ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCE SCHOOL OF PUBLIC HEALTH

ETHIOPIAN FIELD EPIDEMIOLOGY TRAINING PROGRAM

Compiled Body of Works in Field Epidemiology

By Kidist Jifar

Thesis Submitted to Addis Ababa University, School of Public Health in Partial Fulfillment for the Degree of Master of Public Health in Field Epidemiology

Advisors - 1. Prof. Alemayehu Worku

2. Dr. Fufa Abunna

June, 2019

Addis Ababa, Ethiopia

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Ethiopia Field Epidemiology Training Program (EFETP)

School of Public Health, College of Health Sciences

Addis Ababa University

Approval by Examining Board

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Chairman, School Graduate Committee

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Advisor

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Advisor

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Examiner

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Examiner

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Abbreviations/Acronyms

AOR	Adjusted Odd Ratio
AR	Attack Rate
AFP	Acute Flaccid Paralysis
AIDS	Acquire Immuno -Deficiency Syndrome
ANC	Antenatal Care
Arc GIS	Architectural Geographic Information System
ART	Anti-Retroviral Therapy
AWD	Acute Watery Diarrhea
CI	Confidence Interval
CMAM	Community based management of acute malnutrition
COR	Crude Odd Ratio
DRMFSS	Disaster Risk Management and Food Security Sector
E.C	Ethiopian Calendar
EDHS	Ethiopian Demographic Health Survey
EFETP	Ethiopian Field Epidemiology Training Program
EFMOH	Ethiopian Federal Ministry of Health
EPRP	Emergency preparedness and response plan
ETB	Ethiopian Birr
FAO	Food and Agricultural Organization
G. C	Gregorian calendar
GPEI	Global Polio Eradication Initiative
HC	Health Center
HIV	Human Immunodeficiency Virus
HP	Health Post
IDP	Internally Displaced Persons
IMR	Infant Mortality Rate
IRS	Indoor Residual Spray
ITN	Insecticide Treated Nets
LLIN	Long Lasting Insecticide Nets
MCH	Maternal and Child Health
NPENT	Non Polio Intro virus
OPD	Outpatient Department
OR	Odd Ratio
ORS	Oral Rehydration solution
OTP	Outpatient Treatment Program
PEI	Polio Eradication Initiative
PHEM	Public Health Emergency Management
PICT	Provider Initiated Counseling Testing
RDT	Rapid Diagnostic Test

RHB	Regional Health Bureau
RRT	Rapid Response Team
SAM	Sever Acute Malnutrition
SC	Stabilization Center
SIA	Supplement Immunization Activity
SIA	Supplementary immunization activities
SNNPR	South Nations Nationality People Region
TB	Tuberculosis
TSFP	Target Supplementary Feeding Program
UNICEF	United Nations children's emergency fund
VCT	Voluntary Counseling and Testing
VDPV	Vaccine Derived Polio Virus
WHO	World Health Organization

Chapter One- Outbreak Investigation

1.1 Dysentery outbreak investigation in Mizan Tepi University, Bench-Maji Zone, SNNPR, Ethiopia 2019

Abstract

Introduction: Dysentery is an infectious gastrointestinal disorder, characterized by inflammation of the intestines, mainly the large intestine *Shigella flexneri* is the most common cause of bloody diarrhea. We investigated dysentery to describe cases, identify risk factors and implement intervention in Mizan Tepi University.

Methods: Unmatched 1:2 case control design was used from January 29/2019 to February, 14/2019. Data was collected using structured questionnaire, analysis was carried out by using SPSS version 20. Scale map displayed by using Arc GIS 10.2. Drinking water sample was also collected for Microbiological test and isolate the species. To measure the significance of association we used binary logistic regression and results were reported as odds ratio and 95% CI

Result: A total of 50 cases (AR: 9.3/1000 Population) with zero death of bloody diarrhea were identified from January 29/2019 to February, 14/2019. The mean age of cases was 21(SD $\pm$ 1.4), whereas their age ranged from 18 to 26 years. Male accounted 33 (66%). Contact with dysentery cases [AOR 6.3(95% CI 5.164_15.123) and absence of detergent for hand wash [AOR 5.4 (95% CI (1.946_14.839) was identified as risk factors. On the other hand, boiling water for drinking and proper hand washing after visiting toilet found to be protective with [AOR 0.10 (95% CI 0.012_0.945)] and [AOR 0.25 (95% CI 0.086_0.742)] respectively.

Conclusions: Common source outbreak was identified, absence of detergent and contact with dysentery case was identified as risk factors.

Recommendations: We recommend to the university to improve awareness on personal hygiene including use of detergents for hand wash. We also recommend latrine facilities should be made operational with functional water supply.

Key Word: Dysentery, Outbreak, Mizan Tepi University, Ethiopia, 2019.

Introduction

Dysentery is an infectious gastrointestinal disorder, characterized by inflammation of the intestines, mainly the large intestine(1). World Health Organization (WHO) defines dysentery as any episode of diarrhea with blood. *Shigella flexneri* is the most common cause of bloody diarrhea. The main dysentery signs and symptoms are pain and cramping in the lower abdominal region, pass stool mixed with blood and high body temperatures is the most common in dysentery. Dysentery with fever is quite common in children(2). Large-scale outbreak may be caused by *Shigella flexneri*. The incubation period of *Shigella flexneri* is from 1 to 4 days. Dysentery can mainly spread among people through contaminated food and water as well as poor sanitation(3).

Dysentery is endemic throughout the world. More than one million people are estimated to die and 165 million cases from *Shigella* infection each year(4). Children and immune compromised persons are prone to the infection. The mortality rate is greater in children younger than 5 years of age in Asia(5). About 99 % of infections caused by *Shigella* occur in developing countries, and the majority of cases (~70%), and of deaths (~60%), occur among children less than five years of age(6). In the past two decades major outbreaks have occurred in Africa, South Asia and Central America(7). Diarrhea is the second most common cause of death among children <5 years of age worldwide, accounting for 1.87 million deaths per year. Globally 21% of all deaths in children less than five years of age are estimated to be due to diarrheal infections(8). The annual incidence rate of shigellosis in Bangladesh has been reported to be as high as 13.2 cases per 1,000 children less than five years age(9).

In Africa, an estimate of 115 people dies of diarrheal diseases every hour, mostly Cause by *shigellosis* and *salmonellosis*. There are four species of *Shigell*a, which includes *S. dysenter*, *S. flexneri*, *S. boydii* and *S. sonnei.* From this species *S. dysenter* and *S. flexneri* more common in developing country(4). High burden dysentery in developing countries where there is an increased misuse of antimicrobial agents, diagnostic challenges due to lack of adequate facilities, there is limited awareness of the prevalence of infections and prevention methods(10).

In Ethiopia, one in every 17 Ethiopian children dies under one year age and one in every 11 children dies under five years age. According to the Ethiopian demographic and health survey (EDHS) report of 2011, 3% had diarrhea with blood in to the two-week periods before the survey (4). There were different prevalence rates in different regions. A study conducted in Gondar on

children with diarrhea isolated Shigella species with prevalence of 5.2%. Another related study conducted in Jimma also reported an isolation rate 5.8%. A total of 345 among food handlers participate in Arba Minch University for stool examination of whom, stool cultures reveal 3% *Shigella* isolate(11) and also isolated from 34.6% of the patients who attended health facilities in Hawassa(12).

Investigation of dysentery outbreak was carried out in Mizan Tepi University, Bench-Maji zone, SNNPR following the notification from the Zonal PHEM. The aim of undertaking the investigation was to confirm presence of an outbreak, to identify the causative agents, to identify source of the epidemic, to assess the extent of the outbreak in terms of person, place and time affected area and geographic spread of an outbreak, to identify contributing factors for the spread of the epidemic.

Objectives

General objective

To investigate the outbreak and identify risk factors in Mizan Tepi University, Bench-maji zone, SNNPR, Ethiopia, 2019

Specific objectives

- To confirm the presence of outbreak
- To identify the causative agent
- To describe the outbreak in terms of place person, and time

Materials and Methods

Study area and Study period

The outbreak investigation was conducted in Mizan Tepi University, mizan town of Bench maji Zone, SNNPR, Ethiopia, from January 29/2019 to 14th of february,2019. Mizan Tepi university is one of the public University in Ethiopia established in 2006 at the coordinates of 6°58'5"N 35°34'5"E. The university located at 855Km far from Western part of the southern nation nationalities people regional city (Hawassa) and 583 Km far from capital city Addis Ababa. The University had a total of 5412 students in 2019 G.C, of these 3308 (61.1%) were males, whereas 2104 (38.8%) were females. The study was conducted from January 29/2019 to 14th of February, 2019.

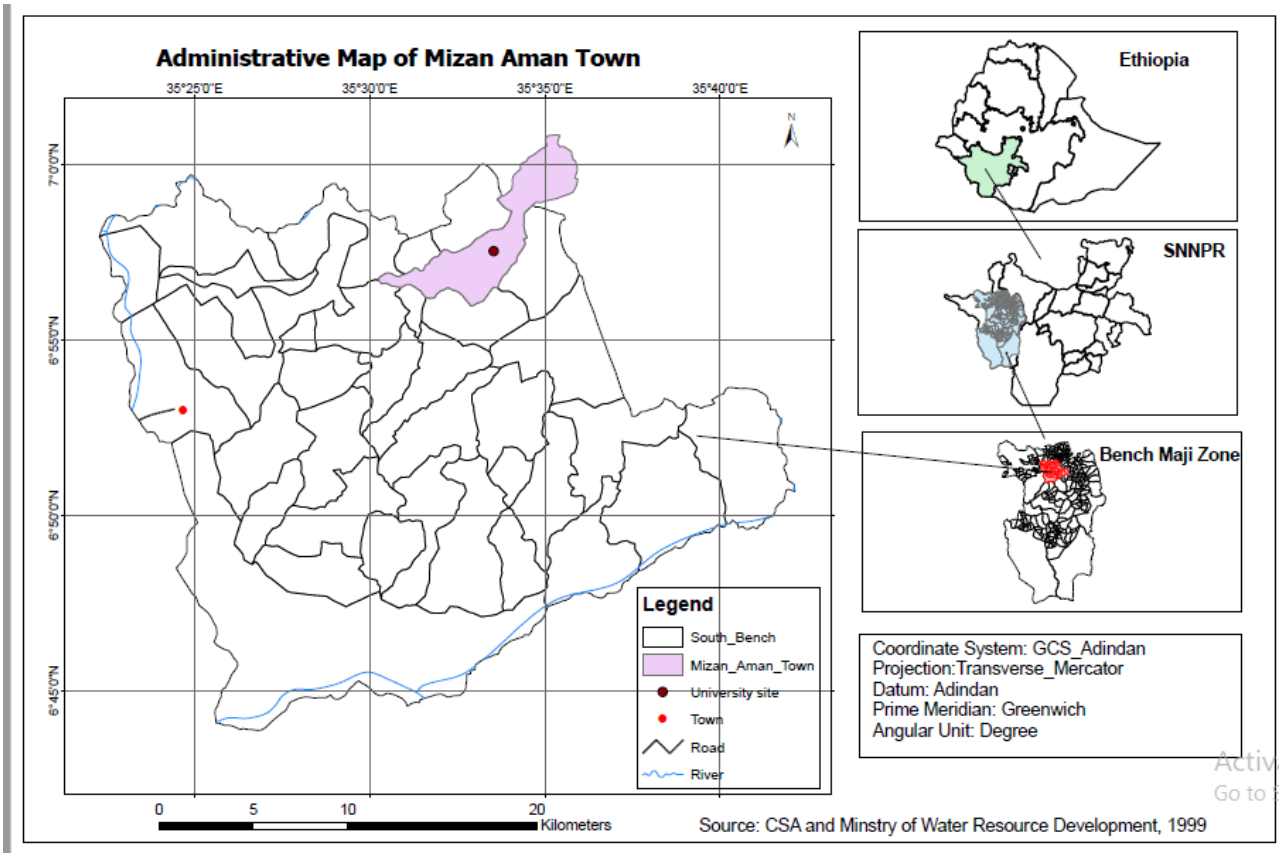

Figure 1: Administrative map of Mizan town

Study Design

Both descriptive and case- control study design was conducted. Dysentery cases were reported by using line-lists compiled by the zonal health department of PHEM core process. We used the national PHEM guide line case definition of a suspected dysentery case in an outbreak setting- in an area where there was a dysentery epidemic, a patient that develops dysentery, with or without abdominal cramp (2).Controls without symptoms of dysentery taken from the students in the university. The selection of cases and controls made conveniently (unmatched). A total of 50 Cases and 100 controls were interviewed with standard questionnaire, which made the ratio of case to control was 1:2

Target population

All students in Mizan-Tepi University where cases and controls recruited

Study population

Those all cases developed signs and symptom of dysentery were enrolled as "cases" while those without sign and symptom, living in the same room or compound were enrolled as "controls".

Inclusion and Exclusion criteria

Inclusion Criteria

Cases: All 50 dysentery cases sent by line list that had symptoms of diarrhea (mucoid or bloody diarrhea, fever, and abdominal cramps) who agreed to participate in the study were included.

Controls: Any students of the University during the study period who shared the same room or compound to a case and who did not develop signs and symptoms of dysentery and agreed to participate were included.

Exclusion criteria

Those **Cases** and **Controls** who refused to participate in the study were excluded and others staffs of the university rather than the students also excluded.

Standard case definitions

Suspected case: A person with diarrhea with visible blood in stool

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

Data collection method

We obtained line list data from zonal health department PHEM core process**.** Both quantitative and qualitative data were collected through interview, observation, discussion, report (line list) reviews and using standard questioner to collect data of case and control. Selected cases and controls were recruited from the same room or compound. Data was collected by principal investigator including regional, zonal and district PHEM officers and sample were taken by regional laboratory technician.

Laboratory Investigation

Water sample were collected and transported to EPHI (Ethiopian public health institute) microbiology laboratory keeping in cold chain for bacteriological analysis using standard water sampling procedure. Samples were taken from Pipe water and River (shonga).

Environmental Investigation

Environmental assessment was undertaken in the compound, specifically in food preparation area, water access sources, latrine facilities, bathing and washing facility and solid waste disposal area. A team of investigators inspected the hygiene and sanitation of the university community.

Data quality control

Collected data was verified daily during the investigation period and in addition to this when entering the data in to the computer by using Epi-Info version7 software, the missing variables and consistency of filling of questionnaires and completeness of data was checked out carefully.

Data entry and Analysis

Descriptive analysis was performed using univariate statistics to report means and standard deviation (SDs) for continuous variables and frequency for the categorical variables. Proportion and summary statistics for dependents and independents variable were generated before cross-tabulation were made. Chi-square test were used to determine the association between categorical variables and Fisher exact test was used for statistical test. Bivariate and multivariable binary logistic regression was performed to describe test for interaction, relationship and crude odd ratio (COR) and adjusted odd ratio (AOR) for the association of each selected independent variables with utilization of latrine while controlling of other variables. The significance level was defined as a p-value of less than 0.05. *Bivariate* and *Multivariable* logistic

regression analysis was applied. Results were displayed using maps, tables and graphs and it was interpreted using Odd Ratio (OR), P-value < 0.05 and 95% Confidence Interval (CI).

