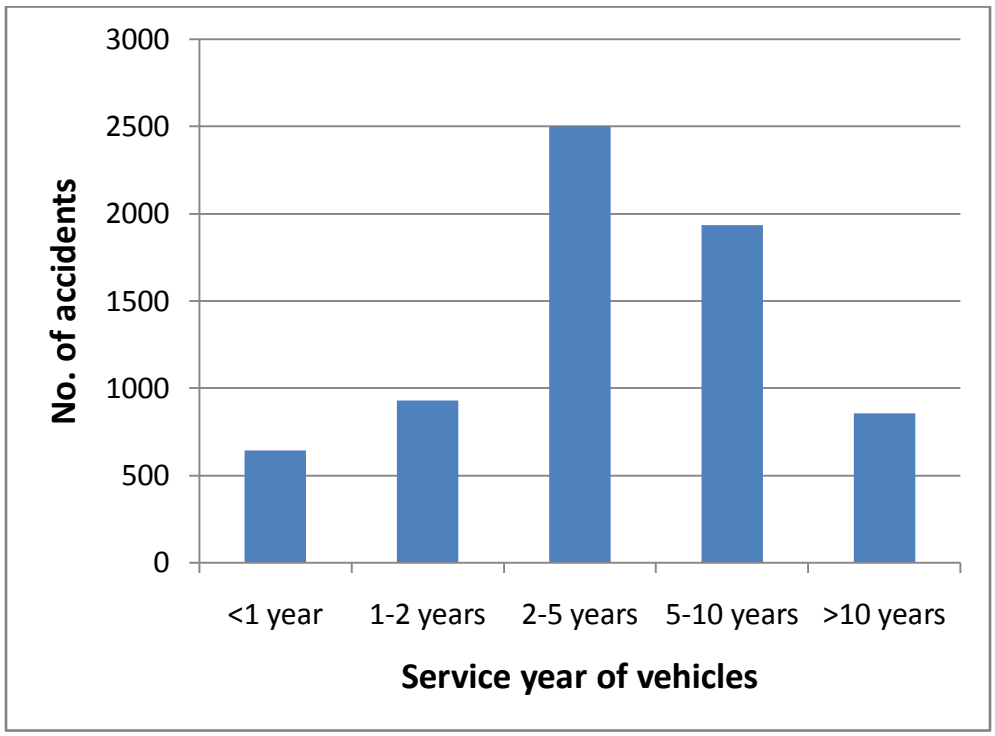

Figure 19: Traffic accident by service years of vehicles in Amhara, Ethiopia/ 2002 - 2004 E.C.

The figure shows us when service year of vehicles increases traffic accident becomes decreased.

In Amhara region by those three years most of the accidents was occurred during day time, on straight and flat place, in good asphalt and weather condition and dry road.

Discussion

The result shows most of the victims for traffic accident were males which is similar in other studies in India, USA this may be due to that males perform different activities around the road than females.

Drivers who complete secondary education and high school cause majority of the accidents than drivers who are illiterate, primary education and educational level of more than high school. This finding is similar with the study done in Mekele, Ethiopia. This may be related with drivers with lower educational status had more years of driving experiences as they got their driving license with the previous law; where, previously driving license was given even with lower educational

status individuals in the Region. On the other hand now most of the drivers must have at least primary education and least of the drivers have higher education. So drivers with no education and had college education covers small numbers and most of the drivers had secondary education. Drivers that had low (< 2 years) experience and high experience (>5 years) did cause least accident but drivers with medium experience (2-5 years) did most of the accidents. The study done in Tanzania showed that drivers that have more experience did not have more risky driving behaviors and the study done in Mekele showed drivers with high experience had high risk of driving behaviors, but in this study drivers with medium experience cause most of the accident and it might be younger age and over confidence of drivers.

Though it is difficult to compare the difference of risky driving behavior between male and female drivers because of the few number of female drivers, evidences have shown that males have more risky driving behavior than females due to biological and cultural reasons and in this study female drivers were very few which is difficult to compare the risk behaviors' of driving with male drivers.

Traffic accident becomes decreased when service year of vehicles increased in this study, which is contrary with other study and needs further study. Traffic accident increases every year and it is similar with other studies done in Tanzania. This increment may be that the increment of vehicles due to economic growth in the Region as well as in the country, ineffectiveness of strategies taken to reduce traffic accident and not identifying the root causes of the problem correctly. Property (material) loss covered most of accidents (41%), minor injury 24%, heavy injury 23% and death 12% and this is similar with other study done in Ethiopia (10).

Limitation

- ✓ The data was summary data which was difficult for entry and analysis
- ✓ Most of the variables that the data contained were for drivers but not for passengers and Pedestrians. Therefore the result underestimate the burden and consequences
- ✓ No more similar studies
- ✓ Absence of denominator for drivers' educational level and service years of drivers

Conclusion

Traffic accident becomes increased from year to year (2002-2004) in Amhara Region. Most of the accidents were caused by the fault of drivers. Drivers with high educational level and drivers had medium experience cause majority of the accidents. More than 70% of the victims of traffic accident were males and majority of traffic accidents were occurred in day time, on dry, straight and flat road, and when the driver drives with more than the recommended speed.

Recommendation

- Polices at all level should record individual data and include variables of passengers and pedestrians that are affected
- The region should evaluate the strategies used to decreases traffic accident in the previous years.
- Give training for drivers and Pedestrians about road safety.
- Improve the traffic system.
- Further study should be done

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Chapter III- Evaluation of Surveillance System

An Evaluation of Malaria Surveillance System in North Gondar Zone, Amhara Region, Ethiopia/ 2013

Summary

Background: Ethiopia is one of the most malaria epidemic-prone countries in Africa and is one of the few African countries that have a history of malaria control strategies for more than 40 years. The problem of malaria is very severe in Ethiopia where it has been the major cause of illness and death for many years. In Ethiopia malaria transmission is unstable. Because of it, malaria epidemic is serious public health emergency. Approximately 54 million people (68%) live in malaria endemic areas in Ethiopia, most (75%) of them found in low land places (below 2000meters). Malaria is also a significant obstacle to social and economic development in Ethiopia. In malaria endemic areas, it attacks during planting and harvesting seasons, reducing productive capacity at a time when there is the greatest need for agricultural work. Malaria is public health priority problem in Amhara Region. North Gondar is one of malarious Zone of the Region with malaria hotspot Districts. So evaluation of malaria surveillance system in the Zone will help to identify the problems faced for malaria control and prevention activities.

Method: Amhara region, North Gondar Zone, two Districts from the Zone two health centers and two health posts from the two selected Districts were evaluated. Health centers and health posts were selected based on their performance on surveillance activities by the District health office. From one District one health center and health post with good performance and from the other District that have poor performance were selected. Data was collected through interview of malaria officers and focal persons using standard questionnaire and records and report formats were reviewed based on checklist. The evaluation contained the overall surveillance system and attributes of surveillance like usefulness, data quality, completeness, timeliness, efficiency, representativeness etc.

Result: - At Regional, Zonal and District levels there were assigned malaria and PHEM officers who has full responsibility on public health emergency management. But at health facility levels

the health workers that have other duty are performing the surveillance as additional work. In all visited sites the immediately reportable disease report immediately if the case is there and reported zero weekly with the weekly reportable diseases if there is no case. The quality of the data at all level except at Regional level is under question mark. Availability of malaria and PHEM guidelines, communication, data reporting and handling mechanisms, written emergency plans, Budget for surveillance and trained man power were some of the strengths of the surveillance system. Lack of vehicles, unavailability of budget for emergency and lack of written feedback were the weakness of the surveillance system. Rapid response team at all level was functional only during the presence of outbreak.

Discussion: - The evaluation showed that malaria surveillance system becomes improved. However, at most sites (health post and health center) the data was simply to report to next level. It was not analyzed, interpreted and used for action at each level. This is due to lack of trained man power, shortage of computer, workload, not feeling of ownership, inadequate supervision and feedback. The surveillance system is simple, useful, acceptable, flexible, sensitive and representative at each level.

Background

Public health surveillance is an ongoing, systematic, collection, organization, analysis, interpretation and dissemination of health and health related data for action. Public health surveillance uses to reduce morbidity and mortality and to improve health of the community. Information of public health surveillance is used to assess public health status, define public health priorities, track conditions of public health, program planning and evaluation, immediate public health action and to formulate research hypothesis (1).

Public health surveillance system should be evaluated periodically and the evaluation should include recommendations of quality, usefulness and efficiency. Surveillance system evaluation uses to promote the efficient use of health resources and to assure the effectiveness of the system. It allows defining weather a specific system is useful for public health and achieve its objectives. Surveillance system evaluation should include assessment of system attributes such as sensitivity, simplicity, flexibility, representativeness, timeliness, positive predictive value,

acceptability, data quality and stability. Due to public health surveillance systems vary in methods, scope, purpose, and objectives, attributes that are important to one system might be less important to another. So, the system should emphasize those attributes that are most important for the objectives of the system (2).

Ethiopia is one of the most malaria epidemic-prone countries in Africa and is one of the few African countries that have a history of malaria control strategies for more than 40 years (3). The problem of malaria is very severe in Ethiopia where it has been the major cause of illness and death (4). In Ethiopia malaria transmission are unstable. Because of it, malaria epidemic is serious public health emergency. Approximately 52 million people (68%) live in malaria endemic areas in Ethiopia, most (75%) of them found in low land places (below 2000meters) (5). The factors that increases burden of malaria are large population movements, mixed infections of Plasmodium vivax and P. falciparum, increasing parasite resistance to malaria drugs, vector resistance to insecticides, low coverage of malaria prevention services and poverty (6). Malaria is also a significant obstacle to social and economic development in Ethiopia. In malaria endemic areas, it attacks during planting and harvesting seasons, reducing productive capacity at a time when there is the greatest need for agricultural work (7).

Surveillance system evaluation was done previously in other Zones of the Region: Waghmira, Awi and South Gondar and Metema District of North Gondar by senior field epidemiology residents. The result of evaluation indicates that even if the overall structural set up of the surveillance system and involvement of the community is good there is lack of follow up and training of PHEM focal persons at District and Zonal level. Use of data at all level is very limited. The major problem is reporting mechanisms like telephone, radio, fax machine and computer for data management and infrastructure like transportation and laboratory service to confirm cases. The problem is high at health post level and in some Districts (found in remote areas). In some Districts PHEM officers have another duty and they assigned to do the surveillance activity as additional which is difficult to do the work effectively. The evaluators recommended that further evaluation and follow up is needed to improve the surveillance system of the Region.

Rationale

Malaria is public health priority problem in Amhara Region. North Gondar is one of malarious Zone of the Region with malaria hotspot Districts. Since 1) Gondar zuria District of N.Gondar Zone is one of the malarious District and there were case build up of malaria during minor malaria transmission season of 2013 and it is epidemic prone disease of the Zone. 2) In Lay Armachiho District malaria is public health problem and 31 from 34 kebeles are malarious. Malaria is leading causes of morbidity of adults above five years old in the District however; it is not one of top ten causes of morbidity of children under five years old. 3) Surveillance system evaluation was not done in the selected Districts of the Zone so far. The surveillance system evaluation could help to improve the surveillance system of the Zone.

Objective

General objective:-To evaluate the existing malaria surveillance system of North Gondar Zone and two Districts from the Zone.

Specific objectives

- ✓ To assess the usefulness of the surveillance system for early detection of malaria cases
- ✓ To assess the importance of the surveillance system to decrease malaria morbidity and mortality
- ✓ To describe and evaluate key attributes of the surveillance system of malaria
- ✓ To identify the strong and weak side of malaria surveillance system of the Districts, Zone as well as Region and to recommend based on findings

Method

Study area and period

The study was conducted in North Gondar Zone which is found in Amhara Region from April to June 2013. North Gondar Zone is located 750km from Addis Ababa and 180 km from the Regional town (Bahirdar). The Zone has 23 Districts and a total population of 3,276,504. Two Districts, Layarmachiho and GondarZuria were evaluated. Layarmachiho is located 23km and

Gondar Zuria is located 40 km from the Zone. The total population of Layarmachiho and Gondar Zuria Districts were 175,114 and 212,954 respectively.

Study design

Descriptive cross sectional study design was used to evaluate the integrated disease surveillance of the zone using malaria surveillance as a proxy indicator.

Data collection tools and methods

Amhara region, North Gondar Zone, two Districts from the Zone two health centers and two health posts one from each selected Districts were evaluated. The selection of Districts is mentioned in the rationale part. Health centers and health posts was selected based on their performance on surveillance activities by the District health office. From one District one health center and health post with good performance and from the other District that have poor performance were selected. Data was collected through interview of malaria officers and focal persons using standard questionnaire and records and report formats were reviewed based on checklist. The evaluation were included the overall surveillance system and attributes of surveillance like usefulness, data quality, efficiency, timeliness, sensitivity, flexibility, predictive value positive, completeness, representativeness and acceptability. Additionally how the surveillance system is organized from health post to regional level and the method of data reporting and analysis at each level was evaluated.

At health post and health center level availability and appropriate use of guidelines, report formats and registration books, case definitions and essential resources, case, detection and confirmation, data reporting and analysis, epidemic preparedness and response, feedback, supervision and training (accepted from higher level and given to lower level) and all attributes was evaluated. At District, Zonal and Regional level the surveillance system like distribution of report formats, guidelines and resources, data completeness, data analysis, outbreak investigation, epidemic preparedness and response, feedback and supervision, allocation of budget for surveillance were included in the evaluation.

Data analysis

Data was entered and analyzed using Microsoft office excel-2007 and epi-info version 7.1.0.6

Study units

The study unites were Regional PHEM office, Zonal PHEM office, two District from the Zone, two health centers, one from each Districts and two health posts, one from each health center totally eight sites were evaluated.

Result

The surveillance system

At Regional, Zonal and District levels there were assigned malaria and PHEM officers who has full responsibility on public health emergency management. But at health facility levels the health workers that have other duty are performing the surveillance as additional work. The information flow is from health post to health center, health center to district, from district to Zone, from Zone to region and from Region to Federal. The Zone received malaria and PHEM reports weekly from Districts and send to the Region by District .The surveillance system in the Region targeted on 21 priority diseases. The reporting organizations for the Region are public health facilities, private health facilities and NGOs health facilities. Military health facilities do not report surveillance data. After checking and compiling the report the Regional PHEM office report to EHNRI, FMOH and Regional council every week.

Table 10: List PHEM immediately and weekly reportable disease in Amhara Region in 2012/13

S. No	I Immediately reportable diseases	S. No	II Weekly reportable diseases
1	Acute Flaccid Paralysis	1	Malaria
2	Anthrax	2	Typhoid fever
3	Rabies	3	Malnutrition
4	Neonatal tetanus	4	Meningitis
5	Cholera	5	Dysentery
6	Avian human influenza	6	Typhus
7	Dracunculiasis / Guinea worm	7	Relapsing fever

8	Sever acute Respiratory Syndrome (SARS)	8	Leshmaniasis
9	Small pox		
10	Measles		
11	Pandemic influenza		
12	Yellow fever		
13	Viral hemorrhagic fever		

In all visited sites the immediately reportable disease report immediately if the case is there and reported zero weekly with the weekly reportable diseases if there is no case. Malaria is reported weekly except there is an outbreak. All evaluated sites report complete (every week) malaria report to next levels. But the Zone sent the weekly report lately and the data had poor quality. Sometimes the report shows differences of total malaria and malaria by species, by age and by sex. They also report deaths with the absence of death. But at the Region the data checked and call to them to correct and resend. The completeness and timelines of report at Zonal level was 88% and 80% respectively in 2012/2013.

Supplies and data reporting materials

At Regional, Zonal and assessed Districts new malaria guideline, PHEM national guideline, malaria standard case definition and report formats were available. The evaluated health center and health posts did not have new malaria guideline and national PHEM guide line. Report formats and standard case definitions were unavailable at the assessed health posts. The health extension workers try to prepare report format but it was not clear and lack the necessary variables. The reporting facilities of the Zone were governmental and private health facilities. No military health facilities in the Zone.

At all health post and health centers there was no problem of malaria case confirmation kits, functional microscope and reagents. But there was shortage of quartum at all levels except at

Regional level. All evaluated health posts had clinical registration book that was not standardized but, filled correctly and with no blank. MMC is available at health posts but not used appropriately. The reporting mechanism was hard copy and telephone from health post to District. The assessed Districts malaria and PHEM officers said that there is problem of telephone service to receive and send reports. They use the telephone which is found in the office of District health office head. Due to it takes long time to receive and report to next level it is difficult for them and they recommended it will be better to have budget for telephone service. The Region has telephone, internet and fax for communication. Computer is available for data handling and analysis. Functional photocopier, printer and scanner are also available. At Zone there was telephone, fax, internet service, computer, printer and photocopier (was not functional during the assessment time). There was no any unit that had radio for communication mechanisms from the assessed sites. There were new but not functional bicycles due to incomplete spare parts at health posts. Except at health posts all units had electricity, telephone and motorcycle. Computers were available at Zonal and District level. At health centers there is no computer for PHEM and malaria but they use HMIS computers to print report formats and fill the hard copy and sent to next level.