Ethical issue

Support letter was written from regional health bureau and we obtained support and willingness to conduct the study from zonal health department. The purpose of the investigation was clearly explained for all respondents. The current study was conducted as epidemic monitoring activity of the Regional health bureau. As a result, ethical clearance was not processed.

Results

Descriptive Epidemiology

A total of 50 cases with zero death of bloody diarrhea were identified from late of January 29/ 2019 to February 14, 2019. The number of cases were increased from February 2 _6/2019. As it described in (Figure 2), out of the total of 50 dysentery cases about 33(66%) students were males and 17 (34%) were females with the mean age of 21 (SD ±1.4) while their crude age was ranged between 18 to 26 years old. Meanwhile about 100% of cases and 95% of control were single in terms of marital status.

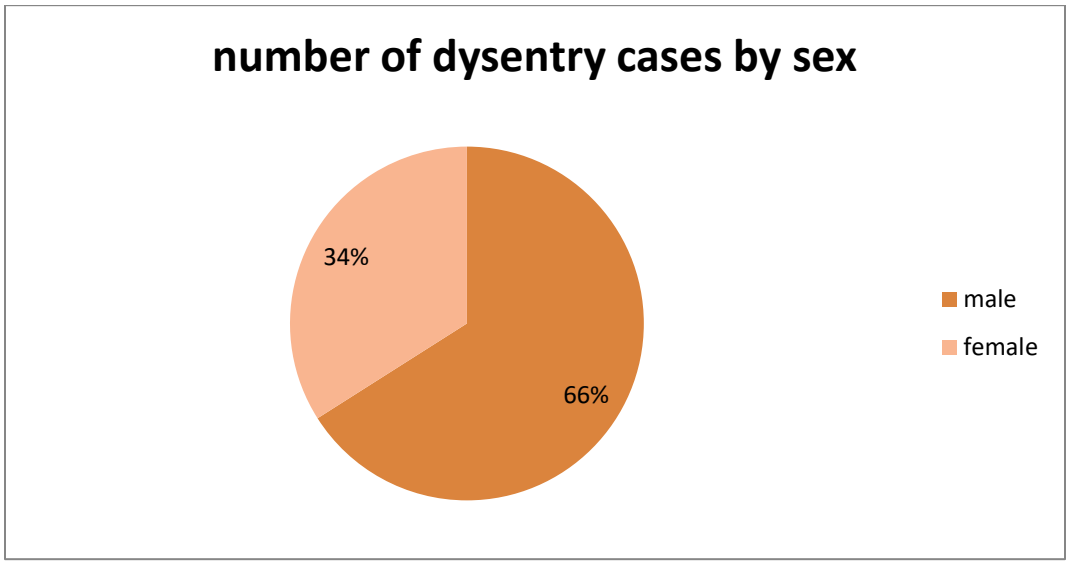

Figure 2: Total distribution of Dysentery Case by Sex in Mizan Tepi University, Bench-Maji zone, SNNPR, Ethiopia, 2019

Regarding clinical manifestation, the majority of students presented with the symptoms of mucoid/bloody diarrhea (100%), abdominal cramp (96%), fever (54%) and Nausea and vomiting (28%) (Table 1:). All cases were students and they were from different departments, years of study and living areas (blocks) in the campus. Majority of cases 42 % (29, 50) were presented from Agricultural department, while Social science department health science department and FBE department an average number of cases were remained 8 as it is illustrated in (Figure3) The number of students reside in one room ranged between 3_8 students per a single dormitory.

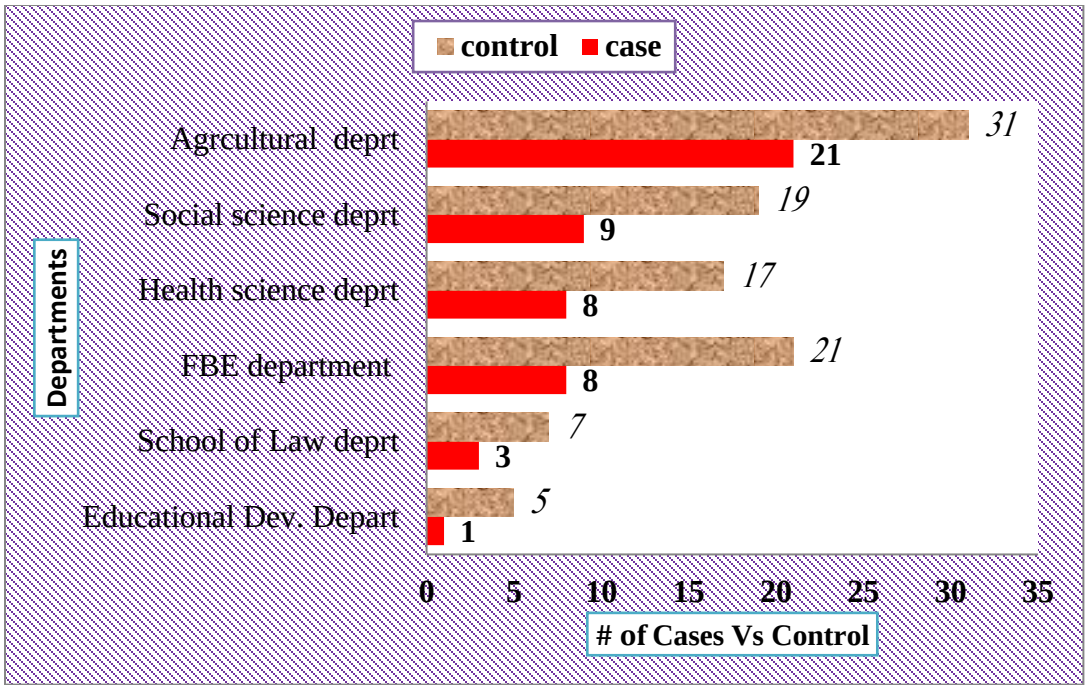

Figure 3: Distribution of Dysentery Cases vs. Control by department, in Mizan Tepi University, Bench-Maji zone, SNNPR, Ethiopia, 2019

Attack rate was calculated as "number of all cases over the number of all students during the occurrence of current dysentery outbreak in Mizan Tepi University". From morbidity data as a whole, overall attack rate (AR) of the cases were estimated to be 9.3 cases per 1,000 populations, however it found to be varies with gender. Attack rate observed among male students was higher than the female students, while affected ratio male to female was approximately 1:2.

Table 1: Clinical Symptoms of cases in Mizan Tepi University, Bench-Maji zone, SNNPR Ethiopia, 2019

Signs and Symptoms	Frequency	%
Diarrhea (Mucoid or Bloody)	50	100%
Vomiting	10	20%
Fever	27	54%
Nausea	14	28%
Abdominal cramp	48	96%

The date of onset of the primary case was verified on January 29/2019. The index case was 23 years old male who came from Agriculture department. When he came to the university clinic, presented with typical sign and symptom of bacillary dysentery. The highest cases were

registered on February, 04/ 2019. The information obtained from the index cases was not found to be different from other cases in having any recent travel history, feeding and drinking outside the compound. Among cases and control, about 40(80%) of cases and 82(82%) of control ate their meal in the compound, while 10% and 8% of cases and control ate their meal outside the compound.

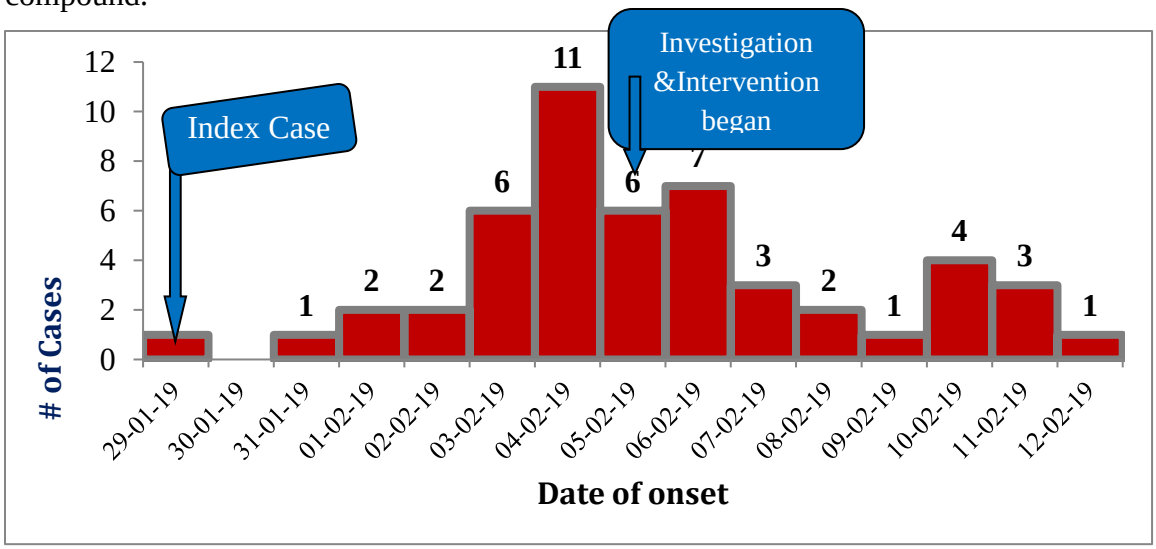

Figure 4: Epidemic Curve by Date of Onset of all bloody diarrhea cases in Mizan Tepi University Bench-Maji zone, SNNPR, Ethiopia, 2019

Assessment of the knowledge of the respondents on transmission and controlling ways of diarrhea, about 50% of case and 73% of control cited as diarrhea transmitted through contaminated water, while 54% case and 75% control replied as it transmit through contaminated food. Nevertheless ,the prevention of diarrhea by thoroughly hand washing suggested by 34% case and 56% of control, keeping food hygiene 38% in case 73% in control, the remaining cited that diarrhea can be prevented by using toilet 1% by case and 38 % by control.

Analytical investigation

Factors associated with an outbreak

Bivariate analysis

The selected variables were tested for their individual contribution or association for the occurrence of outbreak through binary logistic analysis. During bivariate analysis, Socio-demographic status, eating in café or outside of café, history of travel and occupancy of dormitory were not to be found statistically significance with occurrence of outbreak at a significant level of (P > 0.25) and due to null hypothesis was included (OR=1) in the interval.

Whereas statistically significant independent variables were contact dysentery case OR 6.9 (95% CI: 0.068-0.308)] and Storing food for later use OR 3.4(95%CI 0.124_0.6761 were risk factors for the occurrence of dysentery. But, treat drinking water with chemicals/boiling [OR 0.125(95%CI 1.811_35.32) Presence of functional toilet OR 0.34(95%CI 1.25_6.974)] closed water fetching materials OR 0.1(95%CI 0.04-0.43) proper hand washing after visiting toilet OR 0.18(95%CI 2.547_12.758) were protective factors.

Table 2: Bivariate Analysis of Risk and Protective Factors for Dysentery Outbreak, Mizan Tepi University Bench-Maji zone, SNNPR Ethiopia, 2019

#	Variables		Case	Control	COR(95% CI)	P-value
			N=50	N=100		
1	Presence of any sick person in a dormitory	Yes	42(28)	44(29.3)	6.7(0.34_0.224)	0.1
		No	8(5.3)	56(37.3)		
2	Treat water with chemicals/ boil for drinking	Yes	2(1.3)	25(16.6)	0.12(1.81_35.32)	0.003
		No	48(32)	75(50)		
3	Presence of detergent after the use of latrine for hand wash	Plain water only	40 (26)	47(31)	4.5(2.034_ 10.003)*	0.001
		With soap	10(6.6)	53(35)		
4	Presence of functional toilet room for each floor	Yes	8(5.3)	36(24)	0.34(1.25_6.974)	0.01
		No	42(28)	64(42.6)		
5	Type of container used to fetch water from the source	Bottle	44(29.3)	57(38)	0.1(0.04-0.43)*	0.001
		Jerry can	6(4)	7(4.6)		
6	Do you store cooked food for later use	Yes	16(10.6)	12(8)	3.4(0.124_0.6761)	0.001
		No	34(22.6)	88(58.6)		
7	Ate raw or uncooked food in & around compound	Yes	29(19)	25(16.6)	4.1(0.117_ 0.497)*	0.001
		No	21(14)	75(50)		
8	Proper hand Washing after visiting toilet	Yes	27(18)	87(58)	0.18(2.547_12.758)*	0.001
		No	23(15)	13(8.6)		
9	Direct contact history with patient	Yes	33(22)	22(14)	6.9(0.068-0.308)*	0.001
		No	17(11)	78(52)		

* Variables which shown significant association during bivariate analysis.

Multivariable analysis

During multivariate analysis, variables that were significantly associated at the bivariate analysis further examined in the logistic regression to see their relative effects on the outcome variable through multivariable analysis. So to avoid excessive numbers of variables and unstable estimates in the subsequent model, only a variable which was a p- value equals to 0.2 in bivariate analysis were kept in the subsequent analysis in the logistic regression model, to see their relative effects on the occurrence of outbreak. From multivariate logistic regression, risk factor that remained statistically significantly associated with the occurrence of outbreaks were, absence of detergent after the use of latrine for hand wash [AOR 5.4 (95% CI (1.946_14.839)], direct contact history with the patient [AOR 6.8 (95% CI (3.243_14.606], ate raw or uncooked food in a compound or around compound [AOR 3.9(95% CI 1.448_10.501)]. On the other hand protective factors that remained statistically significantly associated with the diseases on multivariate logistic regression analysis were treat water with chemicals/ boil for drinking with [AOR 0.10(95% CI 0.012_0.945)] and Proper hand Washing after visiting toilet [AOR 0.25(95% CI 0.086_0.742)]

Table 3: Multivariate Analysis of Risk and Protective Factors for Dysentery Outbreak, Mizan Tepi University Bench-Maji zone, SNNPR Ethiopia, 2019

Variables	Yes	Case	Control	COR(95% CI)	AOR(95% CI)
	No	**N=50**	**N=100**		
Presence of any sick person in a dormitory	Yes	42(28)	44(29.3)	6.7(0.34_0.224)	6.3(5.164_15.123) *
	No	8(5.3)	56(37.3)		
Treat water with chemicals/ boil for drinking	Yes	2(1.3)	25(16.6)	0.12(1.811_35.32)	0.10(0.012_0.945) *
	No	48(32)	75(50)		
Presence of detergent after the use of latrine for hand wash	Plain water only	40(26)	47(31)	4.5(2.034_ 10.003)	5.4(1.946_14.839) *
	With soap	10(6.6)	53(35)		
Ate raw or uncooked food in & around compound	Yes	29(19)	25(16.6)	4.1(0.117_ 0.497)	3.9(1.448_10.501) *
	No	21(15)	75(50)		
Proper hand Washing after visiting of toilet	Yes	27(18)	87(58)	0.18(2.547_12.758)	0.25(0.086_0.742) *
	No	23(15)	13(8.6)		
Direct contacted history with one bloody diarrhea patient	Yes	33(22)	22(14)	6.9(0.068-0.308)	6.8(3.243_14.606*
	No	17(11)	78(52)		

* Variables which shown significant association during multivariate analysis

Laboratory Investigation

Laboratory investigation was carried out by Ethiopian public health institute. Stool samples collected for microbiological culture were positive for *Shigella flexneri*. The laboratory results of water samples shown it was not potable water.