Data analysis

There was responsible person for data compilation, analysis and interpretation at all assessed units. But data analysis was done only at Regional and Zonal level. At District and health facility level only data compilation and report to higher level was done. Early warning officers and data managers analyze data weekly and other officers analyze quarterly and as needed in the Region. Feed back is given weekly and 52 bulletins prepared in the last year by the Region. At Zonal level data analysis was done quarterly and as needed by place and time but not by age and sex. The responsible persons for data analysis at all times were malaria officers. The reasons why they did not analyze data at District and health facility level was unavailability of computer, lack of computer skill and workload.

Epidemic preparedness and response

There was epidemic preparedness and response plan at Regional, Zonal and District levels. At the Region emergency stocks of drugs, LLINs and supplies were available at all time in the last one year. But the Zone had shortage of LLINs and quartum in the past one year. There was no budget line for surveillance and epidemic response at all levels. There was rapid response team at all level but functional only during the presence of outbreak. As the respondents at Regional and Zonal level said they do not have the capacity to respond all the reported outbreak within 48 hours due to shortage of resource especially vehicle. The Zone and District made integrated supportive supervision monthly but for malaria and PHEM once within six months. The respondents at Zonal level said that the opportunities for surveillance activities were availability of internet service, the presence of bulletin, supervision and feedback from the Region. In the Region presence of partners and availability of communication materials are opportunities for surveillance activities.

Outbreak investigation

There was no outbreak of malaria in the past six months in the Zone and in the Region.

Training, supervision and feedback

Except Layarmachiho District malaria officer all officers of the evaluated sites were trained for disease surveillance by Regional health bureau and partners. No one has been trained for any post-basic epidemic management. At both assessed Districts and all health facility levels the officers have lack of computer skill and need training on data management and analysis.

The Region and the Zone have annual supervision plan supported by standard assessment checklist. The supervision was not conduct as the planned because of lack of manpower and vehicles, but they supervised at least once per six months. The Zone has been supervised two times within in six months by the Region PHEM unit and received written feedback quarterly and as needed but now feedback is given every week. As the officers respond the Zone supervised the Districts monthly by integrated supportive supervision and prepares supervision only for malaria and PHEM every six months. But, there was no supervision checklist which shows the assessment was done at the supervised sites. The systems at Zonal level do not allow

preparing supervision only for PHEM and malaria. Almost all feedbacks given by the Zone were oral feedbacks. The assessed Districts were supervised and received feedback from the zone in the last year. The respondents at Tikildingay health center and Chiranbezo health post respond that they did not supervised and received feedback from the health centers and Districts respectively during the last year.

Surveillance system Attributes

Usefulness

All participants of this evaluation responded that the surveillance system is useful to detect outbreaks of malaria early at Zonal, District and health facility levels. It also helps to estimate the magnitude of morbidity and mortality related to malaria including identification factors associated with the disease at all levels. In addition to these it uses to assess the effect of prevention and control measures of the disease.

Simplicity

As the respondents at all level said the case definition of malaria to detect suspected cases is easy to understand and the laboratory to confirm malaria cases is simple. However, to fill a single reporting format and to confirm the case by laboratory takes greater than 15 minutes and additional data collected on a case is time consuming. There is difficulty of understanding the PHEM report format and filling of MMC by health extension workers due to language barrier. In addition to these the PHEM reporting format lacks some variables like mixed. The clinical variable confuses HEWs. According to the guide line all cases should be laboratory confirmed and cases should not be treated clinically. So, they did not treat cases clinically and all reported cases are laboratory confirmed at HP level.

Flexibility

The flexibility of the current reporting format to adapt new variables and new disease condition is good. Because all the participants said that it is not difficult to add new variables

such as sex and species but they use as the higher level prepares to have uniform report at all level.

Data quality

The quality of the data at all level except at Regional level is under question mark. Though all the reports are complete (no blank) the figures were not exact because the total malaria cases and malaria by species were not equal at Zonal level and Layarmachiho District. Sometimes death report reported with the absence of deaths both at Zonal and Layarmachiho District. Additionally the laboratory, OPD, PHEM and malaria report of malaria cases were different at Tikildingay health center of Layarmachiho District. At District level, Layarmachiho District it was difficult to cross check malaria and PHEM report of malaria cases due to unavailability of PHEM reports at District health office. The data was not appropriately recorded and documented in the District. The data management system both at District health office and health facilities was poor. At Regional level the data sent by the Zones cheeked and corrected by calling to Zones if it has problems before send to ext level. There was also a problem on the reporting dates. The following table shows reports that had error found during the assessment time.

Table 11: Malaria report of Tikil Dingay health center reported to District health office 2013

Date of report	Total BF done	Total malaria	P. Falcifarm	P.vivax	Mixed	Difference
06/05/2013	47	17	3	2	1	11
29/05/2013-09/06/2013	44	8	5	2	0	1
10- 15/06/2013	80	44	10	14	0	20
21-30/06/2013	37	42	3	1		

Acceptability

The acceptability of the surveillance system was measured by the participation of reporting organizations. All Zones and Districts report malaria and PHEM data weekly. The reporting

entities were District health offices, health facilities, health posts, private health facilities and the community by itself. There are no nongovernmental organizations and military organizations in the Zone. All participants respond that the surveillance system is acceptable at all level and also by the community. All Districts of the Zone send malaria report every week on time except some remote Districts like Telemit and Beyeda which report lately due to communication problem and some Districts sent late report when the officers are at field work during the reporting date.

Representativeness

The representativeness of malaria surveillance system becomes improved because the completeness of the Zone report improved from time to time. The health service coverage of the Zone is 97% that indicates the surveillance system is representative. But distribution of the cases by sex and address was difficult due to unavailability of these variables. In general the rural area is well represented by the surveillance system since the 90% of the population of the Zone is found in rural area and malaria is common problem of the rural population because of the presence of many mosquito breeding sites.

Timeliness

Timeliness of malaria report also becomes improved as the completeness. At zonal level 97% of weekly malaria report was sent to Regional level on time in the fourth quarter. At District and health facility levels it was difficult to calculate the timeliness because of unavailability of reporting dates to higher level.

Stability

Stability of the surveillance system is the reliability (the ability to collect, manage, and provide data appropriately without failure) and availability (the ability to be operational when it is needed) of the public health surveillance system. On the basis of this attribute the surveillance system helps to collect, manage and provide data appropriately and it was able to used at any time. Stability of the surveillance system was not affected by BPR or BSC restructuring activities

at all level but it was interrupted by lack of resources that is necessary for malaria surveillance and unavailability of the officers at work place during reporting time.

Sensitivity

The sensitivity of a surveillance system can be referred as the proportion of cases of a disease (or other health-related event) detected by the surveillance system and the ability to detect outbreaks.

According to this attribute the case definition of malaria is sensitive to detect cases. Malaria surveillance system at al level detects cases and outbreaks on time as all respondents at all level said. In this evaluation there was no denominator to calculate the sensitivity of the surveillance system.

Predictive value positive

Predictive value positive is defined as the proportion of reported cases that actually have the health related event under surveillance. The case definition of malaria is not available at health post and health centers but the HEWs and health personnel at health center know the case definition. In this evaluation to calculate the PVP we use number of positive cases for malaria among patients sent to laboratory to test for malaria by using the case definition. (Table 3.1.3)

Table 12Blood film prepared for malaria test and positive results from four health facilities at N.Gondar Zone in July 2013

S. no	Health facility	BF done	Positive	Predictive value positive
1	Tikildingay HC	206	58	28%
2	Maksegnit HC	848	201	24%
3	Baheryginb HP	240	68	28%
4	Chiranbezo HP	23	15	65%

Strengths of the surveillance system

There were many strengths of malaria surveillance system at Regional, Zonal, District and health facility levels. At Zonal level the following were some of the strengths availability of malaria and PHEM guidelines, communication, data reporting and handling mechanisms, written emergency plans, Budget for surveillance and trained man power. The Zone also did data analysis by place and time. Gondar zuria District had better data recording, documentation and handling system than Layarmachiho District. The officers were trained and had appropriate denominators (population by age and by village) in the District. The common strengths were availability of report formats, communication mechanisms (telephone and fax), guidelines, supervision and feedback. The strengths at health facility level were presence of malaria confirmation kits, reagents and anti malaria drug used to treat malaria.

Weakness of the surveillance system

The weaknesses of the surveillance system at all level were lack of vehicles, unavailability of budget for emergency and lack of written feedback. In general the main weakness was not performing data analysis at District and health facilities, unavailability of reporting formats, reporting mechanisms like telephone (at health post level), computer and internet service (from health post to District health office), and assignment of malaria and PHEM focal persons at health facility in addition to other duties. Specifically at Layarmachiho District health office and Tikildingay health centers the quality, documentation and handling of data was poor.

Discussion

In general the evaluation showed that malaria surveillance system becomes improved. However, at most sites (health post and health center) the data was simply to report to next level. It was not analyzed, interpreted and used for action at each level. This is due to lack of trained man power, shortage of computer, workload, not feeling of ownership, inadequate supervision and feedback.

Though the report formats are easy to fill, unavailability of report formats at health post level has effect on data quality. The data reporting flow from lower to upper level is well organized. But it has many problems like vehicle, fax, radio, telephone, computer and internet service that have impact on the completeness and timeliness of malaria report.

The Zone and District had epidemic preparedness and response plan which is good to give response for outbreaks on time and to take action. But, at health facility level there was no plan for emergency. Budget was not allocated for surveillance and emergency at all levels. These make response to be late and difficult to give immediate action for the problem. There is rapid response team at all level but do not have regular meeting to review their plans, actions and learned experiences without the occurrence of an outbreak.

None of the assessed health center and health posts had new malaria guideline and national PHEM guide lines. Report formats and standard case definitions were unavailable at health posts. This can have negative influence on the surveillance system due to absence of reference materials during diagnosis and investigation. Absence of trained manpower on disease (malaria) surveillance except the officers affected the completeness of the weekly report. This is due to that if the trained person is not available on work place the report can interrupt.

As determined by the attributes of the surveillance system at all level the system was useful to collect data easily, timely and properly. But the completeness, timeliness and sustainability of the system was interrupted by the absence of assigned persons (officers), anti malaria reagents and treatments. The surveillance system is representative and most represents the rural areas that constitute 90% of the population of the Zone

Conclusion

The surveillance system is useful in providing malaria data to monitor malaria in the Zone. The general structural set up of the surveillance system and assignment of responsible body at each level is well. But there is a need of follow up, supportive supervision and capacity building of officers and focal persons at all levels. At health centers the focal persons have another duty assigned to do the surveillance as additional activity and they did not give concentration to the surveillance system. Budget is not allocated for the surveillance system at all levels. The surveillance system is simple, useful, acceptable, flexible, sensitive and representative at each level. The quality of data of the surveillance system in some districts had problem and the use of data is limited at district and health facility levels. Officers at District health offices and focal persons at health facility levels have lack of computer skill. There is no malaria treatment protocol, guide line, report format and case definition at health facilities. The major problem was lack of communication means to report cases to next higher level especially from health post to District health office. Communication and reporting materials like telephone, radio, fax, internet and computer indicated as constraints. Except at Regional and Zonal levels data analysis was not done.

Recommendation

To improve and strength the surveillance system the responsible body has to strength means of coordination and communication between higher and lower levels, provide supportive supervision, follow up and feedback . Prepare training, capacity building of Districts and review meeting to improve data quality, reporting, handling and analysis at all levels. Data should be analyzed and used for action at lower levels. There should be a mechanism for focal persons at health facility level to perform the surveillance activities as their primary activity. Make communication materials to be available and functional at all levels. Budget should be allocated for surveillance and emergency at each level. Administrative bodies should give emphasis for surveillance.

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Annex III

Annex 4Surveillance system evaluation check list

1. REGIONAL /ZONAL LEVEL QUESTIONNAIRE

Identifiers: --------- Date: ----------

Respondent name: ---------- Responsibility: ----------

A. Surveillance system

1. Is there national Malaria guideline?

1.Yes 2.No 3. Not applicable 4.Unknown

2. Do you have standard case definitions for the Country's priority diseases like malaria?

1.Yes 2.No 3. Not applicable 4.Unknown

3. Is the central level responsible for providing surveillance reporting forms to the health facilities?

1.Yes 2.No 3. Not applicable 4.Unknown

4. If yes, have you lacked appropriate surveillance forms (Line list, weekly reporting form, and epidemic reporting form, rumor investigation) at any time during the last 6 months?

1.Yes 2.No 3. Not applicable 4.Unknown

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

1. Public health facilities 2. NGO health facilities

3. Military health facilities 4. Private health facilities

5. Others (Specify)_____

6. Percent of district malaria reports (either directly or through an intermediate level) received during each reporting period at the central level during the past 3 months:

6.1. Number of reports in the last 3 months compared to expected number (completeness)

6.2. Weekly: /12 times the number of districts (timeliness)

6.3. Immediately: /------ times the number of districts

7. How do you report? (Multiple responses are possible)

1. Mail 2. Fax 3. Telephone 4. Radio

5. Electronic 6. Other (specify)_____

Data analysis

1. Does the Zonal level describes malaria data by age, sex, time and places:

1. Yes 2. No 3.Unknown 4.Not applicable

Observe if there is line graph

_____
_____

2. If they do not made analysis for Malaria ask the reason why they don't

_____
_____

3. Do you have an action threshold defined for, malaria?

1. Yes 2. No 3. Unknown 4. Not applicable

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

5. How often do you analyze the collected data?

1. Daily 2. Weekly 3.Every 2 weeks 4.Monthly 5. Quarterly 6. As needed…

6. Do you have appropriate denominators?

1. Yes 2. No 3.Unknown 4.Not Applicable

7. Do you give feedback for Districts

1. Yes 2. No

8. If the answer is yes for Question 7, how often?

1. Daily 2. Weekly 3. Every 2 week 4. Monthly 5. Quarterly

Outbreak Investigation

1. Percent of suspected malaria outbreaks that were investigated in the past 6 months_____(# of suspected outbreak)_____(# of investigated) _____ (%)Epidemic Preparedness (relevant for epidemic prone diseases)

2. Existence of a Regional/Zonal plan for epidemic preparedness and response

1. Yes 2. No 3. Unknown 4. Not applicable

3. Has the zone had emergency stocks of drugs, LLITN, and supplies at all times in past 1 year (2012)? 1.Yes 2. No 3.Unknown 4.Not applicable

4. Has the region experienced shortage of drugs, vaccines or supplies during the most recent epidemic (or outbreak)?

1. Yes 2.No 3.Unknown 4.Not applicable

5. Existence of standard case management protocol for Malaria

1.Yes 2.No 3.Unknown 4.Not applicable

6. Is there budget line for epidemic response?

1.Yes 2.No 3.Unknown 4.Not applicable

7. Does the region have rapid response team for epidemic?

1.Yes 2.No 3.Unknown 4.Not applicable

Response to Epidemics

1. Ability of the regional level to respond within 48 hours of notification of most recently reported outbreak

1.Yes 2.No 3.Unknown 4.Not applicable

2. How many feedback bulletins or reports had the regional level produced in the last year? _____

3. How many supervisory visits have you made in the last 6 months? _____

4. The most usual reasons for not making all required supervisory visits:_____

5. Have you been trained in disease (malaria) surveillance?

1.Yes 2.No 3.Unknown 4.Not applicable

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

7. What percent of your subordinate personnel have been trained in surveillance? _____

8. Have you received any post-basic training in epidemic management?

1.Yes 2. No 3.Unknown 4.Not applicable

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

_____
_____

Percent of sites that have:

1. Data management _____2. Computer:_____ 3. Printer:_____

4. Photocopier: _____ 5. Data manager:_____ 6. Statistical package:_____

7. Communications_____ 8. Telephone service: _____ 9. Fax:

10. Radio call:_____ 11. Satellite phone: _____

12. Computers that have modems: ____ 13. Budget line ____ 14. Logistics _____

Surveillance

1. Do you have computerized surveillance network at this level?

1. Yes 2.No 3.Unknown 4.Not applicable

Budget for surveillance

2. Is there a budget line for surveillance in the Regional Health Bureau budget?

1. Yes 2.No 3.Unknown 4.Not applicable

3. How could surveillance be improved?

_____
_____

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

Questionnaire for Attributes and level of Usefulness:

1Total population under surveillance_____

2. What is the incidence / Prevalence of Malaria in your area/region

Malaria _____cases _____Deaths _____

Level of Usefulness of the Surveillance System for these selected priority diseases

3. Does the surveillance system help:

3.1 To detect outbreaks malaria early? 1. Yes 2.No

3.2 To estimate the magnitude of morbidity and mortality related to malaria, including identification of factors associated with the diseases? 1. Yes 2.No

3.3 To permit assessment of the effect of prevention and control programs?

1. Yes 2.No

3.4. To Observe (confirm): interventions and diseases trends analyzed

1. Available 2.Not available

Describe Each System Attributes:

Simplicity:

1. Is the case definition of malaria and case detection known by all level health professionals?

1. Yes 2. No

2. What are the organizations which need to receive reports of the malaria surveillance data?

3. Do you feel that additional data collected on ~~a~~ case are time consuming?

1. Yes 2. No

4. How long it takes to fill the format?

1. <5 minute 2.-10-15minuts 3.- >15 minutes

5. How long does it take to have laboratory confirmation of Malaria?

1. <5 minute 2.-10-15minuts 3.- >15 minutes

Flexibility:

1. Can the current reporting formats be used for other newly occurring health event (disease) without much difficulty? 1. Yes 2. No

2. Do you think that any change in the existing procedure of case detection, reporting, and formats will be difficult to implement? 1.Yes 2.No

3. Data Quality: (Completeness of the reporting forms and validity of the recorded data)

4. Are the data collection formats for malaria clear and easy to fill for all the data collectors/ reporting sites? 1.Yes 2.No

5. Are the reporting site / data collectors trained/ supervised regularly? 1.Yes 2.No

Observe: Review the last months report of these diseases

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

_____

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

Acceptability:

1. Do you think all the reporting agents accept and well engaged to the surveillance activities?
   1. Yes 2.No

2. If yes, how many are active participants (of the expected total)? _____

3. If No, what is the reason for their poor participation in the surveillance activity?

3.1. Lack of understanding of the relevance of the data to be collected

3. 2. No feedback or recognition given by the higher bodies for their contribution; i.e. no dissemination of the analyzed data back to reporting facilities

3.3 Reporting formats are difficult to understand

3.4 Report formats are time consuming

3.5 Other(specify):_____

Representativeness:

1. What is the health service coverage of the district/ zone/ region? ____ ____(#) _____%

2. Do you think, the population under surveillance has good health seeking behavior for these diseases? 1. Yes 2. No

3. Who do you think is well represented by the surveillance data? The urban/ the rural and what is the reason?

4. Timeliness: Timeliness of reporting in the past one year (by Zone and District)

1. On time---------- 2. Late

Stability:

1. Was the new BPR restructuring affected the procedures and activities of the surveillance of malaria? 1. Yes 2. No

2. Was there lack of resources that interrupt the surveillance system?

1. Yes 2. No

II. DISTRICT (DISTRICT LEVEL) QUESTIONNAIRE

Identifiers: ---------- Date: ----------
Province: ---------- Interviewer ----------

Respondent: ---------- Responsibility----------

Surveillance system

1. Is there new guideline for Malaria at this site?

1. Yes 2. No 3.un known 4.Not Applicable

Data reporting:

1. Have you faced lack of forms recommended for the country at any time during the last 6 months? 1. Yes 2.No 3.Unknown 4.Not applicable

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

Weekly: _____ /12 times the number of health facilities

Immediately: _____/----- times the number of health facilities

On time (use national deadlines)

Number of weekly reports submitted on time: ____/12 times the number of health facilities

Number of immediately reports submitted on time: _____/3 times the number of health facilities

3. How do you report (Multiple answers are possible):

1. Mail 2. Telephone 3. Fax 4. Electronic

5. Radio 6. Others (specify)……..

4. How can reporting be improved?

_____
_____

Data Analysis:

1. Percent of sites that: Describe malaria data by person, time and place (case based, outbreaks, sentinel) 1. Yes 2.No 3.Unknown 4.Not applicable

2. Do you have an action threshold for any of the country priority diseases?

1. Yes 2.No 3.Unknown 4. Not applicable

3. If yes, what is it? _____cases _____% increase _____rate

(Ask for 2 priority diseases)_

_____

4. Do you have appropriate denominators? Observe presence of demographic data at site (E.g. population <5 yr, population by village,)

1.Yes 2.No 3.Unknown 4.Not applicable

5. Who is responsible for data analysis? _____

6. How often do you analyze the collected data? 1. Daily 2. Weekly

3. Monthly 4. Quarterly 5.As needed

Outbreak investigation:

1. Number of malaria outbreaks suspected in the past 6months:_____

2. Observe: Of those, number investigated (Observe reports and take copies if possible): _____

3. Has your district ever investigated malaria outbreak?

1. Yes 2.No 3.Unknown 4.Not applicable

4.Existence of epidemic preparedness and response plan at district level

1. Yes 2.No 3.Unknown 4.Not applicable

5. Do the districts have written plan of epidemic preparedness and response

1. Yes 2.No 3.Unknown 4.Not applicable

6. Has the district had emergency stocks of malaria drugs and supplies at all times in past 1 year? 1. Yes 2.No 3.Unknown 4. Not applicable

7. Has the district experienced shortage of malaria drugs, supplies during the most recent epidemic (or outbreak)?

1. Yes 2.No 3.Unknown 4. Not applicable

8. Is there budget line or access to funds for epidemic response?

1. Yes 2.No 3.Unknown 4.Not applicable

Percent of districts that have an epidemic management committee

Observation: Observe minutes (or reports) of meetings of epidemic management committee

1. Yes 2.No 3.Unknown 4.Not applicable

1. Does the district have rapid response team for epidemics?

1. Yes 2. No 3.Unknown 4. Not applicable

Responses:

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

1.Yes 2.No 3.Unknown 4.Not applicable

2. Does the district responded within 48 hours of notification of most recently reported outbreak (from written reports) 1.Yes 2.No 3.Unknown 4.Not applicable

3. Has epidemic management committee evaluated their preparedness and response activities during the past year? (Observe written report to confirm)

1.Yes 2.No 3.Unknown 4.Not applicable

Feedback:

1. Is there written feedback reports has the district produced in the last year?
1.Yes 2.No 3.Unknown 4.Not applicable

2. How many feedback bulletin or reports has the district received in the last year? _____

3. Supervision_____

4. How many times have you been supervised in the last 6 months?

5. How many supervisory visits have you made in the last 6 months? _____

(Obtain required number of visits from central level)_____

6. The most usual reasons for not making all required supervisory visits.

_____

7. Percent of health personnel (in position of responsibility) trained in disease surveillance

8. Have you been trained in disease (malaria) surveillance?

1. Yes 2.No 3.Unknown 4.Not applicable

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

10 8.What percent of your personnel in the district have been trained in surveillance and epidemic management? _____

Resources:

1. Percent of sites that have:

Logistics

1. Electricity 2.Motor cycles 3. Bicycles 4.Vehicles

Data management

1. Stationary 2. Calculator 3.Computer 4.Printer

Communication

1. Telephone service 2. Fax 3.Radio 4.Computers that have modems

2. Information Education and Communication materials

1. Posters 2. Megaphone 3. Generator 4. Screen

5. Projector (Movie) 6. Others (specify):_____

Hygiene and sanitation materials

1. Spray pump 2.Disinfectant

Surveillance coordination:_____

1. Is there a surveillance co-ordination focal point within the district epidemic management committee? 1. Yes 2. No

Satisfaction with surveillance system

2. Are you satisfied with the surveillance system?

1.Yes 2.No 3.Unknown 4.Not applicable

3. If no, how can the surveillance system be improved?

_____

HEALTH FACILITY QUESTIONNAIRE

Identifiers:

Assessment team: Type of health facility:_____

Date: _____ District: _____

Interviewer:_____ Region/province:_____

Respondent:_____ Country: _____

Name of health facility:_____

Surveillance system:

1. Is there national manual for malaria surveillance at this site?

1. Yes 2.No 3.Unknown 4.Not applicable

Case detection and registration

2. Percent of health facilities that have a clinical register_____

3. Percent of health facilities that correctly register cases filling of the clinical register during the previous 30 days? 1. Yes 2.No 3.Unknown 4.Not applicable

4. Do you have a standard case definition for: malaria?

1. Yes 2.No 3.Unknown 4.Not applicable

Case confirmation

5. Do you have RDT to test Malaria at this facility?

1. Yes 2.No 3.Unknown 4.Not applicable

6. Do you have functional microscope to test for Malaria at this facility?

1. Yes 2.No 3.Unknown 4.Not applicable

7. Do you have Geimsa reagent to stain plasmodium species?

1. Yes 2.No 3.Unknown 4.Not applicable

8. Do you have oil immersion to examine slides to detect malaria

1. Yes 2.No 3.Unknown 4.Not applicable

Data reporting

9. Have you faced lack of appropriate surveillance forms at any time during the last 6 months?
1.Yes 2.No 3. Unknown 4.Not applicable

10.Is the last monthly report agreed with the register for malarial diseases; major public health importance

Observation: Malaria 1. Yes 2.No 3.Unknown 4.Not applicable

11. Percent of sites that reported each reporting period to the next higher level during the past 3 months

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

Observe Weekly: /12 times the number of sites

Observe immediately: /-- times the number of sites

On time (use national deadlines)

Observe: Number of weekly reports submitted on time:-_____ /12 times the number of sites

Observe: Number of immediately reports submitted on time: ___/-- times the number of sites
13. How do you report?

1. Mail 2.Telephone 3. Fax 4. Radio 5. Electronic 6.Other _____

Strengthening reporting

14. How can reporting be improved?

_____

Data analysis

1. Percent of sites that:

Describe data by person, place and time

2. Do you have an action threshold for malaria?

1. Yes 2.No 3.Unknown 4.Not applicable

3. If yes, what is it ?_____cases ____ % increase _____rate

4. Who is responsible for data analysis? _____

How often do you analyze the collected data?

1. Daily 2. Monthly 3.Weekly 4. Quarterly Every 2 weeks 6 .As needed……..

5. Do you have appropriate denominators? Observe demographic data at site (E.g. population <5 yr., population by village, total population)

1. Yes 2.No 3.Unknown 4.Not applicable

Epidemic preparedness

1. Is there written case management protocol for malaria epidemic prone disease

1. Yes 2.No 3.Unknown 4.Not applicable

Epidemic response

1. Has the health facility implemented prevention and control measures based on local data for at least one epidemic prone disease? 1. Yes 2.No 3.Unknown 4.Not applicable

Feedback

1. How many feedback bulletins or reports has the health facility received in the last year? ___

2. How many meetings has this health facility conducted with the community members in the past six months?

Supervision:

1. How many times have you been supervised in the last 6 months?

2. Have you been trained in disease (malaria) surveillance and epidemic management?

1. Yes 2.No 3.Unknown 4.Not applicable

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

Resources

Percent of sites that have:

Logistics

1. Electricity 2. Motor cycles 3. Vehicles 4.Bicycles

Data management

1. Stationery 3.Computer

2. Printer 4.Calculator

Communications

Telephone 3.service Radio call

Fax 4.Computers that have modems

Information education and communication materials

1.Posters 2. Megaphone 3. Flipcharts or Image box 4. Projector (Movie

5. Screen 6. Generator 7. Other(Specify):_____

Hygiene and sanitation materials

Spray pump

Disinfectant

List Protection materials _____ _____

Health Post Level Questionnaire

Identifiers:

Assessment team: Type of health facility:

Date : District:

Interviewer : Region/province:

Respondent : Country:

Name of health facility: Surveillance system:

1. Is there national manual for malaria surveillance at this site?

1. Yes 2.No 3.Unknown 4.Not applicable

Case detection and registration

2. Is there a clinical register book health facility?

1. Yes 2.No 3.Unknown 4.Not applicable

3. Do you have standard case definition for malaria?

4. Do you have RDT to test malaria? 1. Yes 2.No 3.Unknown 4.Not applicable

Data reporting

5. Have you faced lack of appropriate surveillance forms at any time during the last 6 months?

1. Yes 2.No 3.Unknown 4.Not applicable

6. Percent of sites that is accurately reported cases from the registry into the summary report to go to higher level? _____

7. Percent of sites that reported each reporting period to the next higher level during the past 3 months

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

Observe Weekly:

Observe Immediately:

9.Percent of HF that have means for reporting to next level by e-mail, telephone, fax or radio?_____

10. How do you report?

1.Mail 2.Fax 3. Telephone 4. Radio 5. Electronic 6. Others(specify):_____

Data analysis

11.Performing trend analysis Observed line graph of cases by time

1. Yes 2.No 3.Unknown 4.Not

Epidemic response

12. Has the health facility implemented prevention and control measures based on local data for at least one epidemic prone disease?

1. Yes 2.No 3.Unknown 4.Not applicable

Feedback

13. How many feedback bulletins or reports has the health facility received in the last year? __

14. How many meetings has this health facility conducted with the community members in the past six months? _____

15. How many times have you been supervised in the last 6 months? _____

Training

16. Have you been trained in disease (malaria) surveillance and epidemic management?

1. Yes 2.No 3.Unknown 4.Not

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

Resources

Percent of sites that have:

Logistics

1. Electricity 2. Motor cycles 3. Bicycles 4.Vehicles

Data management

1. Stationery 2.Computer 3.Calculator 4. Printer

Communications

1. Telephone service 2.Radio call 3. Fax 4. Computers with modems

Information education and communication materials

1. Posters 2.Screen 3.Megaphone 4.Projector (Movie)

5. Flipcharts or Image box 6.Other(specify):_____

Hygiene and sanitation materials

Spray pump

Disinfectant

List Protection materials _____ _____ _____

Satisfaction with surveillance system

1. Are you satisfied with the surveillance system?

1. Yes 2.No 3.Unknown 4.Not

2. If no, how cans the surveillance system will be improved? _____
3. What opportunities are there for integration of surveillance activities?_____

Chapter IV Health Profile Description

Health profile description of Lay-Armachiho District, North Gondar Zone, Amhara, Ethiopia, April 2013

Summary

Background: - Health profile is a collection of information about the characteristics of the community, the health resources within the community, data describing the community and the community's perceptions of health.

Objective: To assess and describe health and health related issues and to identify problems for priority setting in the district.

Methods: A descriptive cross sectional study has been conducted from April 20 - May 02, 2013 in Lay Armachiho district. Health and health related data was collected using standard check list by interviewing and reviewing medical records in the district. Data was analyzed by using excel.

Result: In the district there were 34 kebeles with a total population of 175,114 of these 88,079 (50%) of them were males and one kebele was urban. Contraceptive acceptance rate of the district was 51 and proportion of delivery by skilled birth attendance was 10% and by HEW was 14%. Malaria is endemic in the district which was the leading causes of outpatient visit of adults. 31 from 34 kebele were exposed for malaria, 164,494 populations were at risk of malaria and there were 4,190 total cases, 179 under 5 years old cases and no deaths. LLINs coverage of the district was 100% in 2013. There was quartum, RDT, and premaquen shortage during the assessment time. There was natural disaster on four kebeles. The disaster was heavy rain with hail and affects four kebeles. Latrine coverage of the district was 96% with utilization rate of 58% and solid as well as liquid management of the district was 96%.

Conclusion and recommendation

The leading causes of morbidity in the district were malaria and pneumonia for adult and under 5 Years old respectively. There was low proportion of skill birth attendance in the district. There

is a need for strong prevention and control mechanism on malaria. And an increase delivery by skill personnel should be promoted.

Introduction

Health profile is a collection of information about the characteristics of the community, the health resources within the community, data describing the community and the community's perceptions of health. It is vital for prioritizing prominent health and health related problems of the community at any level. It is basic for planning and for appropriate intervention; and is an entry point for operational research and it helps us to identify health issues and Priorities in the communities (1).

Country Health Profile provides an overview of the situation and trends of priority health problems and the health systems profile, including a description of institutional frameworks, trends in the national response, key issues and challenges. Its purpose is to promote evidence-based health policymaking through a comprehensive and rigorous analysis of the dynamics of health situations and health systems in the country (2).

Objective

General objective: - To assess and describe health and health related issues and to identify problems for priority setting.

Specific objectives

- To assess and describe health related issues
- To assess human resources of the District Health office
- To describe endemic diseases and its control and prevention program in the district
- To describe existing health system of the District
- To assess primary health care coverage of the District

Methods

Study area

Lay Armachiho District is located at a distance of 23km from Gondar town. The District has a total population of 175,114 of which males constitute 88,079 and females 87,035.