Environmental observation

We observed different areas that is, access for hygiene and Sanitation facility, access for drinking water, washing clothes, utensils, personal hygiene, food preparation area, hand washing facility with soap, environmental hygiene, general inspection around food preparation and access to functional latrines. During our observation we saw students wash their cloths in Shonga River which pass through the university compound because of shortage of pipe water and also they wash their hands before going to student's cafeteria in this river sometimes. There were no functional latrine in students' dormitory and because of this students were suffered during the outbreak because the diarrhea was frequent.

Outbreak Prevention and Control Activities

Zonal level response task force were established from different sectors such as Health, Education, Political leader, Water, and team from FMoH, RHB also included and chaired by Mizan Tepi university head/president. The task force were organized in to five thematic areas. These were:-

- Surveillance team
- Social Mobilization team
- Case Management team
- WASH team
- Regulatory (inspection team)
- Logistic and Supply team

The task force were meet regularly at 5:00 PM to monitor and evaluate daily team activities report, challenges and set directions how to resolve faced challenges.

Surveillance Team

They were actively engaged on active case search, contact tracing, disinfection, data collection, line list filling, rumour verification and notification.

Social Mobilization

The other interventions were taken awareness creation on Personal and environmental hygiene issues through health education as social mobilization teams so as to cover the entire area affected by the outbreak. On the other hand discussion made with the community of the university on controlling the outbreak and prevention and case management of similar cases.

Case Management Team

Appropriate case management of cases with local compliance to standardized case management such as antibiotic (Ciprofloxacilin 500 mg 2 times a day for 3 days) and preventing dehydration with oral rehydration therapy fluids.

Water, Sanitation and Hygiene (WASH) Team

This team was focusing on water sample collection together with laboratory professionals, avail water chemicals, inspect latrine water supply coverage and hygiene.

Regulatory Team (Inspection team)

- They were inspected food and drinking establishments.
- Negotiate with water office and made pipe water functional and distributed without shifting together with WASH team
- Sanitation campaigns were conducted in the university compound.

Logistic and Supply team

- Avail required logistics and supply
- Request required logistics from RHB and other stakeholders.

Discussions

According to national guideline the dysentery outbreak threshold is unusually increasing in number of cases or doubling of cases on subsequent weeks (13). Therefore, we confirmed the existence of dysentery outbreak. The peak of epidemic curve was seen on February 4th, 2019 and the curve fell dawn within few days after getting its peak. This sharp increase and decrease of the epidemic curve is typical characteristic of common source type of epidemic (13).

The cases were from different department more of from Agriculture and social science with several activities in and out of compound. The extent of this outbreak is likely to be due to water point contamination. The latter decline might be due to investigation and interventions done. Epidemic curve can determine the probable period of exposure (13). The cases have a date of onset which ranges from January 29 to February 14 /2019, which indicates that the epidemic has lasted for more than one incubation period might be due to secondary person to person transmission.

Male were account three-fourth of dysentery cases, which is male were more affected than female. It was consistent with study done in Addis Ababa University, where among affected over 99% were male. Overall attack rate (AR) was 9.3 per 1,000 populations. Which is similar study done in Hawassa 3.5 per 1,000 populations (12).

According to case control study, 71% of cases were not treat drinking water with chemicals/boiling but 68% of control were treat drinking water with chemicals/boiling. Treating of drinking water also significantly associated with the occurrence of outbreak, where treat water with chemicals/ boil for drinking found to be 90% protective as compared with untreated water ready for drinking. This indicates that treating drinking water with chemicals/boiling is protective factor for outbreak.

Hand washing with soap is the single most effective and inexpensive way to prevent diarrhea and ARI. According to UNICEF, cleaning hand washing with soap before eating and after using the toilet into an ingrained habit can save more lives than any single vaccine or medical intervention, cutting deaths from diarrhea by 50% and deaths from acute respiratory infections by one-quarter. This study found that, proper hand washing with soap after visiting toilet also significantly associated with diseases which emphasized that those who properly wash their hand after visiting toilet were 75%

less likely to develop dysentery disease as compared with those who were not properly washed. In other way due to lack of access of detergent for hand wash at critical time were found to be about 5.4 times more likely to develop dysentery as compared with those who wash their hands with water and soap.

Those who had direct contact with dysentery cases were 6.8 times more likely to develop dysentery compared to those who were not contact dysentery cases. As described on the descriptive, finding the analytical finding also support the source and mode of transmission which is close contact with patients. This can be due to Shigellosis epidemics usually occur in areas with crowding and poor sanitary conditions, where person-to -person transmission or contamination of food or water by the organism is common (14). Others, eating (having) raw or uncooked food item were highly significant for developing dysentery.

A likelihood of student who ate raw or uncooked food item were 3.9 times more likely to develop dysentery. This suggests that in the area uncooked food might be contaminated by shigellosis so as it spreads its transmission. Fecal coliform; from contamination of water samples taken from pipe water and river confirms that the sources of outbreak were water and poor hygiene and sanitation practice. Even majority of the cases were not treat the water with chemical or boiled it, this may worse the scenario. *Shigella* infection is spread through human faeces and also by poor personal hygiene and poor environmental protection (3).

Contaminated water supply, storage and unsanitary conditions were contributed to fecal-oral transmission (15). There were no hand washing facilities including detergents to wash hands and closes, so that personal hygiene and environmental sanitation was in poor condition and also almost all students' dorm floors had no functional latrine. The overall conditions were epidemiologically supported evidence to raise the outbreak.

Conclusions

From January 29 to February 14, 2019, there was confirmed dysentery outbreak in Mizan Tepi University in Bench-Maji zone due to Shigella *flexneri*. 50 cases with no death, of them, 66% were male with the mean age of 21years (SD± 1.4) which was ranged from 18_26 years old affected by current outbreak.

The present study found that transmission of the disease exacerbated with lack of access for safe and potable water, contamination of water sources, inadequate sanitation, and poor personal and environmental hygiene.

This sharp increase and decrease of the epidemic curve is typical characteristic of common source type of epidemic due to contamination of water sources. Independent determinants also witnessed that, proper hand washing with soap and treating drinking water were found to be as protective factor, whereas contact history with dysentery case, eating raw food item and storing foods also significantly associated more likely to develop dysentery.

Intervention measures to control the outbreak were undertaken side by side with investigation like, case management, control measurement and health education at all levels.

Recommendations

Based on the findings we recommended the following points for the university:-

- The university should change the water tank in the kitchen and the water supply to cafeteria should be directly from a water supply pipeline with limited use of stored water
- Any water storage barrel should be narrow mouthed, closed with faucet and regular cleaning, chlorine residual should be there.
- Latrine facilities should be made operational with functional water supply and hand washing after defecation should be promoted
- Monitoring and regular supervision of the food preparation, storage condition, washing and drying facilities of the utensils of the food establishments of the suppliers and the student cafeteria should be strengthened.

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1.2 Suspected Anthrax Outbreak Investigation among pastoralists in Nyangatom Woreda of South Omo Zone, SNNPR, 2018

Abstract

Introduction: Anthrax is an infectious zoonotic disease caused by Bacillus anthracis, spore-forming, Gram positive, rod-shaped bacteria. From January 26–31/2018 an investigation of anthrax outbreak was conducted in Nyangatom Woreda with the main objective to investigate the existence of an outbreak and recommend control measures.

Method: A Descriptive cross sectional study design was used to describe the outbreak

Results: A total of 9 human cases were identified with no death report. About 20 cattle died showing symptoms of anthrax. The onset of the outbreak was on 26 January 2018 and 1 Kebele (kanagaton) of the Woreda was affected. Females 6 (67%) were more affected than males. The mean age was 20 years (SD±17).

Conclusion: The clinical presentation and epidemiological evidences indicated that cutaneous anthrax was a possible cause of illness among human being and death in livestock of the area. Awareness creation and conducting routine immunization of animals should be implemented to protect both human beings and livestock.

Key word: Anthrax, Nyangatom, Pastoralists, SNNPR,

Introduction

Anthrax is an infectious zoonotic disease caused by Bacillus anthracis, a spore-forming encapsulated bacteria. It affects all mammals and in cattle, it is characterized by sudden death and oozing of fresh blood from natural orifices. In human, three forms are recognized: the cutaneous form that is also the commonest; gastroenteritis and pulmonary forms [1]. The disease is important because of its economic impact, zoonotic nature and ability to survive in the environment for a long time making it difficult to eradicate.

Anthrax most commonly occurs in wild and domestic herbivores that ingest or inhale the spores while grazing. Domestic livestock and companion animals are an important sources of transmitting anthrax to human, mostly due to the close interaction between these animals and the people who came in to contact with them.(2)

In most industrialized countries, anthrax is a rare disease, and infection in humans is usually due to occupational exposure to infected animals or their products, handling products from infected animals or by inhaling spores from contaminated animal products .(3, 4) B. anthrax is infection can also be acquired by eating contaminated meat from an infected animal.(4, 5) Human anthrax occurs in three forms such as: cutaneous (about 95% of all cases o), pulmonary with severe typical pneumonia, and gastro-intestinal. Symptoms of disease vary depending on how the disease was contracted. The incubation period is usually 1 to 7 days, but can be as long as 60 days.(3)

If untreated, the case–fatality rates range from 5 to 20% for cutaneous anthrax, to more than 85% for pulmonary and gastro-intestinal anthrax.(5) Antibiotic treatment is effective and can prevent most deaths in cutaneous cases. However, mortality in pulmonary and gastro-intestinal cases remains high even with treatment.(3)

1. Objectives

General Objective

To investigate suspected human cutaneous anthrax outbreak in Nyangatom woreda and enhance control measures.

Specific Objectives:

- To describe the outbreak by place, person and time
- To implement prevention and control measures

Materials and Methods

Study area and study period

Nyangatom district of south omo zone is 735 km from Awassa the regions capitals and 204 km from the zonal capital jinka town. The district is surrounded by Salamago district in the North, Dasenech district and Kenya in the South, South Sudan in the West and Hammer in the East. The district has 20 kebeles 19 of them are rural. The district has a total population of 23,568. The study period was from January 26 to 31/2018.

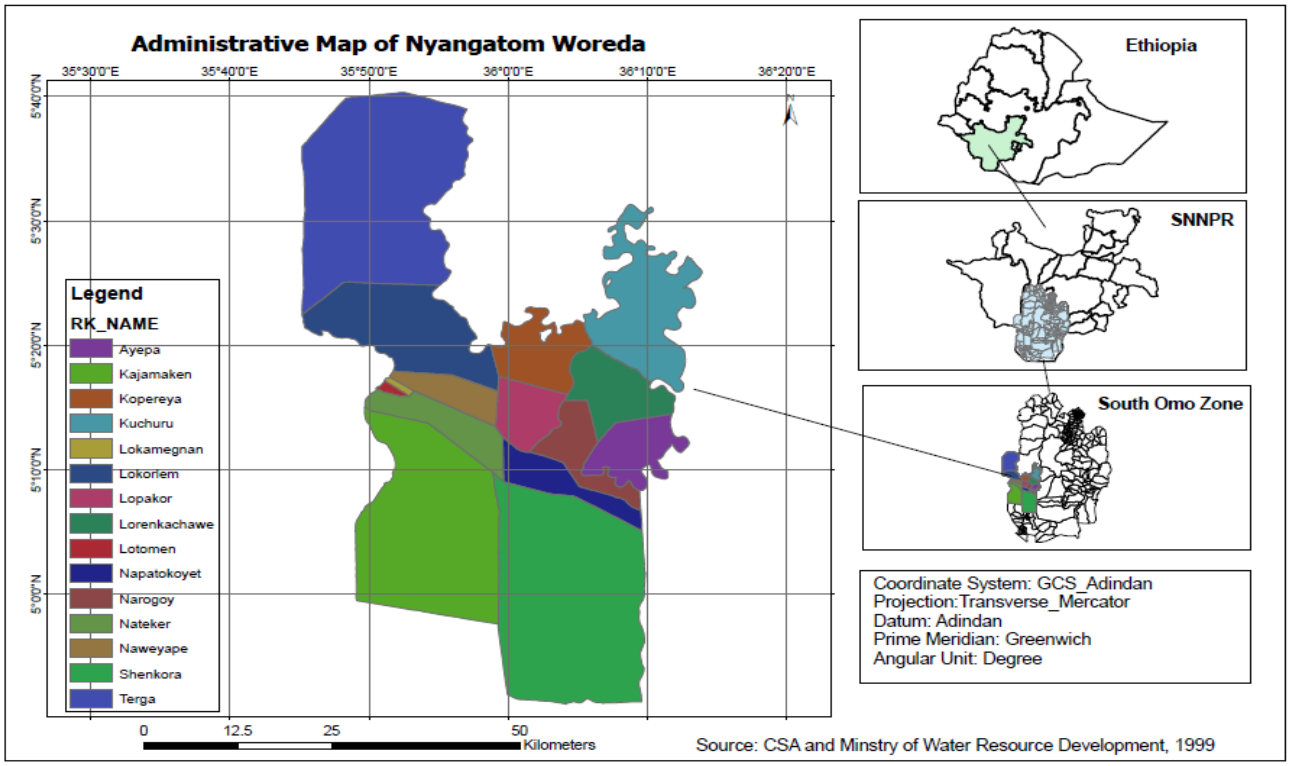

Fig 5 . Administrative map of Nyangatom District

Study Design

A Descriptive cross sectional study design was used.

Case Definition;

Suspected case: - Even though we didn't take a specimen for laboratory confirmation, the suspected case of anthrax was any person living in the affected Kebele with acute onset Characterized by several clinical forms which are: - localized form of Cutaneous: skin lesion evolving over 1 to 6 days from a popular through a vesicular stage, to a depressed black Eschar invariably accompanied by edema that may be mild to extensive

Data collection method

We conducted discussion with the community members and officials, discussion with Zonal health office, Public health emergency management (PHEM) officer and Zonal and Woreda Livestock Resource Development office heads, reviewing the surveillance data, and reorienting the case definitions to the specific type of anthrax.

Ethical Issues

Support letter was obtained from regional PHEM. A letter was submitted for Zonal and Woreda health offices in order to obtain their approval for data collection. Consent was also secured from study participants. Confidentiality was assured throughout by not writing participant's names. Participants were treated with respect and willingly participated in the study with no payment or cohesion. Verbal consent to take photographs was obtained from parents or guardians for cases below 18 years while participants above 18 years were asked for their own consent.