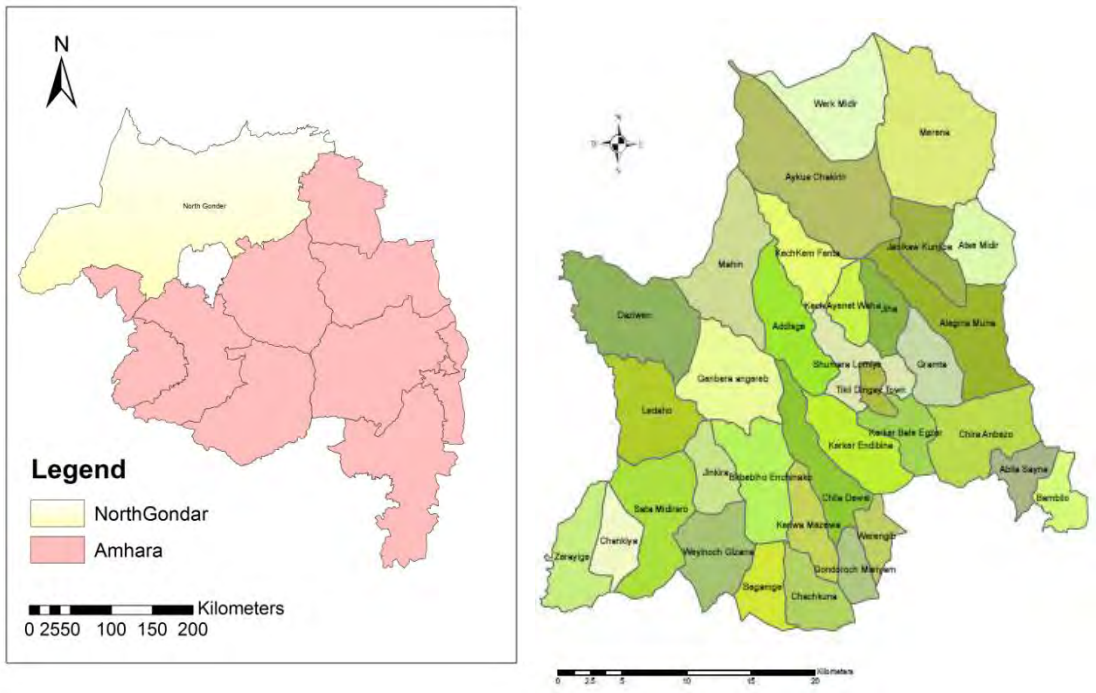

Figure 20: Map that locates Lay Armachiho District, Amhara, Ethiopia/2013

Study design and data collection method

A descriptive cross sectional study has been conducted from April 22 - May 02, 2013 in Lay Armachiho district. Data was collected from different sectors such as: -health office, education office, agriculture office, water resource office, municipality, administration offices and other offices by interview and reviewing documents standardized questionnaire and check list were used.

Result

Historical background and culture

Tikildingay is the capital of Lay -Armachiho district. Nearly 98% of the population is orthodox by religion and the remaining 2% Muslim and other religions. In the district, only Amhara ethnic group lives.

Geography and climate

Lay Armachiho District is located 23km North West of Gondar town. The district has the area of 129,272 square kilo meters with altitude range 980-2820 meters above sea level. Lay Armachiho district shares boarders with Tach Armachiho in the North, Chilga, and Denbya and Gondar town in the south, Wogera in the East and Tach Armachiho and Chilga in the West. The annual temperature ranges from 10-360c. Additionally, the annual average rain fall of the District reaches 1366mm and the climatic zone of the district is 62% woynadega, 32% kola and 7% de

Administrative and political organization

In the district there are 34 kebeles, out of these one kebele is urban and the rest rural. All sector offices are found in the district town namely Tikildingay

Socio demographic Information

Lay Armachiho district has a total population of 175,114 of these 88,079 of them are males and the rest were females with sex ratio of 1:1. From the total population 158,973 were living in rural areas and the remaining in urban areas. Out of the total population the number of less than 1 year, less than 5 years, less than 15 years, above 64 years, and women from 15-49 years old were 5,148, 23,591, 79,483, 5,768, and 40,877 respectively. The ethnic composition of the district was 100% Amhara.

Table 13: Population size of Lay Armachiho District by age group, sex, urban and rural, 2012/13

Population size of Lay Armachiho District by age group, sex, urban and rural, 2012/13

	Urban+ Rural			Urban			Rural		
Age group	Total	Male	Female	Total	Male	Female	Total	Male	Female
0-4	23,591	11,949	11,642	1,299	651	648	22,292	11,298	10,993
5-9	28,697	14,650	14,047	1,507	748	759	27,190	13,903	13,288
10-14	27,195	14,040	13,154	1,809	841	968	25,386	13,199	12,187
15-19	24,380	12,187	12,194	4,623	1,519	3,103	19,757	10,667	9,090
20-24	14,011	7,033	6,978	2,203	1,070	1,132	11,808	5,962	5,846
25-29	12,223	5,473	6,750	1,348	601	748	10,875	4,872	6,003
30-34	9,161	4,511	4,650	859	391	468	8,301	4,120	4,182
35-39	8,580	4,124	4,456	744	359	385	7,836	3,765	4,071
40-44	6,573	3,302	3,272	580	310	270	5,993	2,991	3,001
45-49	5,187	2,610	2,577	344	165	179	4,844	2,445	2,398
50-54	4,185	2,044	2,141	248	120	129	3,937	1,925	2,012
55-59	2,921	1,564	1,357	157	62	95	2,764	1,502	1,262
60-64	2,641	1,339	1,302	138	63	75	2,503	1,276	1,228
65-69	2,022	1,085	937	87	32	55	1,934	1,053	882
70-74	1,567	860	707	82	27	45	1,485	823	662
75-79	1,053	642	411	57	27	30	997	615	382
80-84	665	373	292	35	13	22	630	360	270
85-89	280	172	108	13	8	5	267	164	103
90-94	126	86	41	3	1	1	124	84	39
95+	55	36	19	6	4	3	48	32	16
Total	175,114	88,035	87,035	16,142	7,022	9,119	158,973	81,056	77,916

Source Lay Armachiho District health office.

The proportion of sex, under five years old, 5-15 years old and females with child bearing age (the age group of 15 - 49 years old) in the District was similar with other Districts, Zone, Region as well as the national level.

Facilities

The district town, Tikildingay has 24 hour power supply, mobile and cable based telephone office, one post office and one bank (commercial bank of Ethiopia). All kebeles of the district have network access but only three kebeles, Tikildingay, Musebanb and Chiranbezo have public transport access (main road) and the other 31 kebeles do not have public transport. On the other hand, except one kebele all have transport access for four wheel vehicles. All kebeles have safe water supply but three kebeles which have difficult topography do not get safe water as the other 31 kebeles. Total safe water coverage of the district was 63.6% of which 47% urban and 53% rural. Generally, 125,683 population of the district get safe water supply. Daily water consumption per day per person was 15L/day of which urban dwellers consume 20L/day and rural ones 15L/day. Only three kebeles of the district had 24 hour power supply.

The total income of the district in 2012 was 8,058,684 Ethiopian birr. The sources of the income were

- From agriculture 3,755,830
- From government employer 4,641,496
- From trade 506,907
- From different business 154,449

From 129,272 square km of the district 12,933 square km is cultivated area the other is used for farming 24,804 hectares and 11,436 hectares for grazing.

Education

Lay Armachiho district has one K.G., 55 primary, two secondary and one preparatory school. From the total 59 schools only 16 of them has water supply, 49 were with functional latrine and all of them had HIV and other health clubs. There are 40,257 total students of which 20,120 are

males and 20,137 females. School dropouts in six months of 2012/2013 were 1,138 males and 636 females. There are different reasons for the dropout.

- Moving out from the district,
- Marriage
- Religious(traditional) education
- Using the children for different activities
- Illness
- Death
- Transfer to other schools

1016(57%) of the dropout were from grade 1-4 and 758(43%) of them were grade 5-8. Males covered 1138(64%) of dropout and 1054(59%) of them were dropout due to their parents for using them for different activities (children abuse), 366(21%) leaving the district, 171(9.6%) transfer to other school, 142(8%) illness, 29(2%) marriage, 7(0.4%) death and 5(0.2%) religious education.

District health system

The health service coverage of the district was 100% of theses 59% health post, 26% clinic and 14% health centers. There are 8 government health centers, 2 government clinics which did not fulfill the criteria of health center, 13 private clinics, 34 health posts and three drug vendors. There is no any hospital and diagnostic laboratory in the district. There are total of 16 beds in 8 health centers but most of them do not give proper services for the society because of insufficient space. Health post to population ratio is 1:5150 and health center to population ratio is 1:2, 1889.

Table 14 : Type and number of health professional in Lay Armachiho District, N. Gondar, Amhara,Ethiopia/2013

No.	No.	Remark
8		9 more required
50 diploma	4 BSC	34 more required

9 diploma	1BSC	14 more required
6 technician	5 technologist	14 more required
12drugist	1 pharmacist	12 more required
6 BSC		2 more required
1		7 more required
76		

There is no physician in the district. Nurse to population ratio is 3:10,000; midwifery to population ratio was 5:100,000 and HEW to population ratio was 4:10,000. As mentioned on the above table there is shortage of man power in the district. Since all health professionals were not employed for the District as required by the standard the nurse and midwife population ratio was below the expected.

Immunization coverage

Table 15: Immunization coverage of Lay Armachiho District, Amhara, Ethiopia, 2012/13

S. No	Type vaccine	Coverage
1	Penta1	71%
2	Penta3	61%
3	BCG	47%
4	Measles	54%
5	Polio1	71%
6	Polio3	61%
7	TT2 pregnant women	39%
8	TT2 non pregnant women	9%

Maternal health service coverage

In 2013 contraceptive acceptance rate of the district is 51% and ANC rate (1st ANC) is 87% but there was no recorded data for 4th ANC rate. Proportion of delivery by skilled birth attendance was 10% and by HEW were 14

Leading causes of outpatient visit

Malaria is the leading cause of outpatient visit followed by acute febrile illness and pneumonia for adults, and pneumonia is the leading cause of morbidity followed by diarrhea and helmenthiasis for under five children in the district in 2013.

Table 16: Top ten leading causes of adult outpatient visit in Lay Armachiho, Amhara, Ethiopia, Jul/2012 to Mar/2013

S.No	Type of disease	No. of cases	Percent (%)
1	Malaria(PF confirmed	3460	17.5
2	AFI	2828	14.3
3	Pneumonia	2565	13
4	Dyspepsia	2379	12
5	Helmenthiasis	2291	12
6	AURI(acute upper respiratory infection)	2157	11
7	Malaria (other than PF)	1380	7
8	Trauma	1039	5.3
9	UTI	885	4.4
10	Unspecified infection parasitic disease	704	3.5

Table 17: Top ten leading causes of under five outpatient visit in Lay Armachiho, Amhara, Ethiopia, Jul 2012-Mar 2013

S.No.	Type of disease	Frequency	Percent (%)
1	Pneumonia	1258	30
2	Diarrhea(without blood)	719	17
3	Helmenthiasis	616	14.5
4	Acute urinary tract infection	508	12
5	AFI	347	8
6	Diarrhea with blood(dysentery)	235	5.5
7	Moderate acute malnutrition	23	0.5
8	Diarrhea with dehydration	210	5
9	Other unspecified infection	171	4
10	Infection of skin and subcutaneous tissue	151	3.5

Endemic disease

Malaria

Malaria is endemic in the district and 31 from 34 kebele are exposed for malaria. 164,494 populations are at risk of malaria and there were 4,190 total cases, 179 under 5 cases and no deaths. ITNS coverage of the district is 100% in 2013. There was quartum, RDT, and premaquen shortage.

Tuberculosis and leprosy

There were a total of 175, TB cases 37 PTB negative, and 38 extra pulmonary TB cases in the district. Total TB patients screened for HIV were 110 and 4 positive cases were found.

Table 18: Distribution of tuberculosis cases in Lay Armachiho, Amhara, Ethiopia, 2013

Indicator	Planned	Achievement	Percent
TB case detection rate	175	59	34
TB treatment success rate	40	36	90
TB cure rate	40	24	60
Defaulters		0	
TB treatment completion rate	40	12	30
Death on treatment		3	
Treatment failed		1	

HIV/AIDS

HIV incidence in the district was 73 per year. There were a total of 483 people living with HIV of these 170 were on ART and 323 on pre- ART.

From a total of 2,890 VCT users 33 were positive for HIV, from 7,933 PITC done 307 were positive for HIV and ten were positive for HIV out of 1,502 PMTCT users.

Nutrition, food shortage and disaster situation

There were 34 OTP sites and total admission to OTP per year was one in the district. In addition to this number of TSF program and CBN in the district was one

In the district, there was natural disaster for three consecutive years starting from 2010 up to 2012. The disaster was heavy rain with ice and the following four kebeles namely shumaraemuye, Aynetwuha, Adissge and Chiranbezo were affected. Before the disaster these kebeles were food secured, but now they couldn't afford it. There were human and animal injuries and deaths in each kebele but the exact numerical data was not obtained. The district disaster management and risk reduction office tried to rehabilitate and control the problem through HEWs and other health care professionals in collaboration with District Red Cross and zone disaster management and risk reduction office. And the following activities were performed such as:

- health care activities
- provision of food and cooking materials and,
- distribution of blankets

The residents asked for another settlement because the land is damaged by the disaster and they did not have capacity to prevent to the future. But there were no disease outbreak in the district for the last year.

Health budget allocation

Total budget allocated for the district by government was 46,539,835 from this budget allocated for health was 5, 193,530 (11%). This indicates there is shortage of budget allocation for health. World Bank, UNICEF and JICA are NGOs who support the district by different activities and supplies.

Health education

There is health education program for the community given by HEW and health care providers in health posts institutions, religious places, and during meeting time and about TB, HIV, malaria and personal and environmental hygiene to prevent diarrheal disease and others.

Environmental health and sanitation

Latrine coverage of the district was 96% with utilization rate of 58% and solid as well as liquid management of the district was 96%.

Essential drug and other supply

In the district there is shortage of essential drug and kits such as RDT, quartum, chloroquine, cloxaciline, amoxicillin suspension and ampiciline.

Discussion

The leading causes of outpatient visit in the district were malaria (P.F species) in adults and pneumonia in under five years old. There was no death reported in the district because the district health centers referred Chronic and critical cases to Gondar Referral hospital. Malaria was not included in ten top outpatient visits of children under five years old, but in other malarious Districts it is leading causes of outpatient visit for both adults, greater than five years old and children under five years old. This may be due to report problem of the District. There is shortage of man power in the District (3) which may be difficult to perform the required activities as planed and with good performance. In addition to this Immunization coverage, contraceptive acceptance rate, ANC, PMTCT and delivery by skill birth attendant and by HEWs of the District were below the target of HSDP IV (2, 3). Though LLINs distribution was 100% there was no data for utilization and there was shortage of supplies for malaria prevention and control activities. Though there is high latrine coverage in the District the utilization rate was low.

In the district there was natural disaster which is heavy rain with hail that damages four kebeles. The disaster affected crop, animal, house and there was also human injury. Before the disaster the kebeles were food secured but now there is food insecurity and there were 34 OTP sites and one TSF and CBN program in the district.

There was no diagnostic laboratory service in the district which is difficult to do all laboratory requested to be done from different clinics in the health center.

There was dropout of students in the district in six months of 2012/2013. More than 60% of them were males and. Most of the dropout was from grade 1-4.

Almost all the dropout was due to their parents, but from the total dropout 1054(59%) of the dropout was due to using them for different activities (children abuse), this is due to in the district most of the community are living in the rural area and are farmers who needs more power and males can perform different activities like farming, shepherding, and other labor activities than females. Dropout due to traditional (religious) education was 5(0.2%) which is very few compared to other reasons because even if they learn religious education they can also learn modern education at the same time.

Limitations

- Absence of mortality records in the district
- Unavailability of research done about health and health related issues in the district
- Absence of information about the historical background of the district

Conclusion and recommendation

The leading causes of morbidity in the district are malaria followed by acute febrile illness and pneumonia in adults and pneumonia followed by diarrhea and helmenthiasis in under five. Proportion of delivery by skill birth attendant and HEWs was low. Contraceptive acceptance rate, PMTCT, ANC and immunization coverage of the district was below the expected. Latrine utilization was also low. There is shortage of supplies for malaria prevention and control activities, and man power in the district.

Therefore prevention and control measures of morbidity by malaria, diarrhea and other priority diseases should be strengthen. Maternal and child health should be strengthening by increasing skill birth attendant, immunization coverage, ANC and PMTCT coverage. Utilization of latrine by the community should be promoted. District civil service office should employ staffs for the health sector. Supplies for malaria should be distributed by the Zonal health department on time.

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Annex IV

Annex 5Health profile checklist:

Region_____Zone_____District_____Respondant_____Interviewer____
_____

1. Historical back ground of the area

District Name_____

How & why the name given_____

How and when the District was formed_____

Any other historical aspect_____

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

District map_____

Location(distance) _____Direction _____

Altitude _____

Surface Area _____(_____% from the zone)

Town _____rural _____(land)

Geographical coordinate

Latitude _____

Longitude _____

Annual rain fall(average)_____

Annual temp(average)_____

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

District boundaries

North _____South_____

East _____Weast_____

3. Political and Administrative Organization

Total no. of kebeles:

rural_____ Urban_____

4. Population and Population structures

Demographic data

Total Population _____Male_____Female_____ sex ratio_____

Urban Total _____ Male_____Female_____

Rural Total _____ Male_____ Female_____

Population under 1yrs_____ 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 District/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

Ethnic/language

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

Religion

Orthodox _____ (_____ %), Muslim _____ (_____ %),

Protestant_____(_____%), Other _____ (_____ %)

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

Main income sources

Agriculture_____ Cultivated area_____

Grazing area_____ Cropping seasons_____

Land density_____

Livestock Truism Trade Other business

House hold income source

Agriculture_____ (No.) Government Employer_____(No.)

Private Employer_____(No.) Daily Laborer_____(No.)

Different business_____ (No.) Jobless _____ (No.)

Average Income_____

Education and school Health

1. Number of educational institution

K.G._____ Primarily School_____

Secondary_____ Preparatory_____

College/ University_____ TVET_____

2. Total School Age Children (target) _____

3. Total Enrolment _____Male _____Female_____

4. School dropout in year _____

5. If there is school dropout why _____

6. Educational status of the community

7. Total Educated people_____ Male_____ Female _____

8. Level of education Illiterate _____ Read and write _____

12 completed_____ Diploma _____Degree & above _____

School health activities:

9. Number of schools with water supply_____

10. Schools with functional latrines (male & female)_____

11. Schools with HIV/other Health clubs_____

Facilities

Transport

1. Accessibility (main roads)_____ _____

2. Type of road _____

3. How many kebeles have access to transportation _____

4. Flow of transportation per day_____

Telecommunication

1. How many people have access to fixed telephone?_____

2. How many people have access to mobile phone? (coverage)_____

3. How many kebeles have access to fixed telephone?_____

4. How many kebeles have access to mobile phone? (coverage)_____

Post Office_____

Bank_____

Power supply

1. How many house hold get power supply_____?

Water

1. Total safe water coverage _____ (___%)

2. Safe water supply coverage by kebele _____

3. Main source of water supply _____

4. Kebeles getting safe water____ (__ %)

5. Population getting safe water_____ (__ %)

6. Daily water consumption per day per person_____

Disaster situation in the District

1. Was there any disaster (natural or manmade) in the District in the last one year?_____

2. Any recent disease outbreak/other public health emergency_____

If yes cases_____ and deaths_____

Social situation:

1. Number of libraries_____

2. Number of NGO working on public health_____

3. Number of youth clubs_____

Health service institutions and infrastructure

S.NO	Type of health institution		No of institutions
1	Number of Hospitals	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	
2	Number of Health Centers	with sustainable/ 24 hour /electric power	
		without sustainable/ 24 hour /electric power	
		with telephone service (cable based/mobile)	
		without telephone service (cable based/mobile)	
		with piped water supply	
		Without piped water supply	
3	Number of Hospitals		
4	Number of Health centers		
5	Number of Health post		
6	Number of private clinics	Lower	
		Medium	
		Higher	
7	Number of Drug vendors		
8	Number of Drug stores		
9	Number of Pharmacies		
10	Number of 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

1. Total budget allocated for the district _____

2. Total budget allocated for health _____(____%)

3. Total budget allocated for emergency_____

4. Funds from NGO

Community Health Services;

1. Status of services provided by community health workers namely

No. of TBAs/TTBA_____ and their responsibility _____

No. of HDA_____ and their responsibility _____

Responsibility of HEWs _____

Others_____

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				

Child Health

A. Health centers providing IMNCI service_____

C. Live births weighing < 2500gm_____

B. Moderate malnutrition in < 3yrs_____

D. Severe malnutrition in < 3yrs_____

Health staff to population ratio:

A. Physicians (GP+ specialist)_____
B. Health officers_____
C. All Nurses_____ Mid-wife Nurses_____
D. Medical lab_____ Pharmacy_____, Env'tal _____Health education_____
E. Health extension workers_____
F. Other_____

Expected No of health staff based on BPR and the gap.

cause of the gap

No of Health posts full filled HEW

No of health posts access with telephone

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

1. Penta3 coverage _____

2. Measles coverage _____

3. Full Immunization Coverage_____

4. measles dropout rate_____

5. Penta3 dropout rate _____

6.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 & sanitation.

Latrine coverage_____ & utilization rate_____

Solid waste management_____

Liquid waste management _____

others_____

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
5	TB case detection rate			
6	TB treatment success rate			
7	TB treatment cure rate			
8	Defaulters			
	No of Leprosy cases			

B) MALARIA

S. No	Malaria cases		Adult		Under 5		Preg.	Total		M + F
			M	F	M	F		M	F	
2	Confirmed malaria cases	Pf								
		Pv								
		Mixed								
3	Admission cases due to malaria									
5	IRs coverage	Urban								

		Rural		
		Total		
6	Coverage of LLITN (1 LLITN/1.8 person)	Urban		
		Rural		
		Total		
5	LLITN utilization coverage	Urban		
		Rural		
		Total		

C) HIV/AIDS

HIV prevalence_____

HIV Incidence_____

VCT_____

PMTCT_____

PITC_____

Mothers who received NVP from those tested positive_____

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 & 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 District_____

CBN program_____ PSNP _____other_____

General food security condition_____

Essential drugs (shortage):-

_____

_____
_____
_____

20 .No of factory, Mechanism to control industrial wastes and the impact to health
_____
_____
_____
_____
_____
_____

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

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22. Problem Identification and Priority Setting – set priority health problems based on the public health importance, magnitude, seriousness, community concern, feasibility ----------
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23. Conclusions made about the health status of the District based on the findings

_____
_____
_____

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

_____
_____

Chapter V – Scientific Manuscripts for Peer reviewed Journal

5.1 Cutaneous leishmaniasis outbreak investigation in Ankesha District, Awi Zone, Amhara, Ethiopia

Summary

Back ground: - Cutaneous leishmaniasis (CL) is found in more than 80 countries in the world. It is under reported due to absence of surveillance system in middle and low income countries. An estimated 0.7 million to 1.3 million new cases occur worldwide annually. Ethiopia is one of the ten high burden countries for CL. It is endemic in the highlands of Ethiopia and more than 99.9% is caused by Leishmania aethiopica. CL is not reported in Ankesha District before. The community did not know the cause, transmission and prevention mechanism of CL; and discriminate the cases because they believe that the disease is due to sin.

Method:-We conducted age and sex matched Case control study with the ratio of 1:2 and collected data by face to face interview of cases and controls through semi structured questionnaires. Bivariate and multi variate analysis was done using epi info and SPSS.

Result:-Cases were clinically detected and confirmed by identification of Leishmania parasites on smears from lesions. 37 cases and no deaths were detected. 16 samples were positive by smear (13), and culture (10).The median age of the cases was 16 years old with a range of 3 to 66. Males and 10-19 years age group were most affected. The proximity of the house to the habitat of hyraxes and spent evening time outdoor had significantly associated with developing the disease.

Conclusion: - The presence of hyrax in the kebele was the risk factor. The identified risk factor in the area need further study. The presence of CL in Ankesha, that was not known to be endemic for the disease, indicates the need of leishmaniasis control program in the District to limit its expansion.

Introduction

Leishmaniasis is a vector born disease caused by protozoa parasite of genus Leishmania. The disease spread by the bite of sand fly. There are three main forms of leishmaniasis; visceral, cutaneous and mucocutaneous (1). Cutaneous leishmaniasis is the most common form of leishmaniasis and found in more than 80 countries in the world. An estimated 0.7 million to 1.3 million new cases occur worldwide annually (WHO 2013).

Rodents and hyraxes are reservoirs of cutaneous leishmaniasis. Hyraxes are main reservoir hosts of L. aethiopica in Ethiopia and Kenya (2). In humans, the incubation period for cutaneous leishmaniasis can be as short as 1-2 weeks or as long as several months up to three years (3).

Both CL and VL are growing health problems in Ethiopia with endemic areas that spread continually. According to the 2012 WHO global Leishmaniasis estimate, Ethiopia is one of the ten high burden countries for CL (1).

Three clinical forms of the disease are found in Ethiopia: LCL diffused cutaneous leishmaniasis (DCL) and mucocutaneous leishmaniasis (MCL. More than 99.9% of CL is caused by Leishmania aethiopica. No cutaneous leishmaniasis cases had ever been reported in Ankesha District before.

An effective strategy for reducing human leishmaniasis is to control sand fly vectors. A number of control methods are available, like chemicals, environmental management and personal protection (WHO 2010).

Leishmaniasis control has often been integrated with that of other vector borne diseases like malaria. IRS is the main methods for controlling sand flies. A recent study in Sudan and Morocco indicate a potentially strong reduction in leishmaniasis incidence following a community distribution of ITNs (2, 9). But control of animal reservoir through environmental management is expensive and difficult to implement (2).

Awi Zone health department sent a letter that explains the presence of unknown communicable skin disease as an outbreak. The disease attacks both sexes and all ages. The

cases were seen at health facility but the disease was different from the commonly found skin diseases in the District; the health center could not help them. As a result the ZHD ask Regional PHEM core process to investigate the unknown skin Disease condition by attaching with the pictures of cases. By observing this the Regional PHEM sent a team that constitutes physician, laboratory personnel (parasitologysit) and field epidemiology residents to investigate the epidemic.

Methods

Study design

Age and sex matched 1:2 Case control study design was used. We enroll controls from the community in which the cases came.

Data collection methods

Quantitative data

We collected data by interview of cases and controls using structured questionnaire. The cases were identified by case definition. Data of children who were unable to respond was taken from their mothers (care givers). All (37) cases and 74 controls were interviewed for their exposure status and socio demographic variables.

Case definition

Suspected case: Any person that have a single or multiple lesions that starts as a small red papule and enlarges gradually up to 2cm in diameter and forms nodules or ulcer.

Confirmed case: A suspected case confirmed by microscopy or culture

Laboratory investigation: skin slit was taken from the suspected cases having active lesion. 25 direct smear and 13 cultures was done.

Qualitative data collection

Discussion with the community

Discussion was made with key informants such as kebele administrations, priest, elders, women development army, cases and families of the cases. The discussion was to gather information about the occurrence of the disease previously, the presence of deforestation, the source of the disease, the availability of traditional medicine and the presence of risk factors to spread the disease.

Observation

Observational assessment like the occurrence of hyraxes in the compound of the church and the housing condition of cases and controls was made.

Data entry and analysis:- Data was entered into micro soft excel and Epi Info and analyzed using Epi Info and SPSS.

Result

Totally 37cases and no deaths were detected from November 06 to 09/2013 in Sositu Gimjabet kebele of Sinqua got. The median age of the cases was 16 years old with a range of 3 to 66. Out of 37 total cases 23 (62%) were males and 14 (38%) females. All cases were orthodox religion followers. The occupation of the cases were 18 (49%) and, 10 (27%) students and farmers respectively. The remaining 9 (24%) were house wife, self employed elders and children. 19(51%) of the cases were uneducated. 33 (89%) of the cases had a clinical presentation of localized Cutaneous leishmaniasis and the remaining 4(11%) cases had diffused Cutaneous leishmaniasis. All the cases came from one kebele called Sositu Gimjabet and the attack rate was 10/1000. All of the cases did not have travel history and the disease was not reported in that kebele as well as in the District before.

It was found that the age group 10-19 years old was the most (40.5%) affected and 20-29 years old were less (2.7%) affected age group. Around half 17(46%) of the cases were illiterate and only 2(5%) from the educated cases had an educational status of secondary school.

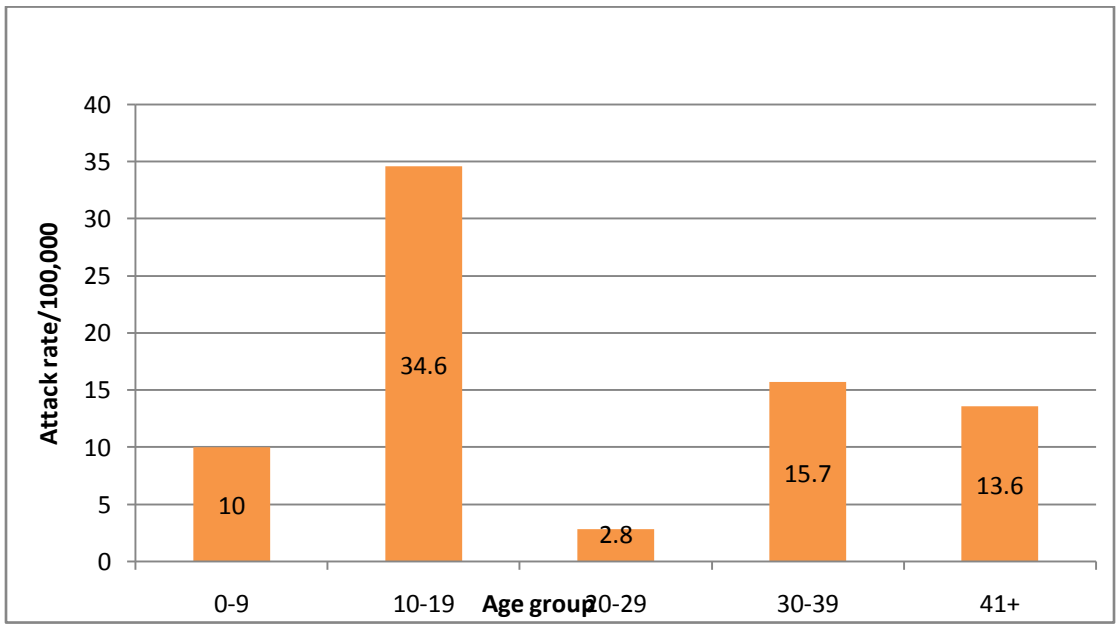

Figure 21: Age Specific attack rate of CL in Ankesha District, Awi Zone, Amhara, Ethiopia, October -2013

Two clinical form of CL were observed; localized cutaneous leishmaniasis (LCL) 33 (89%) and diffused cutaneous leishmaniasis (DCL) 4 (11%). All of CL lesions were observed on the exposed parts of the body such as the face and upper and lower limbs. Number of lesion ranged from 1 to multiple (4 and above). A single lesion was found in 10(27%) of the cases, greater than half 25 (67.5%) of the cases had 2-3 lesions and only 2 (5.5%) cases showed multiple (more than 3) lesion.

Table 19: Site of lesions of cutaneous leishmaniasis cases in Ankesha District, Awi Zone, Amhara, Ethiopia, October/2013

	Frequency	
Site of lesion	Number	Percent
Ear	5	13.5%
Eye	5	13.5%
Face	32	86.5%
Hand	9	24%
Leg	4	11%
Nose	18	49%

Laboratory result

Sample was taken from 25 suspected cases that have active skin lesion. Out of these direct smear was done for all (25) cases and 13 samples were cultured in Bahir Dar Regional laboratory. From the direct smear samples taken 13 were positive. 11 cultured samples from 13 samples cultured were positive. Among 11 cultures positive samples 8 were positive for both smear and culture and three samples were smears negative but positive for culture. 16 samples (13 by smear and 3 by culture only) were positive by smear and culture. PCR amplification was done in (AHRI) for positive cultured samples to identify the species that causes the outbreak and L. aethiopica was the causative agent of the outbreak.

Analytical investigation

Those individuals whose house is less than 2 Kms from the habitat of the Hyrax are 17(95% CI 6.2-45.8) times more likely to develop cutaneous leishmaniasis than individuals whose house is far from Habitat of Hyrax 2 kms and above. Individuals that stay most time outdoor are 10.8 (95% CI2.6-45.2) times more affected than those did not spent time outside door.

Table 20: Multi variate analysis of factors that have association with development of cutaneous leishmaniasis in Ankesha District, Awi Zone, Amhara, Ethiopia, October-2013

Variables	2	Case	Control	AOR(95%CI)	P value
Distance of hyrax from home	0-2 KM	30	15	17(6.2-45.8)	P<0.001
	>2KMs	7	59	1	
Hyrax moved to residence area	Yes	23	18	0.3(0.07-1.2)	P=0.09
	No	14	56	1	
Spent time outside the door	No	11	72	1	P=0.001
	Yes	29	31	10.8(2.6-45.2)	

Qualitative analysis

The disease is new and the community did not the cause, transmission and prevention of the disease. As a result they perceive that the disease is caused as a result of sin and the transmission is by direct contact of cases; they discriminate and stigmatize the cases.

There was a 48 years old men that had a lesion on his lip and said' I became infected because of my sin; I talk about the cases on my mouse". There was farming places near their house and the housing condition was comfortable for the entrance of sand flies that is doors and windows not screened.

Discussion

This study revealed that males were most affected than females which is similar with the study done in Al-jabal Al-gharbi Libya (14). However in other studies that were done in Addis Ababa, Ethiopia (6) both sexes were equally affected by the disease. Though all ages were affected 10-19 years age group were significantly affected and this is similar with the study done in Silti, Ethiopia (13). This could be due to that older people may be more resistant to the bites of sand flies than younger children and the young have more outdoor activities which more exposes to the bites of sand flies. Most of the cases had LCL and the lesion of majority of the cases were 2-3 and found on face of the cases which is similar with the study that was conducted in Addis Ababa, Ethiopia (13). We observed that houses of most cases were found closer to the church where the hyraxes live and it has stastically significantly association 16.9(95%CI, 6.2-45.8) with cases and it is similar with studies that was done in Silti and Addis Ababa, Ethiopia (6,13). Individuals that spent more time outdoor were more exposed by the disease than those not spent time outdoor with10.8 (95%CI 2.6-45.2). This may be that individuals that spent evening time outdoor are more exposed for the bite of sand fly than individuals that spent indoor.