Result

Cutaneous Anthrax Outbreak Situation

Totally 9 suspected human anthrax cases were identified with no death from January 26 to 29, 2018. Cutaneous anthrax was clinically diagnosed as the cause of the reported anthrax, both from medical records, observation of cases found during the investigation and discussion with the zonal and Woreda Health Officials and PHEM Coordinators, the probable cause of the outbreak was contact with slaughtered dead cattle carcass being shared among their neighborhood and using its product like hide or skin for sleeping purposes. This practice was observed in all the interviewed cases of this pastoralist community which they responded that even though they are seeing the cattle is dying by discharging blood from nose and mouth, which killed more than 20 cattle (officially reported number from the Zonal Livestock Development Office) they used the skin for bedding.

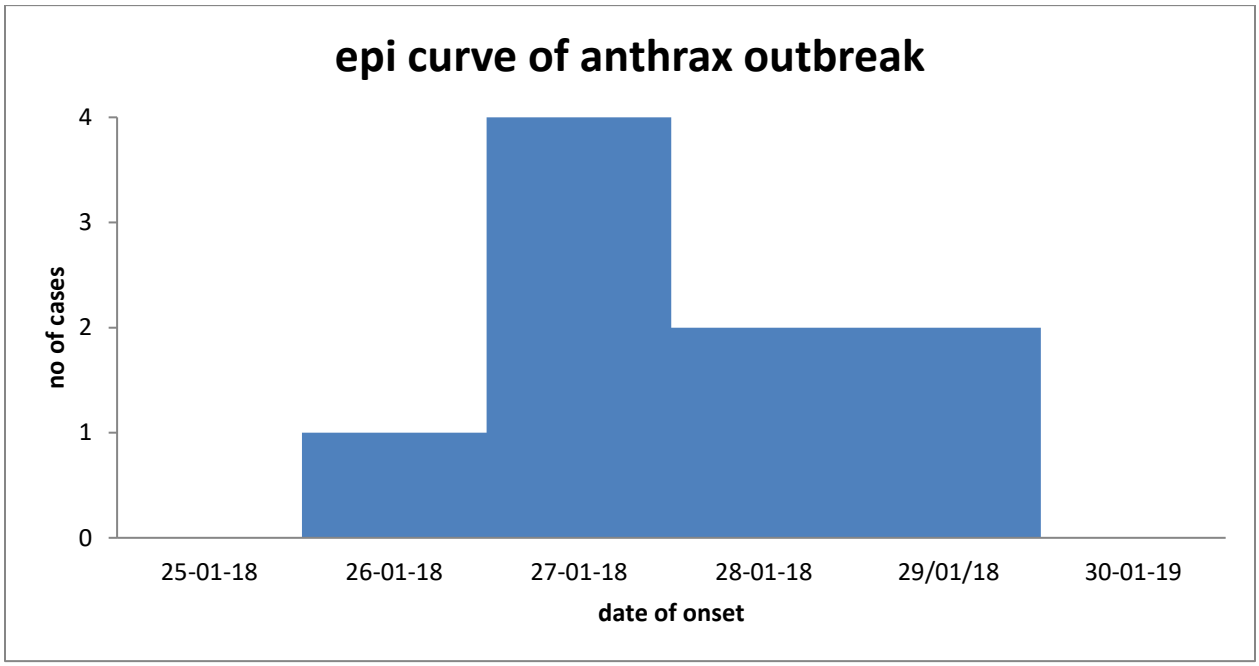

Figure 6: Number of Cutaneous Anthrax cases by date of onset, Nyangatom Woreda of South Omo Zone, 2018

Out of the total 9 cases about 6(66%) were females and 3 (33%) were males with the mean age of 20 (SD±17.4) while their crude age was ranged between 2 to 50 years old.

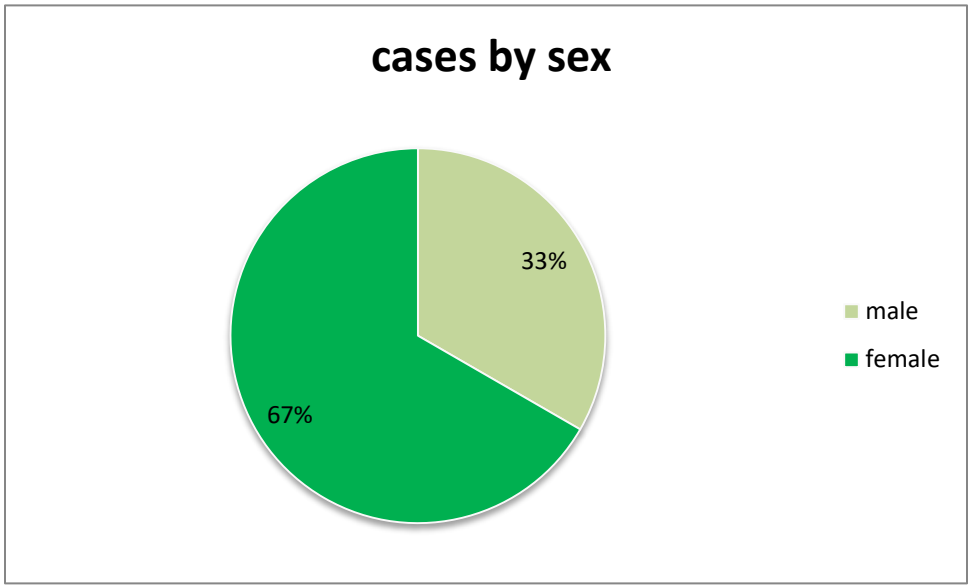

Figure 7: Proportion of cases by sex, Nyangatom Woreda of South Omo Zone, 2018

During our investigation in the affected Kebele nine active cases were found showing typical signs of cutaneous anthrax. Cases 4(44%) presented a typical anthrax skin lesion (Black Eschar), Ulcer and vesicle ring, oozing and edematous. The most affected body part was the hand and legs, followed by the back side of body. Suspected cases have been given antibiotics Amoxacyiline, Doxycycline and Erythromycin to which anthrax is sensitive for 14 days. There was no laboratory investigations done at the time of the investigations since many of the cases identified were already on treatment and recovering from the infection, therefore no samples were taken.

Some of the active cases in kangaton Kebele of Nyangatom Woreda, 2018

Animal Anthrax and veterinary records

The total population of animals in Nyangatom woreda was 685,506 cattle, 186,627 sheep 233,571 goats, 16,664 donkeys and poultry 13,807. All age groups and both sex of cattle were affected. The cattle death was on January 15 and 16 2018. From veterinary records and zonal animal health department we found that no vaccination was given for two years because of shortage of man power and inaccessibility of the kebele.

Intervention

We conducted discussion with Zonal and Woreda health officials and veterinary department officials about the situation and the following measures were taken:-

- Antibiotic treatment have been given for all cases
- The veterinary (livestock development) office had extensively carried out a ring vaccination for all animals
- The skin that was found in their house were collected and burned

Discussion

Totally 9 suspected human anthrax cases were identified with no death during the investigation period and where almost all of the community members are pastoralists in which their day to day life is with animal breeding. Even though there is vaccine for animals to prevent the disease high number of deaths in animals due to lack of vaccinating domestic animals by schedule brought such consequences on human as well as livestock resource loss.

Taking into consideration the fact that the exposure of cattle might be attributed to anthrax spores in the soil while grazing, the outbreak of the human cases could be due to contact with cattle products. Anthrax cases had not been previously reported in the current outbreak area; however, it is possible that undiagnosed cases in livestock or wildlife might have occurred previously in those areas. It is also possible that known carcass sites further away could have the source of the spores which were transported through waterways, natural drainage patterns to the locations of the outbreak.

The mean age of affected people in our study was 20 years (range between 2 - 50 years and SD-17) of age which is almost similar with study done in Bangladesh have mean age 21.4 (12). In our investigation, sixty seven (67%) of the cases were females in which more affected than males it was different from the report of human Cutaneous Anthrax Outbreak Investigation among Pastoralists in Benna Tsemay Woreda of South Omo Zone, Southern Region, 2015, which male were more affected.

Limitation of the study

The study was not supported with laboratory investigation.

Conclusion

The clinical presentation and epidemiological evidences indicated that anthrax was a possible cause of illness among human being and death in livestock of the area even though there is no laboratory confirmed result.

Recommendation

- Coordinated effort is needed on changing the behavior of the community towards the mode of transmission of the disease.(public health and animal health offices)
- There should be routine vaccination of livestock in the area since their day to day life depends on them (livestock department)
- Both health and livestock development offices at Zone and Woreda should strength the surveillance system and conduct active surveillance regularly.

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Chapter two -Surveillance Data Analysis

2.1 Acute flaccid paralysis/polio surveillance data analysis from 2013-2017, SNNPR, Ethiopia 2018.

Abstract

Introduction: Poliomyelitis is highly contagious viral disease caused by 3 poliovirus serotypes [3].Namely, Types 1, 2 and 3. All of which can cause acute flaccid paralysis. The main objective of this analysis was to describe Acute Flaccid Paralysis/polio cases by sex, age, place, and time in the SNNPR.

Methods: Cross sectional study was conducted and Line list data from 2013 to 2017 of AFP cases were collected from the Regional Public Health Emergency management and WHO surveillance data.

Results: Out of a total 1,163 AFP cases reported from 2013-2017, 49.3% were from age 1-4, 30% were from 5-9, 16.2% were 10-14, 3.8% were <1 and 0.4% were >= 15 years of age. From 1163 cases reported, 673 (58%) cases were males and 483 (42%) were females. Proportion of reported case were decreasing from year to year.

Conclusion and recommendations: The most affected age group was 1_4. Regionally the highest number of cases reported in 2013. There were districts and special woredas that reported the non-AFP rate below 2/100,000 population <15 years. Improving data recording and reporting system by health centers, woredas, and zones.

Key words: Acute flaccid paralysis, surveillance, SNNPR.

Introduction

Poliomyelitis is highly contagious viral disease caused by 3 poliovirus serotypes [3].Namely, Types 1, 2 and 3. All of which can cause acute flaccid paralysis. The poliovirus is rapidly inactivated by heat, chlorine and ultraviolet light. The most frequent cause of epidemic polio is poliovirus type 1 and type3 [1]. Poliovirus is found only in human beings and there is no animal reservoir.

Polio is endemic in only 3 countries: Nigeria, Pakistan, and Afghanistan [1]. These three countries are the source of importation for other polio free countries. Unless all countries are free of polio, all countries in the world are at risk of importation. Historically, in endemic areas, cases of poliomyelitis occurred both sporadically and as epidemics, with an increase in the late summer and autumn in temperate countries [4]. In tropical countries, a less pronounced seasonal peak occurred in the hot and rainy season.

Transmission is person to person through feco-oral rout. The virus multiplies in the intestines and spread through the feces [1]. The virus is intermittently excreted for up to 1 month or more after infection. The maximum excretion occurs just before paralysis and during the first two weeks after onset of paralysis [3].

Global Polio Eradication Initiative (GPEI) launched in 1988 and since then nearly five million people are today walking, who would otherwise have been paralyzed by the disease. The GPEI has reduced the global incidence of polio by more than 99 percent [1].

The Polio Eradication Initiative (PEI) in Ethiopia started in 1996 following the Declaration on Polio Eradication in Africa in the same year. Ethiopia has accelerated implementation of polio eradication strategies since the declaration of the initiative: routine immunization, supplemental immunization activities (SIAs), Acute Flaccid Paralysis (AFP) surveillance, and mop-up vaccinations [5].

The burden of disease in south nations, nationalities peoples region as measured by premature death from all causes, comes primarily from preventable causes is dominated by communicable diseases, reproductive health problems and nutritional deficiencies. The leading causes of morbidity and mortality are mostly attributable to lack of clean drinking

water, poor sanitation, and low public awareness of nutrition, environmental health and personal hygiene practices. One of the diseases which come or aggravated from the above mentioned risk factors is polio [6].

Acute flaccid paralysis is one of the twenty-one priority diseases that are under the Public Health Emergency Management integrated disease surveillance system. It is one of the immediately reportable diseases. Case-based surveillance data will be collected using the standard case-based investigation form whenever suspected cases are detected [3].

Rationale of the study

There is high risk for an explosive outbreak in an unimmunized population and children are especially vulnerable if even one laboratory-confirmed case of polio occurs in the population.

Thus this surveillance data analysis will help to determine the magnitude of acute flaccid paralysis detected by surveillance system, characterize the epidemiology of AFP cases, immunization activities and to suggest corrective measures and solutions so as to achieve the polio eradication goal in SNNPR.

Objectives

General objective

- To analyze surveillance data of Acute Flaccid Paralysis/polio in South Nations, Nationalities and Peoples Region from 2013 to 2017 (five years' data).

Specific objectives

- To describe Acute Flaccid Paralysis/polio cases by sex, age, place, and time in the SNNPR.
- To see how well the surveillance of Acute Flaccid Paralysis/polio ready to cascade the Polio Eradication Initiative

Materials and Method

Study setting

The study was conducted in Southern Nations Nationalities and Peoples' Region (SNNPR) of Ethiopia. The region has 15 zones, 4 special woredas and 136 woredas. The region has 3880 health posts, 780 health centers and 41 hospitals. Public health emergency has its own structure from the Regional level to the health post. i.e. Region-zone-woreda-health center-health post. Hence, it is a line of reporting from the lower level to the upper.

Case definitions

The following are case definitions used in all facilities to detect AFP cases.

- ***Community case definition- for Health Extension workers***
  - ✓ Any person with sudden onset of paralysis of the limbs.
- ***Standard case definition- for HCs and hospitals***
  - ✓ Any child under 15 years of age with acute/sudden weakness or floppiness of one or more limbs regardless of the cause or Any person of any age in whom a clinician suspects polio.
- ***"Hot" AFP case:***
  - ✓ An AFP case likely to be paralytic polio, Age less than five years, asymmetric paralysis, fever at the onset, incomplete OPV doses, rapid progression of paralysis) and/or AFP case with direct contact to a confirmed case or a case from endemic area

Investigation, stool collection and laboratory processing of specimen should be prioritized for "hot" cases.

Study design

A cross sectional study design was used.

Data source

Surveillance data report from public health emergency management data base.

Study population

AFP cases in the SNNPR Region with in the study period were used as a study population.

Data collection and analysis

Line list data from 2013 to 2017 of AFP cases were collected from the Regional Public Health Emergency management and WHO surveillance data.

Data cleaning and encoding was done using Microsoft Office Excel 2016 and categorization of the variables by age, sex, kebele, woreda and zone was done. Data capturing and analysis was done using Microsoft Office Excel 2016.

Ethical consideration

Permission to carry out the study was obtained from SNNPR regional health bureau public health emergency management core process.

Result dissemination plan

The result of the study will be submitted to Addis Ababa University School of public health and Regional Health Bureau public health emergency management core process.

Result

By person

Out of a total 1,163 AFP cases reported from 2013-2017, 49.3% were from age 1-4, 30% were from 5-9, 16.2% were 10-14, 3.8% were <1 and 0.4% were >= 15 years of age. .

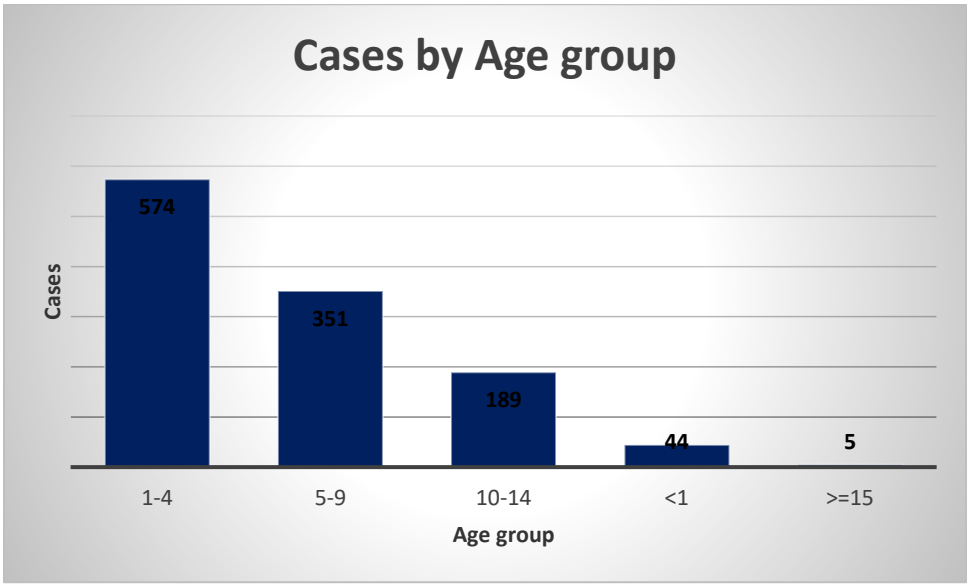

Figure 8: Acute Flaccid Paralysis reported cases by age group SNNPR, Ethiopia, 2013-2017.

When we see age specific attack rate age group 1-4 were more affected followed by age group 5-9 years of age.

Table 4: Acute Flaccid Paralysis age specific attack rate by age group SNNPR, Ethiopia, 2013-2017.

Age group	population	No of cases	ASAR/100000
<1	627,945	44	7/100000
1 – 4	2,097,865	574	27/100000
5 - 9	2,719,753	351	12/100000
10 – 14	2,602,644	189	7/100000
>=15	8,601,446	5	0.05/100000

From the total 1163 reported AFP cases, 32 (2.7%) cases received zero polio doses, 50 (4.2%) cases received one polio dose, 92 (7.9%) cases received two polio dose, 247 (21.2%), cases received three polio doses, 226 (19.4%) case received four polio doses, 114 (9.8%) cases received five polio doses , 24 (2.1%) cases received six polio doses, 7 (0.6%) cases received seven polio doses, 5 (0.4%) cases received eight polio doses, 2 (0.2%) cases received nine polio doses, 4 (0.3%) cases received ten doses, 1 (0.1%) cases received eleven doses, 1 (0.1%) cases were missed variables and 358 (30.8%) cases had unknown vaccination history.

AFP cases affected their limbs symmetrically, and 133(8.1%) AFP cases affected their all limbs, 10(0.6%) cases affected their 3-limbs, and 24 (1.5%) cases affected only their one limb and for 897 (54.4%) AFP cases no data were found about the paralysis effect. Out the total 149 follow up conducted cases, 49(32.9%) AFP cases developed residual paralysis, 87(58.4%) improved their initial paralysis, 8(5.4%) cases lost to follow up, and 3(3.4%) died before follow up. Out of 1648 reported AFP cases; there was no confirmed case for the last seven years. Out of the total cases 40(2.4%) were suspected polio virus, 1212(73.5%) were negative for polio cases, 121(7.3%) were NPENT, and 275(16.7%) were missed variables.

AFP cases by sex SNNPR, from 2013-2017.

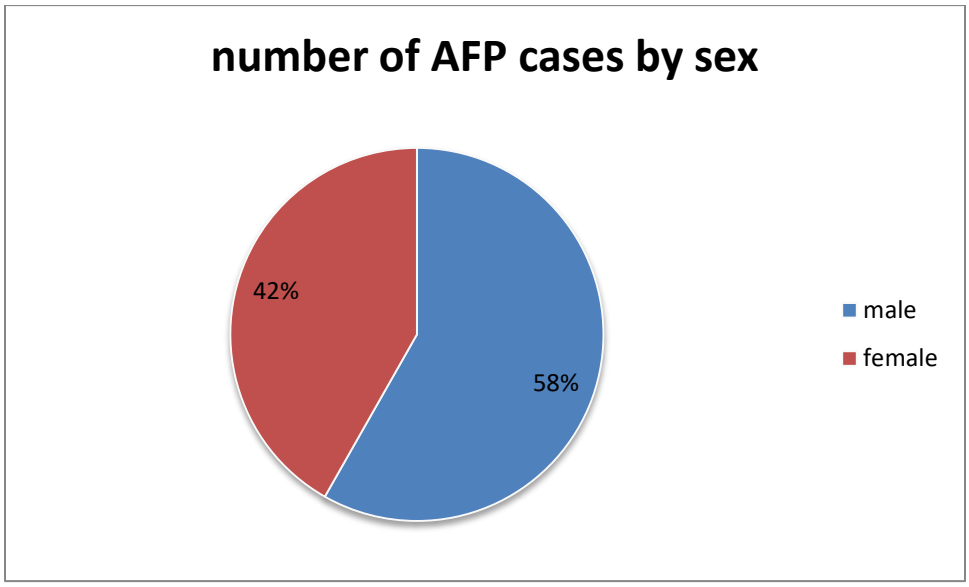

Figure 9: AFP cases by sex SNNPR, Ethiopia, from 2013-2017.

From 1163 cases reported, 673 (58%) cases were males and 483 (42%) were females.

By time

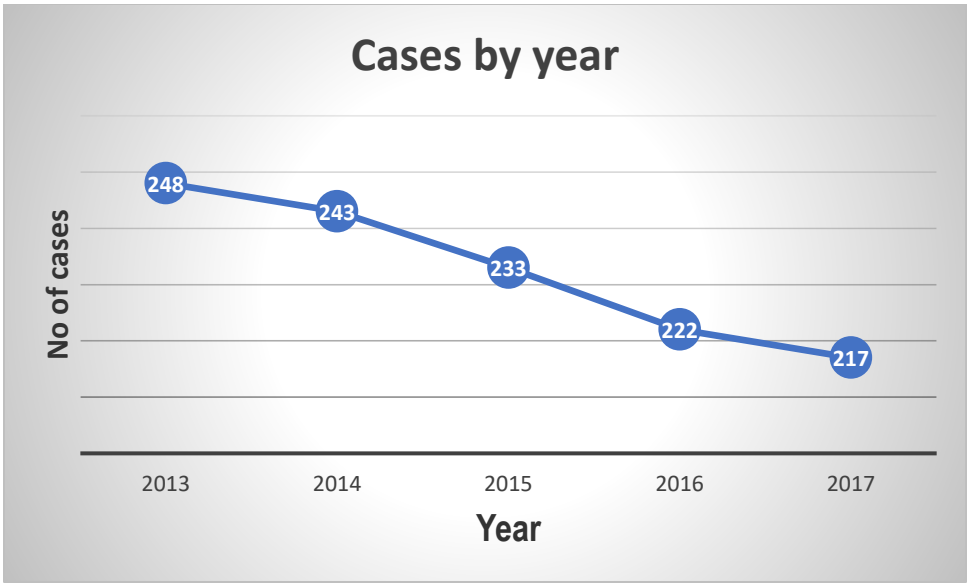

Figure 10: AFP cases by year SNNPR Ethiopia, 2018.

As we can see from the above graph AFP cases are decreasing from year to year.

By place

Top 10 districts with reported AFP cases

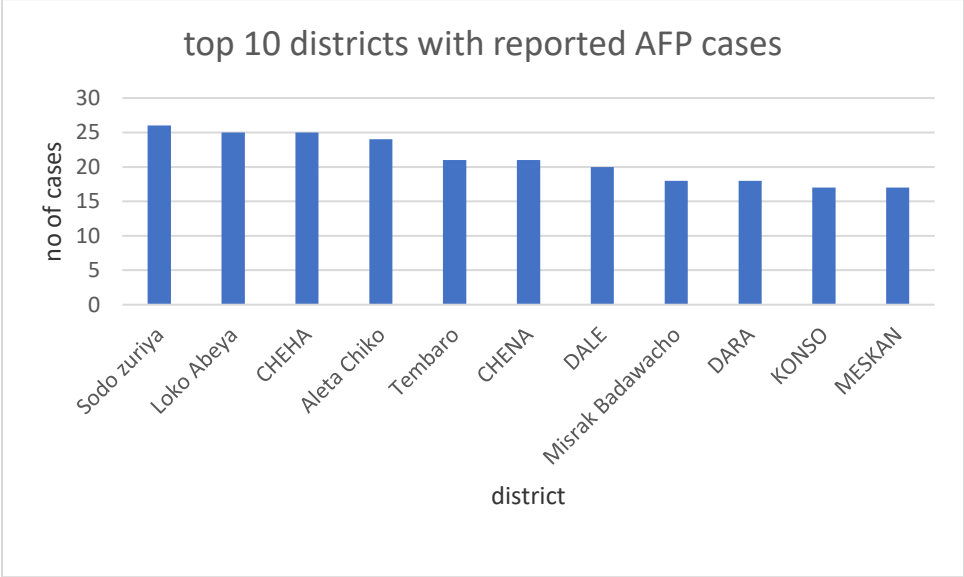

Figure 11: Top 10 districts with reported AFP cases 2013-2017, SNNPR, Ethiopia 2018.

Table 5: Reported AFP cases by zone and special districts by year, SNNPR, Ethiopia 2018.

zone/special districts	Years					
	2013	2014	2015	2016	2017	Grand Total
ALABA	2	3	3	3	4	15
AWASSA City Admin.	4	3	4	4	3	18
BASKETO		1		1	1	3
BENCH MAJI	3	10	12	13	9	47
DAWRO	13	12	6	3	6	40
GAMO GOFA	28	29	17	25	27	126
GEDEO	16	10	12	11	15	64
GURAGHE	27	25	24	19	24	119
HADIYA	17	22	21	18	20	98
KEFA	15	13	18	14	16	76
KEMBATA/TEMBARO	8	14	10	7	7	46
KONTA	2			1	1	4
S OMO	10	10	11	11	11	53
Segen	11	11	5	9	9	45
SHEKA	1	6	2	2	4	15
SIDAMA	45	45	44	49	37	220
SILTE	18	11	11	11	17	68
WOLAYTA	27	18	15	21	19	100
YEM	1		2	2	1	6
Grand Total	**248**	**243**	**217**	**224**	**231**	**1163**

Table 6: Expected AFP cases by zone and district by year, SNNPR, Ethiopia 2018.

zone/special districts	Years					
	2013	2014	2015	2016	2017	Grand Total
ALABA	5	5	5	6	6	27
AWASSA CA	6	6	6	6	7	31
BASKETO	1	1	1	1	1	5
BENCH MAJI	15	16	16	16	17	80
DAWRO	11	11	12	12	12	58
GAMO GOFA	37	38	40	40	41	196
GEDEO	20	21	22	22	22	107
GURAGHE	30	31	32	32	33	158
HADIYA	29	30	31	31	32	153
KEFA	20	21	22	22	22	107
KEMBATA/TEMBARO	16	16	17	17	17	83
KONTA	2	2	2	2	2	10
S OMO	13	14	14	14	14	69
Segen	13	14	14	14	14	69
SHEKA	4	4	5	5	5	23
SIDAMA	70	72	74	79	81	376
SILTE	17	18	18	18	19	90
WOLAYTA	36	37	38	38	38	187
YEM	2	2	2	2	2	10

Table 7: Expected and reported cases by zones and special districts SNNPR, Ethiopia, 2018.

Zone/spe. district	Expected AFP cases	Reported AFP cases
ALABA	27	15
AWASSA CA	31	18
BASKETO	5	3
BENCH MAJI	80	47
DAWRO	58	40
GAMO GOFA	196	126
GEDEO	107	64
GURAGHE	158	119
HADIYA	153	98
KEFA	107	76
KEMBATA/TEMBARO	83	46
KONTA	10	4
S OMO	69	53
Segen	69	45
SHEKA	23	15
SIDAMA	376	220
SILTE	90	68
WOLAYTA	187	100
YEM	10	6
Grand Total		**1163**

Duration of case investigation following notification: Out of the total 1163 AFP cases 452 (38.8%) cases investigated less than or equal to three days following notification, 473 (40.8%) cases investigated greater than 3 days, 238 (20.4%) AFP cases had been missed.

Interval between first and second stool collection: From 1163 cases reported, 1157 (99.4%) cases of stool collected within 24-48hrs interval.

Days between onset of paralysis and second stool collection: For 1092 (93.8%) of AFP cases the duration is less than or equal to 14 days, for 69 (5.9%) of AFP cases the duration is greater than 15 days, and for 2 cases days between date of onset of paralysis is not field.

Discussion

A total of 1163 AFP cases reported from 2013-2017. The most affected age group was 1_4 followed by the age group of 5_9 and 10_14 respectively.

From the total 1163 reported AFP cases, 32 (2.7%) cases received zero polio doses, 50 (4.2%) cases received one polio dose, 92 (7.9%) cases received two polio dose, 247 (21.2%), cases received three polio doses, 226 (19.4%) case received four polio doses, 114 (9.8%) cases received five polio doses , 24 (2.1%) cases received six polio doses, 7 (0.6%) cases received seven polio doses, 5 (0.4%) cases received eight polio doses, 2 (0.2%) cases received nine polio doses, 4 (0.3%) cases received ten doses, 1 (0.1%) cases received eleven doses, 1 (0.1%) cases were missed variables and 358 (30.8%) cases had unknown vaccination history.

Children who received 4 and more polio dose less than 50%, which was below the WHO standard. The possible reason for the low polio dose was there were significant number of children who took only either of one or two polio doses, the other may be poor case investigation. The regional trend of non-AFP rate met the WHO minimum standard. But when we look at the non-AFP rate of certain districts per 100,000 population, it was below the WHO standard.

Conclusion

The most affected age group was 1_4. Regionally the highest number of cases reported in 2013. Sidama zone reported the highest number of cases in the region. There were significant number of districts that did not meet the WHO standard. I.e. there were districts and special woredas that reported the non-AFP rate below 2/100,000 population <15 years. There was low vaccination coverage among children of all age groups in which only 19.4% were vaccinated with 4 and more polio doses. The majority of cases have been vaccinated with less than 4-polio doses.

Recommendation

- Monitoring and evaluation, and regular supportive supervision of EPI Program by RHB, zones, woredas, health centers.
- Improving data recording and reporting system by health centers, woredas, and zones

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Chapter Three- Evaluation of surveillance system

3.1 Evaluation of Maternal Death Surveillance and Response (MDSR) System in Hawassa city administration, SNNPR Ethiopia

Abstract

Introduction: Public health surveillance is the ongoing and systematic collection, analysis, and interpretation of health data in the process of describing and monitoring a health event" with the objective of supporting the planning, implementation and evaluation of public health interventions and programs. The main objective of this study was to evaluate the surveillance system of MDSR in Hawassa City Administration, SNNPR.