Cutaneous leishmaniasis has not reported in Ankesha district previously. The community did not have awareness about the cause, transmission, prevention and treatment of the disease. The presence of hyraxes, sand flies, the housing condition and the presence of animal shelters

near the house makes the environment suitable for cutaneous Leishmaniasis to spread. Staying outdoors for long periods and till night times, proximity of houses to the residence of hyrax and the presence of hyrax in the compound increases the risk of encountering Leishmania infection. There is no integrated prevention mechanism with malaria, like using LLINs and IRS implementation in the District. Males and under 20 years old were more affected by CL.

District health office

- Should mobilize the community and create awareness about cause, transmission, and prevention and control mechanisms of the disease.
- Should trace cases in other kebeles.
- Cases should be treated to prevent further transmission
- Further investigation to verify presence of the vectors and reservoirs responsible for the transmission of the disease.

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Chapter VI Abstract for scientific presentation

6.1 Measles outbreak investigation in Dembia District, N. Gondar Zone, Amhara Ethiopia/2014

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Background: Background: Measles is one of the vaccine preventable diseases causing preventable morbidity and mortality among children in the World. Ethiopia established immunization program in 1980 and delivers service through fixed and outreach sites nationally. Measles vaccination coverage for Ethiopia indicates an increase from 37% (2000) to around 80% (2010). However, Measles account 3-6 % of childhood mortality in Ethiopia. The highest case-fatality rate happens in infants 6 to 11 months of age and malnutrition has the greater risk.

Method:-We conducted case control study with case control: ratio of 1:2. We collected data by face to face interview of cases and controls through semi structured questionnaires. We define cases using WHO case definition. Mothers /care givers were interviewed for children who cannot able to respond. Bivariate and multi variate analysis was done using epi info and SPSS.

Result: - 181 cases and no deaths were detected. 5 samples were sent for confirmation and all were IgM positive for measles. The median age of cases was 11 years (8 months to 35 years).Females and under 15 years age group were most affected. The overall attack rate of the District was 6/10,000. The attack rate of 0-4 and 5-14 years olds were 7.5/10,000 and 7.6/10,000 respectively. Being not vaccinated, contact with cases and the presence of cases in the house hold, neighbor and school were significantly associated with developing the disease.

Conclusion:-Most of the cases were unvaccinated school age children who had contact history with other measles case at school or with neighbors. This indicates that in addition to not vaccination, contact with cases increase transmission of the disease. Awareness creation for the community and at school is needed to limit the disease transmission during the outbreak time.

Key words: measles outbreak in Dembia, Ethiopia

6.2 cutaneous leishmaniasis outbreak investigations in Ankesha District, Awi Zone, Amhara, Ethiopia/2014

Abstract

Back ground: - Ethiopia is one of the ten high burden countries for cutaneous leishmaniasis. Cutaneous leishmaniasis is endemic in the highlands of Ethiopia and more than 99.9% is caused by Leishmania aethiopica. CL had not been reported in Ankesha District before.

Method:-We used an age and sex matched Case control (1:2) study design. We took 37 (all) cases and enroll 74 controls. We collected data by face to face interview of cases and controls through semi structured questionnaires. Cases were clinically detected and confirmed by identification of Leishmania parasites on smear and culture. We Performed bivariate and multi variate analysis.

Result:- 37 cases and no deaths were detected. 16 (43%) were laboratory confirmed and 21(57%) were epidemiologically linked cases. The median age of the cases was 16 years old (range from 3 to 66). Males and 10-19 years age group were most affected. PCR tests on human samples were positive for L.eathopica. Proximity of the house of cases to the habitat of hyraxes (OR: 17 (95%CI :(6.2-45.8)), and spending time outside, (OR: 10.8 (95%CI (2.6-45.2)) were statistically significantly associated with developing the disease.

Discussion: - The presence of hyrax in the kebele was the main risk factor. The presence of CL in Ankesha, that was not known to be endemic for the disease, indicates the need of leishmaniasis control program in the district to limit its expansion.

Key Word: - Cutaneous Leishmaniasis outbreak Ankesha, Ethiopia

6.3 Traffic accident data analysis from 2002 to 2004 of Amhara Region, Ethiopia

Abstract

Background: Road traffic accident is a major public health problem all over the world. According to Road Transport Authority of Ethiopia, in 2003, around 1,800 people died, and over 7,000 individuals suffered diff as a result of traffic accidents. In Amhara region from 1996-2001years more than 380 people died, about 706 people had suffered different degrees of bodily harm and there was a loss of property of Birr 24,074,974 each year because of traffic accident.

Method: - We obtained secondary data registered by police from Amhara region police commission which is found in Bahirdar. All data registered by police during 2002-2004 EC in Amhara Region was taken.

Result:-A total of 4460 cases were affected by traffic accident, 3225(72 %) were males. 2552 properties worth of birr ……..were destroyed due to traffic accident in the same year. There was a trend of gradual increase of traffic accident from year to year. Drivers, pedestrians, vehicle and road problems were registered as causes of the accidents. As registered by the police more than 75% cause of accident was drivers' problem like high speed, not respecting pedestrian first and not keeping right side drive. Above 90% of the accidents have occurred during day time, on straight and flat surface, in good asphalt, all weather condition and dry road. Different level bodily injured and a property loss of about 400 million Ethiopian Birr. Drivers who drive with high speed caused more than 70% of the accidents.

Conclusion: There was a trend of an increase in the number of accidents in subsequent years of the reviewed period. The result of the analyzed data indicates main reason of traffic accident was drivers fault. Intervention on drivers could decrease road traffic accident.

Chapter VII Narrative summary of Disaster situation Health Emergency Need Assessment

Narrative summary of Disaster situation Health Emergency Need Assessment in West Gojjam and Awi Zones, Amhara, Region, Ethiopia

Summary

There was no functional multi sectoral coordination forum in 4(67%) of the assessed Districts and except Ankesha District budget was not allocated for emergency in all assessed Districts

Except Quarit and Guagusa Districts with diarrhea and pneumonia leading cause of morbidity respectively in children under five years old malaria was the leading cause of morbidity both in under five and adult in all assessed Districts. Malaria, diarrhea, pneumonia, AFI, URTI, helmenthiasis, skin infection and trauma were top five leading causes of morbidity both in under five and adults.

There were no meningitis and AWD cases in all districts. A total 72,977 of malaria cases (56% from Awi Zone and 44%W/Gojjam) and 2 deaths (Jawi) and 13 (12Mecha, and 1Guagusa) measles case and no deaths were reported from all assessed Districts from January to May 2013. No outbreak was reported in the last three months in all districts, but there was malaria case buildup in all assessed districts. Malaria and water borne diseases (AWD) are anticipated by all the assessed zones and measles is the additional expected disease outbreak by Awi zone. The number of children and PLW screened for SAM and MAM during CHD shows increment of cases. 83% of Districts are malaria endemic and have breeding sites. All Districts have ITNs coverage of less than 80%. IRS coverage was above 89% in 50% of assessed Districts. The timeliness and completeness of PHEM and malaria reports shows improvement in all assessed Districts.

Objective:-To assess and identify public health emergency needs of the Zones.

Specific objectives

To assess and quantify the current capacity of the Districts health system to manage emergencies

To assess the type, magnitude and risk of epidemics of different public health emergencies of the most vulnerable Districts

Method

Awi and West Gojjam Zones were selected by the Region based on their malaria burden. The team discussed with Zonal health department and District health office heads about the assessment and its purpose. Six malarious Districts that have the history of malaria epidemic in 2012 and have malaria case build up during minor malaria transmission season of 2013, three from each Zone were selected by the Zonal health department. Data was collected by interviewing PHEM, malaria, EPI, hygiene and sanitation officers and store man of the assessed Zones and Districts using check list. Review of records and observation of posted information were also used for data collection. Finally briefing of the data we collected from the Districts and Zone for Zonal health department. The assessment was mainly focused on the available resources, supplies and drugs that uses for epidemic prone diseases like malaria, AWD, measles and meningitis. Vaccine coverage, ITNs coverage, training, supervision and review meeting were also assessed.

Result

Zonal level

Health

Coordination

Multi sectral coordination forum was established in W.Gojam Zone, not in Awi Zone. However, partners were not represented and the meeting was carried out during the presence of emergency.

Disease outbreak in the last three months

A total of 5182 (WHO week 45-48) malaria cases with no death were reported from Gonjikolela District of W/Gojjam zone in May 2013.

Ongoing outbreak

There was no ongoing outbreak report from the assessed zones.

Anticipated epidemics

Malaria and water borne diseases (AWD) are anticipated by all the assessed zones and measles is the additional expected disease outbreak by Awi zone.

Public Health emergency management

In all the assessed zones, there was public health emergency preparedness and response plan which is not funded. A total of 17 PHEM officers were trained on PHEM. Of which, 13 (76%) were from Awi zone. With respect to emergency drugs and supplies, only W/Gojjam has adequate coartem and chloroquine for malaria treatment and RDT for malaria test. Awi Zone reported nil stock for coartem. All Zones reported inadequate emergency drugs and supplies for AWD, meningitis and measles.

District level

Socio-demographic profile

A total of 6 Districts (Mecha, Quarit and Jabithenan from W/ Gojjam Zone and Ankesha, Guangua and Jawi from Awi Zone) were included in the assessment. Total population of 1,215,916 was covered by the assessment, (Table 1).

Table 21: Demographic characteristic of Awi and W.Gojjam Zones in Belg 2013 Amhara Region, Ethiopia

S.no	Zone	Districts	Total	Male	Female	Under 5	Women 15-49 years	Pregnant women
1	Awi	Ankesha Guagusa	221,796	110,259	111,537	29,942	52,787	7,097
2		Guangua	93,574	46,188	47,386	12,632	18,995	2,994
3		Jawi	88,024	43,571	44,453	11,883	20,756	2,817
4	W. Gojjam	Jabitehnan	191,473	95,644	95,829	25,849	45,188	6,127
5		Mecha	323,950	161,003	162,947	43,733	76,128	10,366
6		Quarit	99,493	62,588	36,905	17,047	23,461	3383

Health Profile

According to the assessment findings, malaria, diarrhea, pneumonia, acute febrile illness (AFI) and helmenthiasis were the leading cause of morbidity in children under five years of age. In adults above the age of five years old, malaria, pneumonia, acute febrile illness (AFI), URTI and helmenthiasis were reported to be the leading cause of morbidity in the year 2005(2012/13) in the visited Districts. Malaria was found to be the leading cause of morbidity of adults in all assessed Districts.

Morbidity and Mortality Data

Malaria

A total 72,977 of malaria cases (56% from Awi Zone and 44%W/Gojjam) and 2 deaths (Jawi) were reported from the assessed Districts of 2 Zones from January to May 2013. Of which, Ankesha District accounted for 32% followed by Jabitehnan (20.5%).All of the assessed Districts reported increased malaria cases in the minor malaria transmission season, March, April and May 2013.

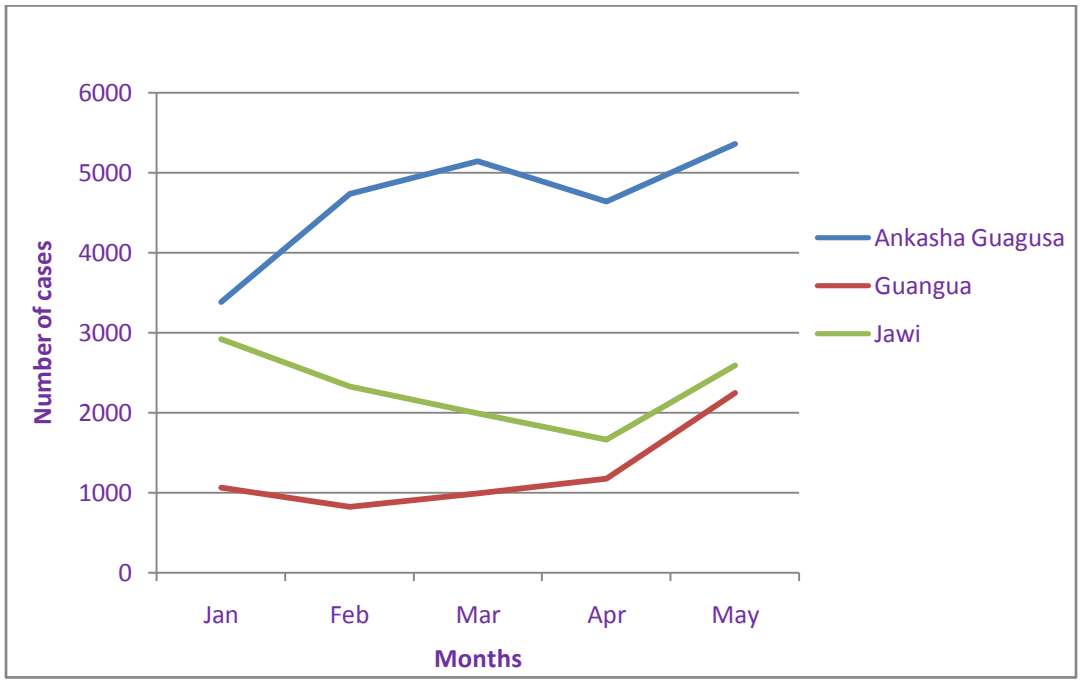

Figure 22: Malaria trend in Awi Zone, Amhara Region from January to May/2013

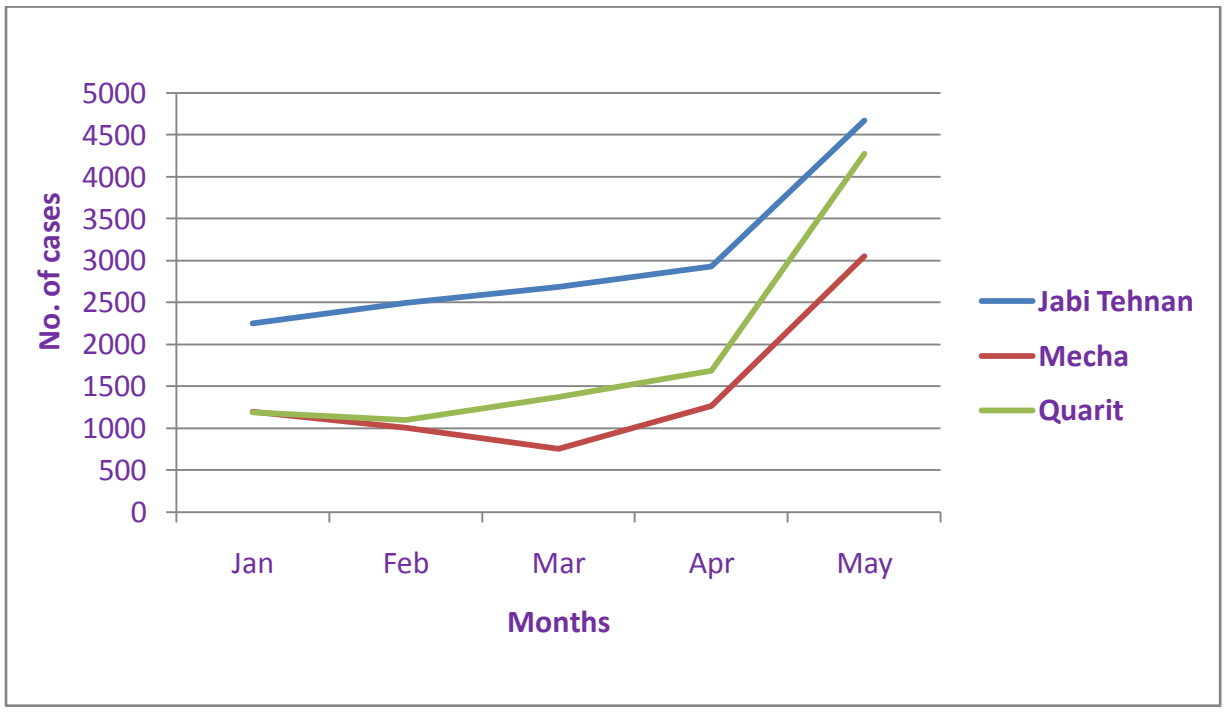

Figure 23: Malaria trend in W.Gojjam Zone, Amhara, from January to May/2013

Mealses

A total of 13 (12 from Mecha, and 1 from Guagusa) measles case and no deaths were reported from all assessed Districts from January to May 2013.

Other diseases

During the assessment time a total of 2,902 typhoid fever, epidemic typhus and dysentery cases were found in all districts of which, 1235 in Guagusa, 432 in Mecha, 504 in Jabitehnan, 261 in Jawi, 470 typhoid fever and dysentery in Ankesha districts from January to May 2013.