Methods: Cross sectional study was conducted from March 15 – March 22/2019 in Hawassa city administration. Purposely we selected the city administration, two hospitals and two health centers. Data collection was done by face to face interview using questionnaire/checklist and observation of tools for surveillance and secondary data review were done.

Results: From the city administration 2, from Hawassa comprehensive specialized hospital 3, from Adare hospital 2, from millennium health center 6 and from Adare health center 5 PHEM focal persons and other officers trained**.** There were Epidemic management committee established at the administration level but not working regularly and not formulated with all necessary disciplines. At the city administration level and two visited hospitals surveillance data were analyzed by person, place and time but the health centers did not perform analysis of reportable diseases. All the respondents agreed that the existing surveillance system was simple, useful and flexible.

Conclusion and recommendations: Public health emergency management guideline and case definitions were available for Measles, Malaria, AFP, NNT, Meningitis and MPDSR in all visited health facilities and the city administration. Eighteen (18) PHEM focal persons and other officers trained regarding RRT, Community Integrated Disease Surveillance and MDSR surveillance and reporting system. Data analysis for prioritized diseases at health facility level should be performed regularly.

Key words: Surveillance system evaluation, Hawella Tula sub city, 2019.

Introduction

Public health surveillance is the ongoing and systematic collection, analysis, and interpretation of health data in the process of describing and monitoring a health event" with the objective of supporting the planning, implementation and evaluation of public health interventions and programs. An epidemiological surveillance system is the set of interconnected elements and activities which contribute to the achievement of surveillance objectives (1).

A functional disease surveillance system is essential for defining problems and taking action. Proper understanding and the use of this essential epidemiological tool helps health workers at the district and health units to set priorities, plan interventions, mobilize and allocate resources, detect epidemics early, initiate prompt response to epidemics and evaluate and monitor health interventions (2).

Ethiopia introduced integrated disease surveillance and reporting (IDSR) strategy in 1996 as part of the response to growing public health problems with communicable disease focusing on 17 priority diseases and then adopted the WHO IDSR strategy in 1998 and frequently revises the list of priority diseases. Since 2008 the Federal Ministry of Health (FMoH) launched a reform and restructuring of the health sector aimed at bringing effectiveness and efficiency in execution of various work by using business re-engineering process (BPR) as a tool (2).

The MDSR system in Ethiopia was started in October 2013 with the purpose of providing information about avoidable factors that contributed to a maternal death and actions that need to be taken at the community level, within the formal health care system, and at the inter sectoral level (i.e. in other governmental and social sectors) to prevent similar deaths in the future and also to establish the framework for an accurate assessment of magnitude of women's deaths related to pregnancy.

Maternal death is the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes

According to WHO report, every day, approximately 800 women die from preventable causes related to pregnancy and childbirth and 99% of all maternal deaths occur in developing countries. Maternal mortality is higher in women living in rural areas and among poorer

communities. Young adolescents face a higher risk of complications and death as a result of pregnancy than older women. (4)

According to Ethiopian demographic and health survey 2016, maternal mortality ratio is around 412/100,000 live births. Ethiopia has been implementing MDSR for the last five years by integrating MDSR with the existing regional IDSR system /PHEM in 2014.

In SNNP region since the launching of the system orientation and trainings were given for health professionals almost all over the region by integrating MDSR training with PHEM basic level training. According to the regions 2010 E.C 12 month report from the expected 2,288 report only 128 (6%) maternal deaths were reported. From the report 75% of deaths were from age group 25-39 years and 59% were illiterates. 68% of the deaths were in hospitals followed by on transit. 70% of deaths were postpartum.

The purpose of evaluating public health surveillance systems is to ensure that problems of public health importance are being monitored efficiently and effectively. Public health surveillance systems should be evaluated periodically, and the evaluation should include recommendations for improving quality, efficiency, and usefulness. The evaluation of public health surveillance systems should involve an assessment of system attributes, including simplicity, flexibility, data quality, acceptability, sensitivity, representativeness, timeliness, and stability. (6).

Rationale of the study

Surveillance system evaluation is an important tool to assess the capacity of the system to meet its purpose and objectives; to improve its operation and to optimize the available resources. Evaluation of Hawassa city administration maternal death surveillance system provides information if the Surveillance system is useful, describes the specific attributes, identifies areas that needs improvement and make recommendations to improve the quality, efficiency and usefulness of the system. Therefore this evaluation will help to identify the challenges of MDSR system which can give crucial information about the system in general.

Objectives

General objective

To evaluate the surveillance system of MDSR in Hawassa City Administration, SNNPR.

Specific objectives

- To assess core and supportive functions of the system.
- To describe key attributes of the surveillance system

Materials and Methods

Study area and study period

The evaluation was conducted in *Hawassa* city which is capital of SNNPR, with an estimated total population of 335,319 and 275 km away from Addis Ababa in south direction. The study period was from March 15 – March 22/2019.

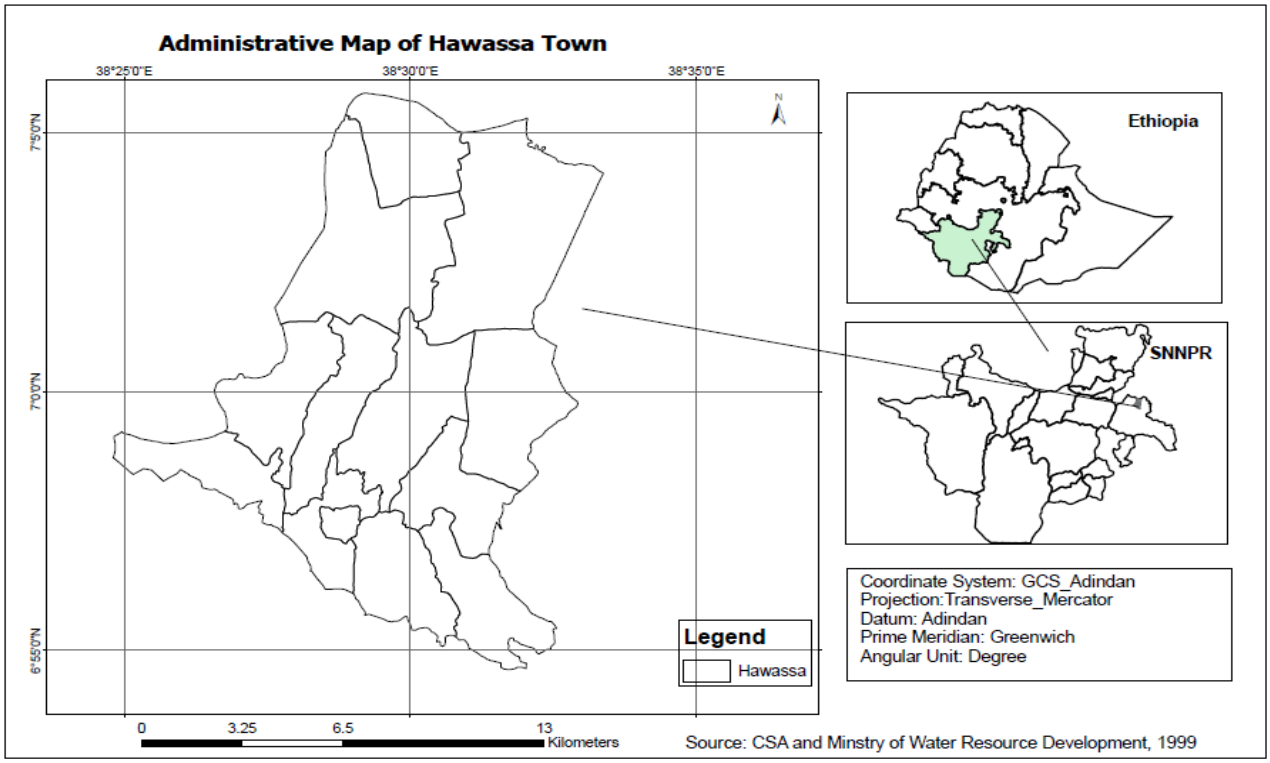

Figure 12: Administrative map of Hawassa town

Study design

Cross-sectional study design was conducted using questionnaire adopted from CDC

Sample size and sampling method

During selection of zone/area for this assessment, discussion was held with Regional PHEM Core Process head and staffs. It was decided to conduct this assessment in Hawassa city administration. In this assessment, city administration department PHEM staff, selected hospitals and health center focal persons were participated. A total of 5 study units/sites were included in the study, these were Hawassa city administration health department, two hospitals and two health centers.

Data Collection Tools and Procedures

Questionnaire adopted from CDC was used during data collection at all levels. Zonal and Health Facility PHEM focal persons were interviewed with this questionnaire. To confirm responses and ensure quality of the data, observation of documents was done.

Ethical Consideration

Permission letter was obtained from regional PHEM department to Hawassa city administration to collect data.

Operational definition

Acceptability:-Willingness of persons and organizations to participate in the surveillance system. And it will be measured quantitatively through the reviewing completeness of report forms for the past three months and timeliness of information coverage.

Accessibility: - Ease which statistical data can be received from the office. This lets in the ease with which the existence of information can be found out, as good as the suitability of the shape or medium through which the data can be accessed. The monetary value of the information may also be an aspect of accessibility for some users.

Accuracy: - Degree to which a measurement or an appraisal based on measurements represents the genuine value of the attribute that is being evaluated.

Completeness: - Proportion of all expected data reports that were actually submitted to the public health surveillance scheme**.**

Data Quality: - Data quality reflects the completeness and robustness of the data entered into the public health surveillance scheme**.**

Flexibility: - A flexible public health surveillance system can conform to changing data needs or operating conditions with little extra time, staff office, or allocated funds**.** Flexible systems can accommodate, for instance, new health-associated effects, changes in case definitions or technology, and variations in funding or reporting sources. In accession, organizations that utilize standard data formats (e.g., in electronic data interchange) can be well mixed with other arrangements and therefore might be considered flexible.

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

Simplicity: - The simplicity of a public health surveillance system refers to both its structure and ease of operation. Surveillance systems should be as simple as possible while still meeting their objectives.

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

Timeliness: - Interval between the occurrence of an adverse health event and the report of the event to the appropriate health agency or the identification of that agency of trends or outbreaks or the implementation of control measures

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

Results

Population under surveillance

The national public health emergency management targets all the population in the country to be under surveillance for all the priority diseases. The population under surveillance for the selected health facilities was given below on the table.

Table 8: population under surveillance in selected health facilities, Hawassa city administration, SNNPR 2019.

No	Name of assessed institution	Population under surveillance/catchment popn	Remarks
1	Hawassa city administration		
2	Hawassa comprehensive specialized HSP	>10,000,000	Referral HSP
3	Adare HSP	1,368,341	
4	Millennium health center	29,352	
5	Adare health center	27,147	

Availability of National PHEM Guideline

Public health emergency management guideline was distributed by the region for all zones. In the same manner, all zones had distributed this guideline for their districts and districts for their respective hospitals and health centers. We found this guideline in all visited hospitals and health centers of Hawassa city administration.

Case Detection, Registration and Case definitions

Standard case definitions for all prioritized diseases are available at Zonal, visited hospitals and health centers. At visited health facilities, case definitions were available for Measles, Malaria, AFP, NNT, Meningitis and MPDSR. In these health facilities, these case definitions were posted on the wall. At all visited health facilities, there was clinical registration.

Cased Definitions Used in the Surveillance System

- **Maternal Mortality** – "The death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause

related to or aggravated by the pregnancy or its management but not from accidental or incidental causes." (6)

- **A Suspected Maternal Death** – "The death of any woman while pregnant or within 42 days of the termination of pregnancy" (6)

- **A Probable Maternal Death** – "Deaths among women of reproductive age, not clearly due to incidental or accidental causes." (6)

- **Direct Obstetric Deaths** – "Those resulting from obstetric complications of the pregnant state (pregnancy, labor and puerperium), from interventions, omissions, incorrect treatment, or from a chain of events resulting from any of the above." (6)

- **Indirect Obstetric Deaths** – "Those resulting from previous existing disease or disease that developed during pregnancy and which was not due to direct obstetric causes, but which was aggravated by physiologic effects of pregnancy" (6)

- **Pregnancy Related Death** – "The death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the cause of death (and) is intended for countries that wish to identify deaths occurring in pregnancy, childbirth and up to 6 weeks after the end of pregnancy but where the cause of death cannot be identified precisely." (6)

Data Reporting

Federal ministry of health and its stakeholders are responsible for designing and preparation of PHEM reporting formats. Zonal health office has provided these format through regional health bureau. During the last six months, no shortage of weekly PHEM reporting formats were observed. Hawassa city administration is using mail to report weekly surveillance activities to regional bureau. All visited health facilities were using telephone to report for the next level except Adare hospital that used both mail and telephone.

Data Analysis and report

During 2010 EFY 52 maternal deaths were reported 47 were from referral hospital and 5 from Adare hospital. At the city administration level and two visited hospitals surveillance data were analyzed by person, place and time but the frequency differs that is the city administration analyze weekly and the rest as needed. The health centers did not perform analysis of reportable diseases. At all levels, PHEM and focal persons are responsible for data analysis of reportable diseases.

Epidemic preparedness and management

There was written epidemic preparedness and response plan at zonal level and no shortage of emergency drugs and supplies were encountered in the past one year at this level. Regarding existence and activities of epidemic management committee, there were established committee at zonal. During this assessment, it was identified that established committee at these levels is not working regularly and not formulated with all necessary disciplines. Out of four Visited health facilities 3 (75%) were implemented prevention and control measures based on local data. There was no budget line for epidemic response at health facility level but there was at zonal level. The health facilities use from other budget sources and supported by regional health bureau during epidemic. In addition there was epidemic rapid response team at visited sites.

Availability of budget and resources for surveillance activities

There was no allocated budget from government source for public health emergency activities at zonal level. This problem was extended to the next level and they were depending on zonal or regional support. Due to this reason, PHEM focal persons were not motivated for surveillance activities. Only one visited hospital (Hawassa comprehensive specialized hospital) that had computers and its accessories allocated for the surveillance purpose, the rest did not have allocated budget for PHEM activities separately rather they use it for all activities. Stationery is not enough at some health centers. In addition there were shortage of hygiene and sanitation material and personal protective equipment all visited health facilities.

Feedback

Hawassa city administration health department has given written feedback for health facilities quarterly. However the two hospitals did not give feedback regularly.

Supportive Supervision

During the past six months, the city administration conducted supportive supervision twice on surveillance activities for hospitals and health facilities. The visited 2 hospitals had not supervise their respective health facilities regularly due to shortage of vehicle and budget.

Training of Surveillance Activities

From the city administration 2, from Hawassa comprehensive specialized hospital 3, from Adare hospital 2, from millennium health center 6 and from Adare health center 5 PHEM focal persons and other officers trained regarding Rapid Response Team, Community Integrated Disease Surveillance and MDSR surveillance and reporting system by regional PHEM unit and EPHI. During our evaluation, the city administration raise the idea about post training supervision and participant's relevance that is most of the time coordinators participate on trainings.

Case Confirmation and Laboratory Capacity of Health Facilities

All visited health facilities have the capacity to transport specimens to higher levels for confirmatory test. This can be explained by there are trained personnel on this and enough cold chain equipment at this level. Also these health facilities have guidelines of specimen collection, handling and transportation. Laboratory of all visited health facilities has ability to collect and diagnose sputum, stool and urine and blood specimen. But only Hawassa comprehensive specialized hospital has ability to collect and diagnose CSF others do not have the capacity because of material shortage and lack of trained personnel.

Attributes of the Surveillance System

Usefulness

At all visited level, it was identified that the current surveillance system is helpful for early detection of outbreaks. Respondents at all level believe that the system is good enough to estimate magnitude of maternal death, identify factors associated with the death and able to

evaluate prevention and control programs. However, late or no verbal autopsy report to the concerned body has been a challenge in prevention and control measures.

Simplicity

All respondents agreed that case definition of maternal death are easy and applicable by all level professionals. In addition, they believe that community case definition are easy to understand at community level. In all health facilities, all interviewed professionals were respond correctly for case definition of maternal death. PHEM focal person at city administration level thought that additional data collection on cases are not time consuming but respondents at health facilities thought that it is time consuming because of shortage of man power and coordination and it takes greater than 10 - 15 minutes (up to half day) to fill weekly reporting format on morbidity and mortality of priority disease.

Flexibility

As the current reporting format contains additional spaces at the end for both weekly and immediately reportable diseases with namely; others, it can accommodate newly occurring health events/disease to fill on without any difficulty. Also, weekly reporting format can be modified based on current situation and different concerns. Respondents agreed that implementation of National PHEM guideline not difficult with changes in existing procedure of case detection, case definition and report forms. However, 60% of respondents believe that changes in allocating funds will affect implementation of surveillance system.

Data Quality

Reporting formats of weekly and immediately reportable diseases are well understood at all levels.

Acceptability

Active participation of agents in reporting system of surveillance activities in regular pattern is a major attribute for system's acceptability. The city administration thought that not all the

reporting agents were well engaged because of lack of understanding of the relevance of the data to be collected, feedback implementation problem and poor documentation.

Representativeness

Representativeness can be evaluated by access to health services and health seeking behavior of the populations. Both urban and rural population were equally benefited from the system. The potential health service coverage of assessed facilities was 100%, providing that the surveillance system in the city was representative.

Timeliness and Completeness

Timely report of surveillance data is important for early public health interventions. Timeliness is a speed between steps in a public health surveillance system. As per standard of National PHEM the expected level of report timeliness is 80% and above. Timeliness of the city administration report was 100% and the average report completeness was 90%. But regarding maternal death report the verbal autopsy report were not sent according to the recommended time.

Stability

The surveillance system ensured to function in proper way and there was no time or condition by which the surveillance system is interrupted even during some instability and security problems occurred in the past few months in the city of Hawassa the surveillance system was not interrupted.

Discussion

Surveillance system evaluation is a periodic assessment of effectiveness and efficiency of a program toward its purposes and objectives. Collaborative and integrated assessment of public health surveillance system is important for resource utilization, comprehensive skill, anticipatory and organizes feedback. It is possible to conduct repeated evaluations with similar objectives, or implement a series of evaluations with different objectives and assessing different components of the surveillance system [2]. Epidemic preparedness refers to the existing level of preparedness for potential epidemics and includes availability of preparedness plans, stockpiling, designation

of isolation facilities, setting aside of resources for outbreak response [2]. At health facility level, there was no well-organized epidemic preparedness and response plan and also no budget line for epidemic response but there was at zonal level. The aim of preparedness is to strengthen capacity in recognizing and responding to public health emergencies through conducting regular risk identification and analysis, establishing partnership and collaboration, enhancing community participation and implementing community-based interventions and strategic communication during the pre-emergency phase and ensuring their monitoring and evaluation [3]. Feedback is a key function of public health surveillance system. The city administration gave feedback quarterly but not regular especially in written form. Due to shortage of budget and vehicle the visited 2 hospitals had not supervise their respective health facilities regularly. Lack of budget line either from government or non-governmental organizations for surveillance activities at health facility level was a problem to run tasks under PHEM towards their objectives. Visited health facilities had a capacity to collect, handle and transport specimen of reportable diseases. Surveillance data analysis is helpful to see trend of diseases and to turn raw data in to useful information which can be used for action. At the city administration level and two visited hospitals surveillance data were analyzed by person, place and time but the frequency differs that is the city administration analyze weekly and the rest as needed. The health centers did not perform analysis of reportable diseases because of this the health centers did not apply control and prevention measures based on their local data.

Despite some gaps the city administration reported greater than the expected level of maternal death report that is 52/43 according to regional 12 month report.

Conclusion

Public health emergency management guideline and case definitions were available for Measles, Malaria, AFP, NNT, Meningitis and MPDSR in all visited health facilities and the city administration. There was no budget line for epidemic response at health facility level but there was at zonal level. Eighteen (18) PHEM focal persons and other officers trained regarding Rapid Response Team, Community Integrated Disease Surveillance and MDSR surveillance and reporting system by regional PHEM unit and EPHI. All the respondents agreed that the surveillance system is simple and flexible.

Recommendations

- Data analysis for prioritized diseases at health facility level should be performed regularly.
- Strong supportive supervision and feedback should be maintained in regular basis at all levels.
- Budget should be allocated for surveillance activities at each level.

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Chapter Four- Health Profile Assessment

4.1. Health Profile Description of Misrak Badewacho District, Hadiya Zone, SNNPR, Ethiopia 2018

Abstract

Introduction: Misrak badewacho is one of Hadiya zone district. It is located 345 km to the south west of Addis Ababa, 117 km from Awassa (Capital of the region) and 97 km from Hosana (capital of Hadiya zone). Health profile assessment is a process of gathering and interpreting information from multiple and diverse sources in order to develop a deep understanding of the health of a community. The purpose of this review was to assess and describe the district health profile which would be helpful for understanding of the health profile and use for program planning and intervention.

Objective: To assess the Health and health related profile of Misrak badewacho district.

Methods: A retrospective document review was employed in Misrak badewacho District, Hadiya Zone from March 10 2018 to March 25, 2018 and available data reviewed from health office & other institutions like agricultural office, finance and economic office, water resources, educational office and others.

Results: Misrak badewacho district had 36 kebeles with a total of 171,578 population from which males account for 85,240 (49.6%) and females account for 86,321 (50.4%) with the majority of the population (89.5%) residing in the rural part of the district.

The district had 7 health centers with a ratio of 1:24,511 health center to population ratio and 36 health posts with a ratio of 1:4766 health posts to population ratio. Out of 7 health centers, 4 (57.1%) had electric power supply, from 36 health posts only 3 (8.3%) had electric power supply. All health centers and health posts had access to transportation. There was no telecommunication access in all health centers and health posts. Primary health service coverage of the district was 97% and all rural kebeles have health posts.

The Antenatal care (ANC) rate, the districts health office in 2009 E.C. expected 5937 pregnancies to attend the first Antenatal care (ANC) and achieved 6937 (117%) pregnancies and 6019 (101%) attend the fourth ANC. Percentage of deliveries attended by skilled birth attendants was 73.4% and the contraceptive acceptance rate was 75.9 %

Top five causes of morbidity in pediatrics and adults were malaria, pneumonia, diarrhea, severe acute malnutrition and helminthiasis.

There were a total of 57 governmental schools and 3 Non-governmental schools (2 high schools and 1 elementary school) in the district. The district had 52 enrolled elementary schools and male students were 23,647 (55.4%) and female students were 19,023 (44.6%). The total number of enrolled secondary schools were 7 and male and female students in the schools constitute 2463 (59.4%) and 1684 (40.6%) respectively. There were two preparatory schools in the district.

Schools with water supply were 2 and 54 schools had toilets but schools with functional latrines were 16 (Male latrine 8 and Female latrine 8). Schools with HIV/other health clubs were 47.

The district water supply coverage was 41% in rural areas and 62% in urban areas. From 36 rural kebeles 9 kebeles had no water supply, out of 9 kebeles 3 kebeles had fluoride in their water resource. The source of water was deep well and hand pump.

Conclusions:

Malaria was the top cause of morbidity in Misrak badewacho district both in adults and children followed by pneumonia, diarrhea, severe acute malnutrition and helminthiasis. All health centers, health posts and most of the schools did not have water supply and safe water coverage of the district was poor.

Recommendation: Effective use of malaria prevention and control measure to reduce malaria incidence should be focused by the community, health posts, and health center and district health office.

Important health indicators and vital statistics data's should be organized.

The necessary intervention should be taken to improve the districts water supply coverage.

Key words: District Health profile, Misrak badewacho District, Hadiya zone SNNPR, Ethiopia

Introduction

SNNPR is the third largest administrative region of Ethiopia that represents about 20% of the country's population and one of the nine Regional States in Ethiopia. The total population of the region was estimated to be 18,719,008 in 2016. It has 14 Zones, 4 Special District and 1 city administration. The region has an area of 118,000 sq. km and which consists of 10% of the total area of the country.

Misrak badewacho district is one of Hadiya zone districts. It is located 345 km to the south west of Addis Ababa, 117 km from Awassa (Capital of the region) and 97 km from Hosana (capital of Hadiya zone). The district previously known as 'Sike' in 1989 E.C the name changed to local name badewacho means ' togetherness ', in 1998 E.C badewacho split to Misrak badewacho and Mirab badewacho for administrative purpose.

The district is located at 70° 30' latitude and 37° 46' longitude and the area of the district is about 33,447 sq.km. The district is surrounded by siraro in east, Adilo in west, Damot gale in south and halaba in north boundaries. The climatic condition of the district is 87% midland and 13% lowland. The Annual range of rainfall is 800-1200 mm and the annual average temperature is 19.5℃.

A community health profile is a system of collecting, organizing and summarizing health and other health related events to describe health and other health related conditions. Public health surveillance officials used identified and prioritized information as a basis for planning, implementation and evaluation of public health surveillance program conducting at community level. The information may include data already collected and published about a community or information collected by the organizations or individuals creating the profile [1].

An assessment that covers an entire community will necessarily be broad and include a wide range of data. A community health profile includes both previously identified health issues and the identification of new, emerging issues [2].

Data will be collected analyzed and disseminated for decision on the important information available. Morbidity, mortality, socio-demographic and vital statistic other data will be collected and that will address evidence based public health problems and support to take public health action [3]. District health data is important for program planning, implementation and evaluation

of health care. The purpose of this project was to assess and describe the district health profile which would be helpful for understanding of the health profile and use for program planning and intervention.

Rationale of the study

Health profile description helps to determine the effectiveness of policies, programs and projects to improve the health and social services of a given population by assessing the existing health service coverage, the developmental activities, social services, major health problems, risk factors and indicates areas that needs attention or focus to improve the health status of the specifically identified community or population. Moreover the health profile of the district has not yet been done in the area. So this rapid assessment was designed to describe the health profile of Misrak badewacho district.

Objectives

General objective:

- To assess the health and health related profile of Misrak badewacho district of Hadiya zone, SNNPR.

Specific objectives:

- To describe the demographic characteristics of the population
- To describe the health status of the population
- To know vital statistics and health indicator
- To set recommendations based on identified problems

Materials and Methods

Study area and period

The study was conducted at Misrak badewacho district Hadiya zone SNNPR, Ethiopia. A one-year data (from July, 2008 to June, 2009 E.C) was used to develop the health profile assessment of the study area. Data was collected from March 10 2018 to March 25, 2018 and available data were reviewed from health office and other institutions like agricultural office, finance and economic office, water resources and energy office, educational office and others. Semi- structured check list was used for collection of data regarding health and health related information of the district in addition interview, personal observation and discussion with concerned health office head, experts, health professionals also applied. The finding was communicated to the district health office and other stake holders.

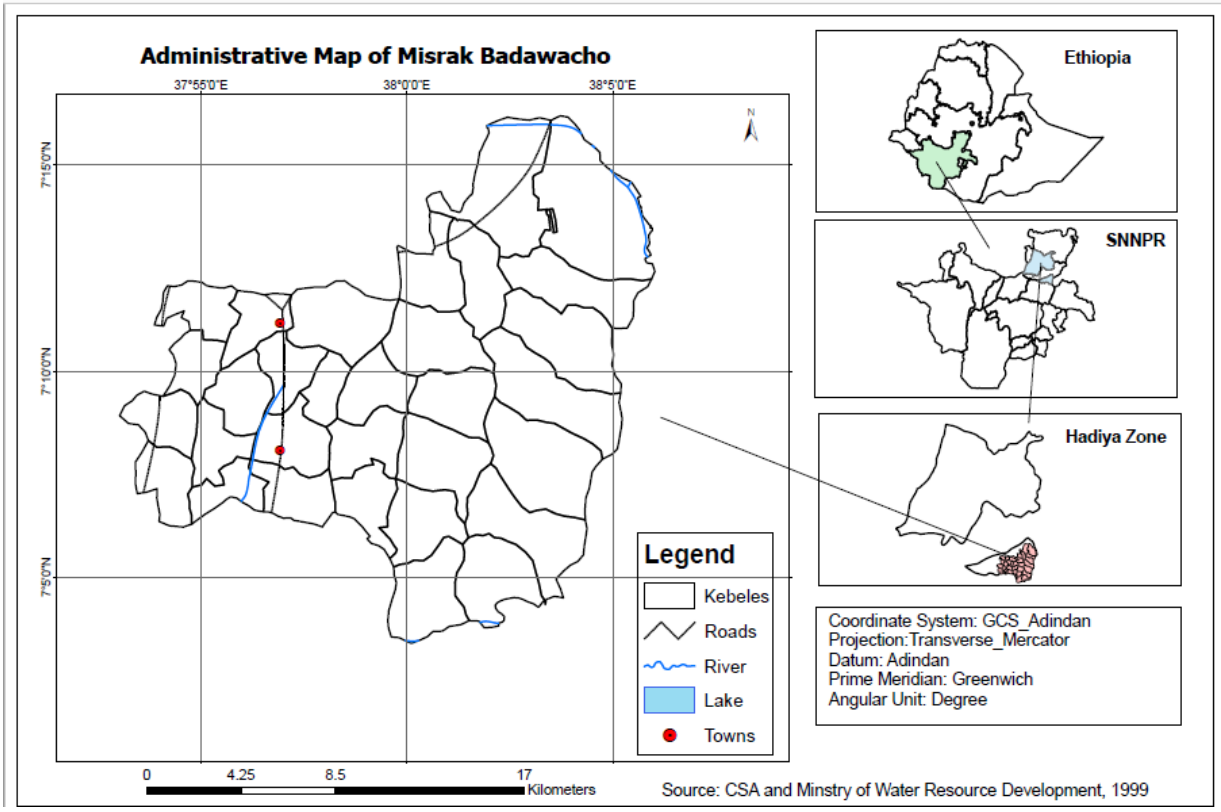


Fig 13. Administrative map of Misrak Badewacho District

Study design

A cross sectional study was done.