Outbreak

In the last three months (August – October 2012/2013)

There was no any outbreak in all assessed Districts during the last three months (August to October 2012/2013).

Emergency drugs and supplies for preparedness

No budget was allocated for emergency in all assessed districts. There were supplies on store of the Zones and districts only for malaria, though there was shortage of it. However, all Districts in the assessed two zones don't have supplies for measles, AWD and meningitis.

Coordination

Two (33%) of visited Districts (Ankesha and Mecha) have functional multi sectoral PHEM coordination forum. Jawi and Jabitehnan did have the forum but inactive and the other three Districts did not have the forum. In addition, every visited District has public health emergency preparedness and response plan but except one District (Ankesha, Awi Zone) all were not funded.

Risk Analysis

Malaria

Except Guagusa District in Awi zone, all the assessed Districts have malarious kebeles, breeding sites, interrupting rivers and unprotected irrigations. All Districts had LLINs coverage less than 80%. LLINs replacement was done only for mothers and children due to shortage of it in all Districts. In three (50%) malarious Districts IRS coverage was 89% and above. However, the coverage was 56% in Jabitehnan District of W/Gojjam and 60% in Ankesha District of Awi Zone. It was also found that except ITNs malaria prevention and control activities was improved in all visited Districts compared to last year of the same time. The Districts prevent outbreak of malaria and decrease cases of malaria by increasing IRS application and identifying, treating, drying and avoiding malaria breeding sites on time.

Meningitis

All the visited Districts did not reported meningitis epidemic in the last three months. However, most of them are in the meningitis risk zones, they did not conduct vaccination in the last three months and don't have meningitis guidelines. As to the training, health workers from health centers and hospitals in the assessed Districts didn't taken training on meningitis.

AWD

There was no AWD epidemic in the last three months in all assessed Districts. Most (63%) Districts are at risk of outbreak due to history of AWD in the years in different areas of the Zones, low safe and adequate water supply like Jawi, and Jabitehnan Districts and low latrine coverage and poor latrine utilization as well as reported diarrhea among the leading cause of morbidity in all assessed Districts.

Measles

Of the total assessed Districts, 2 Districts (Mecha in W/Gojjam and Guagusa in Awi reported measles coverage less than 85% in the year 2012/13. The assessment also identified that there was SIA in all the assessed Districts in 2013.

Nutrition

A total of 310 SAM (sever acute malnutrition) and 682 moderate malnutrition cases were in six Districts from January to May 2013.Most (69%) screened during CHD. Only three (37%) Districts had OTP sites but the remaining didn't have OTP sites because of unavailability of supplies though SAM cases were there. There was no SC in all assessed Districts. The Districts refer sever cases to nearby Hospitals. Quarit District reported 42% of the total SAM cases in the last six months. As the Head of the District and EPI officer of Quarit said there was no review meeting and capacity building activities on nutrition.

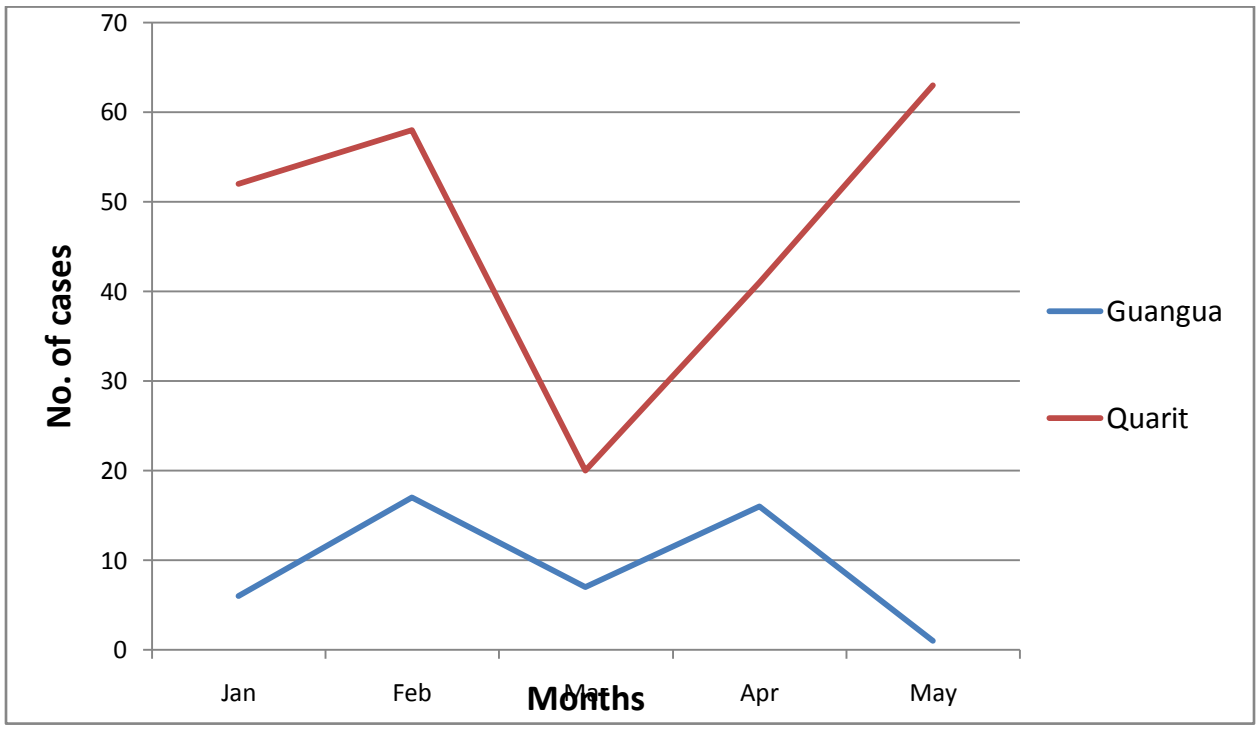

Figure 22: severe malnutrition cases in Awi Zone, Amhara, from January to May/2013

Timeliness and completness

The timliness and completness of PHEM and malaria reports shows improovement in all assessed Districts comparing to last year. All Districts had timless and completness of 80% and above from March to May 2012.

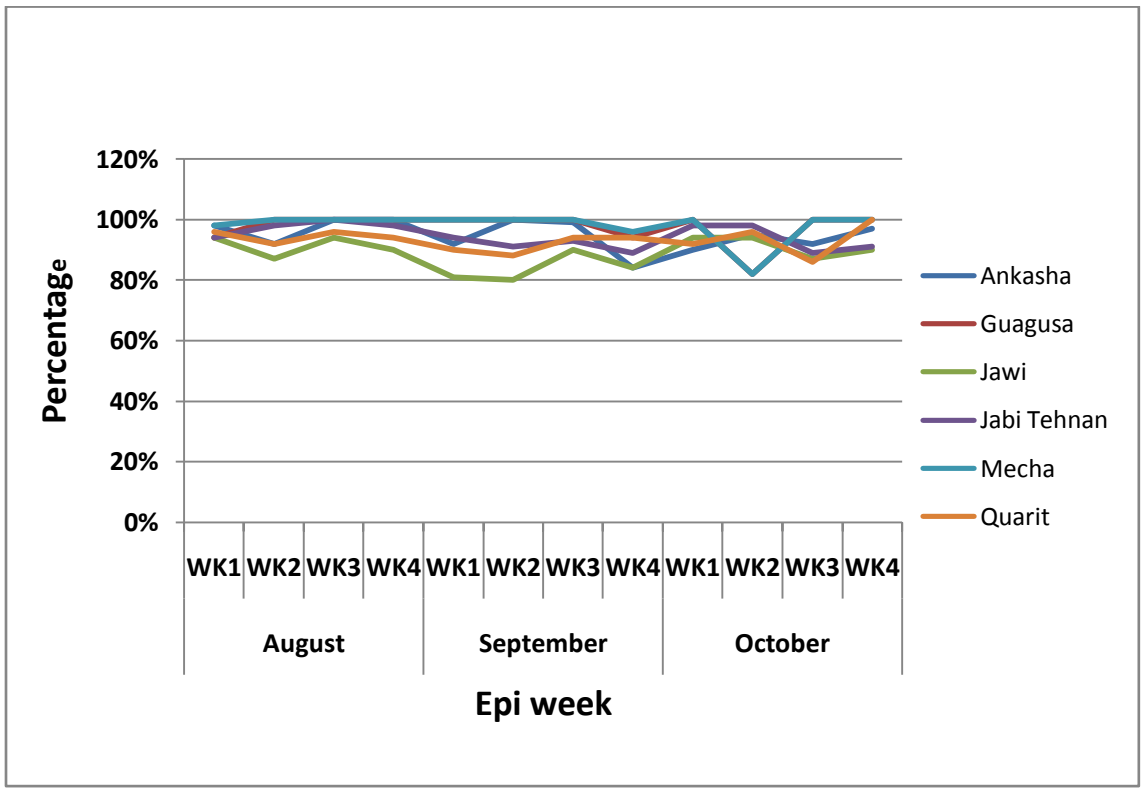

Figure 23: Malaria trend in W.Gojjam Zone, Amhara, from January to May/2013

The improovement of timeliness and completeness is that assignment of responsible persons (officers) at each level and increasing the capacity of the officers by training.

Discussion

Malaria was the primary public health problem both in adults above five years old and children under five years old in all assessed Districts. There was case build up of malaria in all assessed Districts but no outbreak from January to May 2013. The number of malaria cases decrease compared to the same time of last year. This is due to that prevention and control mechanism was done by identifying the mosquito breeding sites like Ayo River in Ankesha District of Awi Zone and increasing IRS coverage of the Districts. The river was interrupted for irrigation and it was the source of the outbreak last year (2012). This year (2013) the District identify and eliminate the larvae by using chemicals and decrease the mosquitoes by spraying chemicals in hot spot areas of the Districts. In addition to these there was no shortage of malaria supplies to detect and manage cases. In all assessed Districts there were no emergency drugs for AWD,

measles and meningitis. In Jawi District of Awi Zone since there is an investment and there are migrant workers and there is low (55) safe water coverage, measles, malaria and AWD is anticipated epidemics. But, there was no any budget for emergency. Timeliness and completeness of PHEM and malaria weekly report becomes improved in all assessed Districts. This is due to that the heads of District health office understand the usefulness of the program and assign officers at District levels. Additionally training was given for PHEM and malaria officers at District and health facility levels about data management and documentation. There was no SC in all Districts and only three (37%) Districts had OTP sites. Because of unavailability OTP and SCs it was difficult to treat SAM cases. SAM cases were referred to hospitals which is far and difficult to go. The main challenges in all assessed Districts were absence of budget for emergency, lack of man power during IRS, shortage of LLINs and unavailability of functional coordination forum and absence of OTP and SCs.

Conclusion and Recommendation

Malaria was the primary public health problem in the assessed Districts. The prevention and control mechanism of malaria was improved except LLINs coverage and utilization. Absence of emergency budget, OTP, SC and functional coordination forum were the main problems of the Districts. To improve the health status of the community and to control disease of epidemics, the Districts should allocate budget for emergency, Districts as well as partners should fund emergency preparedness plan, malaria prevention and control should be strengthen and OTP and SC sites should be there. Most (69%) of the SAM and MAM cases were screened during CHD, so to identify the cases such type of activities should be strengthen.

Chapter VIII Protocol/Proposal for Epidemiologic Research Project

Associated factors for low vaccination coverage and occurrence of measles outbreak in N.Gondar Zone, Amhara, Ethiopia, 2013/14

Abstract

Background: Measles account 4% of childhood mortality in Ethiopia. The country is implementing routine immunization of children aged 9 to 11 months, SIA, case based measles surveillance and case management through the provision of vitamin A to control and prevent measles. However, measles outbreak is occurring in Ethiopia particularly in Amhara. Measles outbreaks have been linked with low coverage of routine immunization and SIA, leading to critical build up of susceptible populations. Contrary to the link between measles outbreaks with unvaccination status, reports from some Districts of the Zone shows coverage level for measles vaccination to be as high as 100. Measles is found to be a major public health problem in Amhara Region, particularly in N.Gondar Zone in 2013/14. In the Zone 16 (73%) of the Districts were under measles outbreak. Therefore this study will be conducted to identify factors associated with the occurrence of the measles outbreak in N.Gondar Zone, Amhara, Ethiopia.

Methods: Unmatched case control study design will be carried out. Study population shall be children aged 6 months to 5 years who were cases of measles and the controls will be neighborhoods of the cases. In addition Zonal and District EPI officers and EPI focal persons at health facility level and HEWs will be interviewed about the cold chain and the overall system of the EPI service. The total numbers of study subjects which will be included in the study is 438; of these 146 are cases and 292 are controls and they will be selected by systematic random sampling technique using the line list as a sampling frame. The data will be collected using structured questionnaire by interviewing the children's parents or care givers EPI officers and focal persons and HEWs.

Time schedule: The study will be conducted from May to October 2014.

Total Cost: The total cost required to implement this project is. 4,767 USD.

INTRODUCTION

Back ground

Measles is a highly contagious respiratory viral disease. Characterized by fever, macula popular rash, cough conjunctivitis and runny nose. The incubation period of the disease ranges from 10 to 12 days. Measles is spread through contact with nose and throat secretions of infected people and through airborne droplets released when an infected person sneezes or coughs. Measles infected person is contagious from four days before to four days after the rash appears (1).

Measles remains the leading cause of childhood morbidity and mortality in the world despite the availability of safe, effective and relatively cost effective vaccine. Globally 227,245 cases and 122,000 deaths reported on the year 2012.Majority (95%) of deaths occurred in low income countries with weak health infrastructures (2).

Immunization coverage is one of the indicators used to monitor progress towards the achievement of MDG 4 and the reduction of childhood mortality. Routine measles vaccination for children combined with mass immunization campaigns in countries with high case and death rates are key public health strategies to reduce measles deaths.

In the setting of high routine measles vaccination coverage accumulation of susceptible through time is one of the factors of measles outbreak. However, high vaccination coverage of children's below the age of 15 years has led to reduction of measles cases by up to 99% in developed or industrialized countries. Developing countries are failing to achieve high vaccination coverage, hence frequent outbreaks of measles with high case fatalities as high as 3- 30% (3).

In Ethiopia measles is one of the vaccine preventable disease causing preventable morbidity and mortality in children. Measles account 4% of childhood mortality in Ethiopia (4). The country is adopting strategies to control and ultimately to eliminate measles by 2020 for the

achievement of this strategies the country is implementing routine immunization of children aged 9 to 11 months, case based measles surveillance and improving case management through the provision of vitamin A.

1.2 Statement of the problem

Outbreaks of vaccine preventable diseases have associated with low vaccination service. Measles outbreaks have been linked with low coverage of routine immunization and SIA, leading to critical build up of susceptible populations (8). Contrary to the link between measles outbreaks with unvaccination status, reports from some Districts of the Zone shows coverage level for measles vaccination to be as high as 100.

Measles is found to be a major public health problem in Amhara Region, particularly in N.Gondar Zone in 2013/14. In the Zone 16 (73%) of the Districts were under measles outbreak. The Zone reported 1200 cases from December 2013 to March 2014. The routine measles vaccination coverage of the Zone in 2014 was 75%.

1.3 Literature review

Different study showed a number of reasons for factors associated with measles outbreak. Consistent factors associated with measles transmission, morbidity and mortality were vaccination status, living condition, movement of refuges, nutritional status and effectiveness of control measures including vaccination campaigns, surveillance and security situations (9).

Case control study conducted in Kangra of Northern India revealed measles outbreak can be occurred in highly immunized area which had vaccination coverage above 90%. Inconsistent cold chain maintenance showed the risk factor for the failure of vaccine potency. In addition educational status of mother and time taken to reach the nearest health facility contributed to the occurrence of outbreak (3). Study conducted in India indicated that Poor cold chain maintenance and gaps in knowledge of health workers supplemented with beneficiary-related issues are the factors of the outbreaks in the area

The study carried out in Niger showed that maternal education and vaccination decrease the occurrence of measles (8). The study done in South Africa by WHO showed that HIV infection, low vaccination coverage and high population density were associated with an increased risk of measles outbreak. The main risk factor for measles outbreak in Burkinafaso was Lack of measles vaccination and reasons for not receiving measles vaccination were lack of knowledge about vaccination campaigns or need for measles vaccination and absence during vaccination outreach or campaign activities.

According to DHS 2011 survey report in Ethiopia revealed children whose mothers have secondary education are more likely to be fully immunized than those born to mothers with no education. Moreover another outbreak investigation conducted in Arsi zone, Oromia have shown that Un-vaccination, mothers' education and the number of family in a house hold (greater than five) revealed that increased susceptibility for measles infection (10).

In Ethiopia, vaccination is given on routine and outreach bases. The routine vaccinations services are given starting from birth expected to be completed before one year of life by all children.

1.4 Justification

Vaccination coverage figures of the Zone are available; however there is no information about factors affecting uptake of vaccination services and occurrence of outbreak in various areas of the Zone. In order to define priorities and plan and implement interventions that aim to improve getting of vaccination services and to prevent outbreak occurrence, community-based information about the determinants of not getting vaccination services and occurrence of outbreak in the Zone is needed. The aim of this study will be to assess the level of getting of measles vaccination services and the determinants of measles outbreak. Moreover factors associated with low uptake such as household factors, community, childhood will be assessed. The results obtained from this study will be used for program managers working with RCH services at National, Regional and district level to improve uptake of vaccination services and

prevent future outbreak. It is expected that these results will be incorporated when planning routine vaccination and supplementary immunization activities.

The outbreak causes morbidity and mortality in all age group especially in children. The possible risk factors associated with epidemic might be malnutrition, low vit. A distribution, poor cold chain management, distance of the HP from the house and lack of awareness of the community about the disease. However, there is no study that addresses the actual risk factors. In order to resolve this problem we proposed to study the possible risk factors associated with the occurrence repeated measles outbreak in N.Gondar Zone.

Conceptual Framework

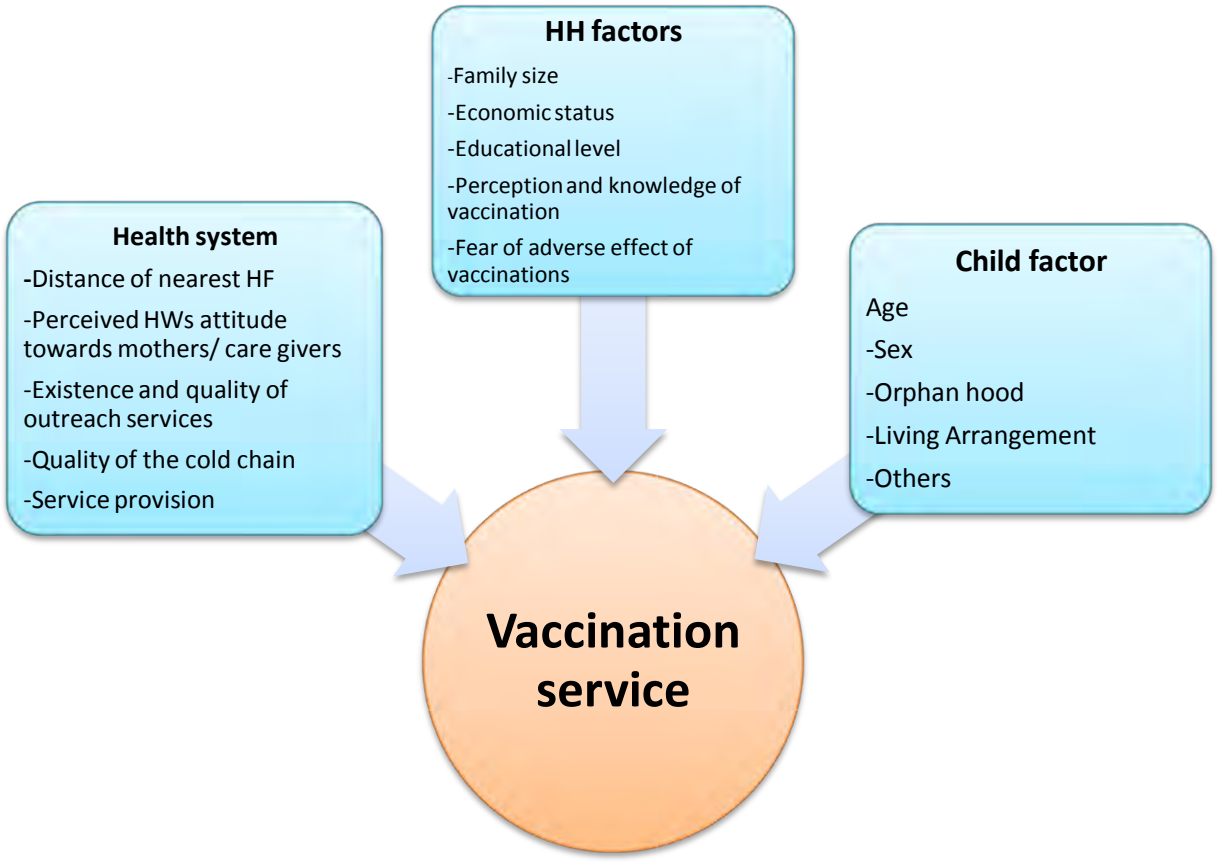

Figure 24 Conceptual framework of factors affecting vaccination services

Objective

General Objective:

To assess associated risk factors for the occurrence of measles, in N.Gondar Zone, Amhara, Ethiopia

Methods

Study design

- Case control study design will be conducted

Settings

Area: N.Gondar Zone is one of the 9 Zones found in Amhara Region. The zone is located 744 kms from Addis Ababa and 180 kms from Regional town, Bahirdar. It is the largest Zone in the Region with a population of 3,374,048 and 22 Districts. The zone has 566 HPs, 125 HCs and 2 hospitals. Most of the districts of the zone had difficult topography that is hard to reach areas. However, the accessible Districts were affected by the outbreak.

Source Population: children aged 6 months to 5 years who live in N.Gondar Zone.

Study population: Children aged 6 months to 5 years who were cases of measles and their controls live in the Zone. In addition Zonal and District EPI officers and EPI focal persons at health facility level and HEWs will be interviewed about the factors of low vaccination coverage.

Inclusion criteria: Children aged 6months to 5 years will be included in the study

Exclusion criteria: Children who were cases and change their address and children who have previous history for measles (in the control group) will not be included in the study.

Variables:

Dependant Variables: Measles (presence or absence)

Independent Variables:

- Age
- Sex

- Family size
- Monthly family income
- Educational status (parents or care takers/ respondents)
- Vaccination status
- Nutritional status
- Living condition

Operational definition

Educational level:

- **Illiterate**: person who cannot read and write
- **Primary**: person who complete 1-8 grade
- **Secondary**: person who complete high school (9-10 or 12) grade
- **Tertiary**: Person who complete college and above

Distance of health facility:

- **Far from health facility**: if person travel above five kilometer to get health facility
- **Near to health facility**: If a person travel less than five kilometer to access health facility

Family size:

- **Small family size**: A person who has 1-2 children
- **Medium family size**: A person who has 3-4 children
- **Large family size:** A person who has five and above children
- **Malnourish**: - Moderately and severely malnourished children will be included.

Vaccination status:

- **Vaccinated** :a person who were vaccinated for measles antigen
- **Not vaccinated**: a person who were not vaccinated for measles antigen

Sample size determination

Sample size was calculated based on the following assumptions

- Unmatched case control study (comparison of ILL and NOT ILL)
- Two sided confidence level : 95%
- Power : 90%
- Ratio of controls to cases : 1:2
- Percent of controls exposed : 55%
- Odds ratio : 2
- Percent of cases with exposure : 71%
- Cases =148
- Controls = 296
- Total = 444

Sampling method:

- ✓ Purposive sampling method will be used to enroll highly affected Districts.
- ✓ Simple random sampling method (use the line list as sample frame) will be applied to select cases.
- ✓ We will enroll the controls from the family or neighbors of the cases selected.

Ethical consideration

Ethical clearance will be obtained from the Ethical review board of Amhara Health Bureau. Communication with the different office administrators will be made through formal letter obtained from the regional Health Bureau. Supporting letter will also be obtained from N.Gondar Zone and selected district office of administration. After the purpose and objective of the study have been informed, verbal consent will be obtained from each study participants. Participants will also be informed that participation will be on voluntary basis and they can stop or leave from the participation at any time if they are not comfortable about the questionnaire. In order to keep confidentiality of any information provided by study subjects, the data

collection procedure will be anonymous and keeping their privacy during the interview by interviewing them alone.

Dissemination of results

The findings of the study will be forwarded to selected Districts, N.Gondar Zone health department, Amhara Region health bureau and for those governmental organizations and non-governmental organizations interested in the subject matter. An attempt will be made to present the findings in different conferences and workshops and will be sent to publication on scientific journals.

IV) Work plan

Table 22: work plan on factors associated measles outbreak investigation in N.Gondar Zone, Amhara, Ethiopia/2014

Major Activities	April,2014	May, 2014	June, 2014	July, 2014	August, 2014	Sept, 2014	Oct, 2014
Proposal submission							
Arranging administrative process							
Data collection (Field)							
Data entry							
Data analysis and							

interpretation							
Writing progress report							
Write up							
Submitting final report							

Budget

Table 23: budget break down

Item/Description	Quantity/Number	# of days	Price or (Rate per day) (USD)	Total cost (USD)	Remark
Perdium					
Principal investigator	1	30	20	600	
Consultant costs	1	10	20	200	
Field supervisors	5	10	15	750	Including training
Driver	1	30	10	300	
Data collectors	10(two / team)	15	8	1200	Including training

Rental of training site and equipment for training	1	2	300	600	
Local guider	5	6	10	300	One per team
Transportation					
Fuel cost	350 litters		1.5 per litter	525	Assuming to travel around 2125kms
Stationery					
writing pad	6		2	12	
Paper (A4 size)	4		5	20	
Blank WR-CD	3		1	3	
Printing and Photo copying				30	
			Sub- total	*4540*	
			Contingency (5%)	227	
			Grand total	*4,767*	

Table 24: Dummy table

Socio-demographic behavioral profiles	№ (%)
Age of child	

6 –12 months	
1-5 years	
Sex	
Male	
Female	
Residence	
Urban	
Rural	
Marital status of care taker	
Never married	
Married	
Separated	
Divorced	
Widowed	
Level of education of care taker	
No education	
Primary	
Secondary	
Tertiary	
Religion	

Muslim	
Orthodox	
Protestant	
Catholic	
Others	
Employment status	
Government employ	
Private employ	
Other	
Unemployment	

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Annex 6Annex Questionnaire on factors of measles outbreak in North Gondar Zone/Amhara, Ethiopia

101	Residence of the respondent	1.Rural 2.Urban	
102	Age of your child	___ Years	
103	What is your religion?	1. Orthodox 2. Muslim 3. Protestant 4. Catholic 5. Other	
104	What is your educational status?	Can't read & write Read and write only Primary school(1-8) Secondary(9-12) 12^{+1} and above	
105	How many children did you have	1.one - two 2.two-four 3.five and above	
106	What type of occupation you are currently engaged in?	1. house wife/house work	

		2. merchant 3. daily laborer 4. government employee 5. others	
107	How much is your family monthly income?	_____birr	
108	Do you have radio and/ or TV in your house?	1. radio only 2. TV only 3. both radio and TV 4. none	

Part Two: Questions Related to Risk factors for Measles occurrence

201	Did the child receive measles vaccine?	1. Yes 2. No	
202	If yes, for Q 201, at what age?	1. 9-11 months 2. 1- 2years 3. > 2 years	
203	If yes, for Q 201, evidenced by what?	1. EPI card 2. History	
204	Were there other persons with	1. Yes	

	symptoms of measles within the household?	2. No	
205	Were there other persons with symptoms of measles in the neighborhood?	1. Yes 2. No	
206	Have you measles infection in your life?	1. Yes 2. No	
207	Have you any contact with suspected /confirmed measles case?	1. Yes 2. No	
208	Did the child receive Vit.A at 6 months?	1. Yes 2. No	
209	Was the child on OTP?	1. Yes 2. No	

Part three; Questions Related to Knowledge, Attitude and Practice about vaccination

	Knowledge		
301	Have you ever heard of measles?	1. yes 2. no	

302	What is your source of information about occurrence of measles?	1. HEWs 2. Radio 3. TV 4. Health Center 5. Other (specify)	
303	For what reason do somebody vaccinate her/his child with measles vaccine?	1. to prevent measles disease 2. to prevent hunger 3. I don't know	
304	What is the right age of vaccinating the child with measles vaccine in Ethiopia?	1. 9 months 2. 6 months 3. 1 year 4. I don't know	
305	By what mechanism does the healthy child get measles disease from the sick child?	1. Droplet/through air 2. food 3. water	
	Attitude		
306	Do you think vaccination can prevent measles disease?	1. yes 2. no	
307	Do you think medical treatment helps	1. yes	

	measles patient?	2. no	
308	Do you believe that the child with rash should get medication?	1. yes 2. no	
	Practice		
309	What can somebody do if the child gets measles?	1. Taking to HFs 2. Taking to local healer 3. Keeping at home 4. I don't know	
310	What care can be given to measles patient at home?	1. Giving food/fluids 2. Giving local medication 3. Leaving alone 4. I don't know	
311	What can you do to prevent your family from measles disease?	1. Vaccinating 2. Giving local medication 3. Keeping at home 4. I don't know	
312	Would you isolate the child with measles rash from other children?	1. yes 2. no	

Chapter XI other additional output reports

Narrative summary on Regional laboratory of Amhara Region

Bahir-Dar regional health research laboratory center (BRHRLC) activities

Laboratory tiers in Ethiopia

- National reference laboratory/EHNRI/
- Regional health research laboratories
- Hospital laboratories
- Health center laboratories

Amhara Region has two regional laboratories found in Bahir Dar and Dessie cities. The Western part of the Region is covered by Bahirdar Regional laboratory where as the Dessie regional laboratory covered Eastern part of Amhara region. The laboratories are under the Regional Health bureau and the levels of laboratories are regional research laboratory.

Bahir Dar Regional Laboratory main activities

- Established in 1996
- Serve as the technical arm of the Amhara RHB
- Mandated for coordinating and strengthening the laboratory system in the region by providing public health services such as:
    - specialized referral diagnostic testing
    - surveillance for infectious and communicable diseases
    - outbreak investigation & emergency response
    - analysis of food and water
- Conduct research on the main public health threats
- Conduct disease surveillance for PHEM &other epidemic prone diseases

The laboratory has four core processes and one sub process. The core processes are laboratory capacity building core process, specialized Referral Diagnostics core process,

emergency management core process, Research and Technology transfer core process, and Finance purchasing and Administration sub process.

There are different departments under the institute like clinical chemistry, hematology, parasitology, micro biology, virology, serology and research and technology transfer. The laboratory performs different types of tests ranging from routine to sophisticated tests.

The main activities performed in the laboratory are the following

Laboratory capacity building core process

The following main activities performed under laboratory capacity building core process.

Quality control activities, Preparation of different laboratory reagents and distribute to laboratories which is found under it, Preparing and giving training for lower level laboratories, Supportive supervision, Laboratory manual and soap preparation.

Quality control activities

Internal and external quality control activities are under taken by the laboratory to identify the gaps on knowledge, skill and practice of technicians and to give onsite support and capacity building trainings. The quality control activities are performed in to three ways: onsite observation using standardized check list, proficiency testing and rechecking of the tests or slides done by the laboratories.

using standardized check list

- Checking the entire lab. test procedures
- Interview of laboratory personnel.
- Review of laboratory records and documents.
- Discussion with head of HF and the lab.
- Review of (IQC, Blinded rechecking, feedback, etc).
- Conduct coaching and mentoring

Monitors the laboratory process and ensures testing quality.

Blind rechecking

- A random selection of slides is collected from the routine lab. services.
- Sent to the reference laboratory for rechecking.
- Review technical procedures blindly by the first & second controller of the reference laboratory
- Review the test results blindly by mentor lab.
- Sent the feed back

Proficiency or panel test (PPT)

- Panels of specimens with known results are sent to multiple test sites by the reference lab.(Currently, we used for HIV rapid test)
- Test sits process panel samples blindly the same as routine samples
- Perform tests and report results to the reference lab.
- Results indicate quality of personnel performance and test site operations.
- Results are compared across several testing sites.

Current EQA targeted test areas

TB-Microscopy

✓ On-site Supervision

✓ Blinded rechecking

HIV-rapid test

✓ On-site Supervision

✓ Panel testing

Malaria

✓ Blinded rechecking

✓ On-site Supervision

Major challenges to conduct EQA regularly

- Limited participation of partners
- Panel preparation
- Rapid increase in number of participants laboratories
- Structural problem

Lack of vehicles for transportation

Specialized diagnosis service core process

There are different laboratory tests performed in the laboratory such as, Viral load, DNA PCR, and LPA, clinical chemistry analysis, clinical microbiology analysis, different hematological tests, CD4 count, hormone analysis (TSH,T3,T4), serological and immunological analysis, water and food analysis and parasitological tests.

Research core process

Development of research proposal and accomplish research activities, surveillance activities and conformation of epidemics are the main activities accomplished under the research core process.

Training activity undertaken

AFNET conference: I have participated in AFNET conference in Addis Ababa from November 7-22/2013. I got many experiences from the conference on public health interventions. In particular outbreak investigation methods and the way of presentation at scientific conference were the experiences I learn.

PHEM training: Public health emergency management (PHEM) training were given for PHEM officers of North Gondar Zone and District officers at Maksegnet town for 30 trainee in collaboration with regional health bureau , North Gondar zonal health department and Japan international cooperation agency (JAICA).

Bulletin Article

I participate on preparation of Public health emergency management weekly bulletin of the Region.