Data collection tool

The data was collected by using structured questionnaire and an interview. The questionnaire consists of socio demographic situation, economic status, and educational facilities, water sources disaster status of the area, vital statistics and health indicators, health facilities and health professionals and diseases condition in the district.

Data processing and analysis

Microsoft Excel was used to analyze the data. The results were presented in tables and graphs.

Ethical considerations

An official letter of cooperation was written from the Regional Public Health Emergency Management (PHEM) core process and other concerned bodies to the district stake holders to obtain their consent and the necessary explanation about the purpose of the study and its procedures was done.

Results

Administrative and demographic information

Misrak badewacho had a total of 39 *kebeles* from which 36 were rural *kebeles* and 3 urban kebele. The district had a total estimated population of 171,578 with 85,240 (49.6%) males and 86,321 (50.4%) were females. Out of these population 153,579 (89.5) peoples reside in rural areas and 17,981 (10.5) people live in urban areas. The district had a total of 35,016 households with average household of 5 people. Under one years old children constitutes 5473, under five 26,783, women of child bearing age 39,978 and pregnant women were 6,019.

Ethnic and religion compositions

Hadiya ethnic was the majority in the district and Hadiyigna was the dominant language where most of the people speak it and the other languages that are widely used in the community were Amharic, Wolaitigna, Halabigna, Kembatigna and Afaan Oromo. The religion composition of the district was Protestant 35%, Muslim 15%, Orthodox 13%, Adventist 8%, Jehovah's Witness 4%, Hawariyat 15% and catholic 10%.

Productivity and Income

The main source of income in the district was agriculture. The total land density of the district was 14640.33 ha out of which 14,214 ha was cultivated and 744.32 ha was grazing land. Maize, Haricot bean and Teff were the main crops in the district and the farmers utilize 25,422 quintal and Urea 20,378 quintal fertilizer in year 2009 E.C. The average income from agriculture source was 14,336 per house hold. From around 17,000 youths in the district 4408 youths were unemployed, the district youth and sport office facilitate job opportunity for 1717 youths.

Education

There were a total of 57 governmental schools and 3 Non-governmental schools (2 high schools and 1 elementary school) in the district. The district had 52 enrolled elementary schools and Male students were 23,647 (55.4%) and Female students were 19,023 (44.6%). Total number of enrolled secondary schools were 7 and Male and Female students in the schools constitute 2463 (59.4%) and 1684 (40.6%) respectively. Preparatory schools were 2.

The number of teachers at elementary schools was 1157 (Male 914 & Female 243). There were two private kindergarten schools and there was no TVET college in the district.

Schools with water supply were 2 and 54 schools had toilets but schools with functional latrines were 16 (Male latrine 8 and Female latrine 8). Schools with HIV/other health clubs were 47.

All kebeles had accessed with school and almost all had road access. School age children (target) were Male 6805 and Female 5957 totally 12,762. There was school drop out because of drought, shortage of water and food.

Infrastructure

The district water supply coverage was 41% in rural areas and 62% in urban areas. From 36 rural kebeles 9 kebeles had no water supply, out of 9 kebeles 3 kebeles had fluoride in their water resource. The source of water was deep well and hand pump. Out of 21 deep well 15 were functional and the rest 6 were non-functional, out of 73 hand pumps 65 were functional and 8 hand pumps were non-functional. Pipe water supply was 20% in rural and 62% in urban area. Chlorination was 3 times a year but in hand pumps it may go to 4 times a year and when there is rumor for example like AWD chlorination exceed the normal program.

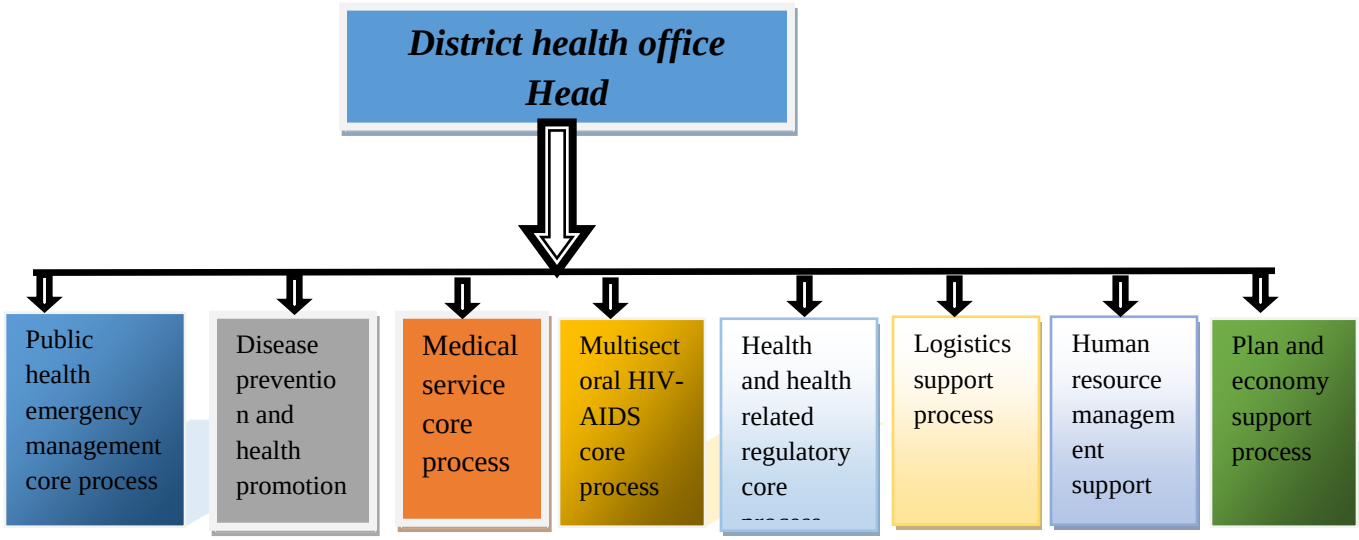
Health budget allocation

In 2009 E.C out of the total district budget (104,679,069 ETH Birr) 13,130,260 ETH Birr was allocated for health sector. For trachoma prevention 572,672 birr was budgeted by Orbis international, for children health care 66,218 birr by save the children and for sanitation and hygiene 103,613 birr was budgeted by MHM.

Health Infrastructure

The district had 7 health centers with ratio of 1:24,511 health center to population ratio and 36 health posts with a ratio of 1:4766 health posts to population ratio. Out of 7 health centers 4 (57.1%) had electric power supply, from 36 health posts only 3 (8.3%) had electric power supply. All health centers and health posts had access to transportation. There was no telecommunication and water supply access in all health centers and also health posts. Primary health service coverage of the district was 97% and all rural kebeles had health posts.

District health office organogram



Human resource in health institutions

Table 9: Human resource of health institutions in the district, in 2009 E.C

S. N	Profession	Male	Female	Total
1	MPH	3	0	3
2	BSC Nurse	7	2	9
3	BSC Environmental	3	0	3
4	Medical Laboratory Technicians	5	2	7
5	Midwifery	0	10	10
6	Clinical nurse	70	50	120
7	Public Nurse	6	2	8
8	Pharmacist Technicians	7	0	7
9	Diploma Environmental	2	0	2
	Total	103	66	169

There was no recorded information about HO to population ratio, Nurse to population ratio and HEW to population ratio.

Disaster status in the district

In 2009 E.C there was outbreak of scabies and all kebeles were affected. There were 8895 cases but no death recorded and the attack rate was 5.18%.

Vital statistics and indicators

Health indicators and vital statistics are important for estimation of the district's or country's development. The table below shows the vital statistics and health indicators of the District in 2009 E.C.

Table 10: vital statistics and health indicators of the District in 2009 E.C.

NO	*Indicators*	*Number*	*Percentage*	*Remark*
1	Total population	171,578	100	
2	Male	85,240	49.6	
3	Female	86,321	50.4	
4	Under 1-year population	5473	3.18	
5	Under 5-year population	26,783	15.6	
6	Pregnant women	6019	3.5	
7	Infant mortality rate	-		No data
8	Postnatal mortality rate	-		No data
9	Total live birth	4359	2.54	
10	Total still birth	1		
11	Total neonatal death	-		No data
12	Child mortality rate	-		No data
13	Crude birth rate			
14	Crude death rate	-		No data
15	Maternal mortality rate			No data
16	Contraceptive prevalence rate	30345		
17	Contraceptive acceptance rate	30345	75.9	
18	Average house hold size	5		

Immunization coverage of under one-year children

The district immunization coverage in 2009 E.C for children under one years of age was summarized in a table below.

Table 11: Immunization coverage of the District in children under one years of age in 2009 E.C

No	Type of vaccine	Number	Percentage
1	Penta-1	5604	102.3%
2	Penta-3	5527	100.9%
3	Measles	5291	96.6%
4	Fully immunized	5208	95.1%
5	PW TT2+	5994	109.5%

Maternal and child health service coverage

When we see the Antenatal care (ANC) rate, the districts health office in 2009 E.C. expected 5937 pregnancies to attend the first Antenatal care (ANC) and achieved 6937 (117%) pregnancies and 6019 (101%) attend the fourth ANC. Percentage of deliveries attended by skilled birth attendants was 73.4% and the contraceptive acceptance rate was 75.9 %.

Environmental health, Sanitation and Hygiene

Safe water supply coverage of the district was 39.19 % and the main Source of water was deep well and hand pump well. The latrine and ODF coverage of the district was 73% and 78 % respectively.

Community health service

The total community health services had been implemented by the lead of health extension workers. There were 888 CHWs in the district and their responsibility was teaching each house

hold on a package of HEWs and to be model for others. The health extension workers implement over all HEWs program packages.

Top ten causes of morbidity (OPD visit) in adults

Table 12: Top ten causes of morbidity (OPD visit) in adults in Misrak Badewacho district in 2009 E.C.

Rank	Disease	No of cases	percentage	remark
1	Malaria	2788	31.36	
2	Pneumonia	1740	19.57	
3	Diarrhea (non-bloody)	769	8.65	
4	Typhoid fever	653	7.34	
5	Infections of the skin and subcutaneous tissue	541	6.08	
6	Acute febrile illness	528	5.94	
7	Helminthiasis	461	5.19	
8	Trauma (injury, fracture...)	329	3.7	
9	Acute respiratory infections	286	3.22	
		8095		

Top five causes of morbidity (OPD visit) in pediatrics

Table 13: Top five causes of morbidity (OPD visit) in pediatrics in Misrak Badewacho district in 2009 E.C.

S.N	Disease	Remark
1	Pneumonia	
2	Malaria	
3	Diarrhea (non-bloody)	
4	Severe acute malnutrition	
5	Helminthiasis	

Endemic Diseases

Malaria

All kebeles in the district are malarious and a total of 171,578 populations were at risk of being infected by malaria. Total malaria cases per year was 2788. Out of 36 kebeles in 35 kebeles there was insecticide treated bed nets (ITNs) distribution and the ITNs coverage was 97.2%. Ten kebeles were undertake IRS and all population in kebeles were covered.

The dominant species of malaria parasites was P.falciparum (56.6%) and P.vivax (43.4%).There was no shortage of anti-malaria drugs to treat malaria cases

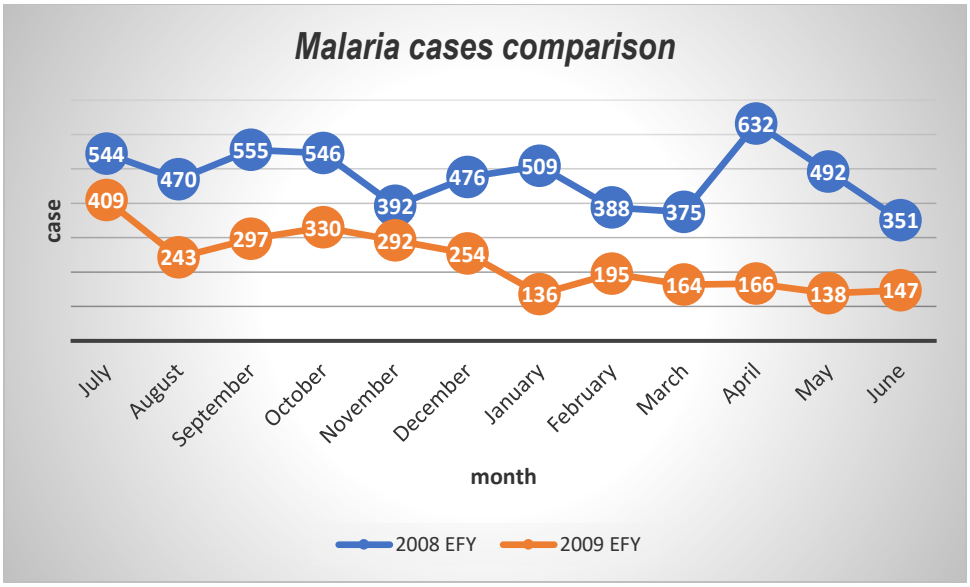


Fig 14: Malaria cases comparison by months in 2008 and 2009 E.C

Nutritional Status of the District

There were 36 outpatient treatment program (OTP) sites and 7 stabilization centers (SC) in the district in 2009 E.C. There was targeted supplementary feeding (TSF) program in the district and the children in the program were 7086. In PSNP program there were 9888 PW and 805 DS.

OTP Trend of the district

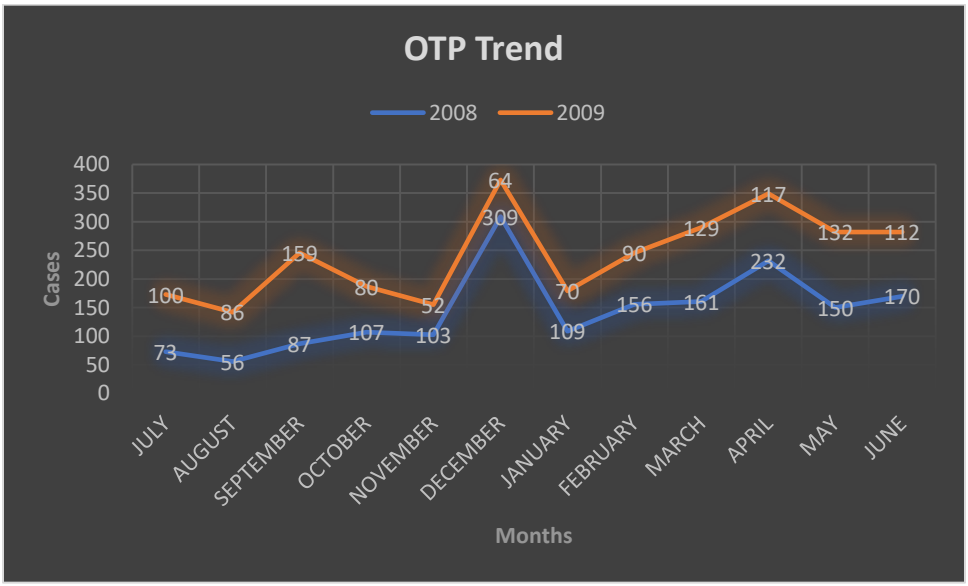


Fig 15: OTP Trends of the district in 2008 and 2009 E.C

SC Trend of the district

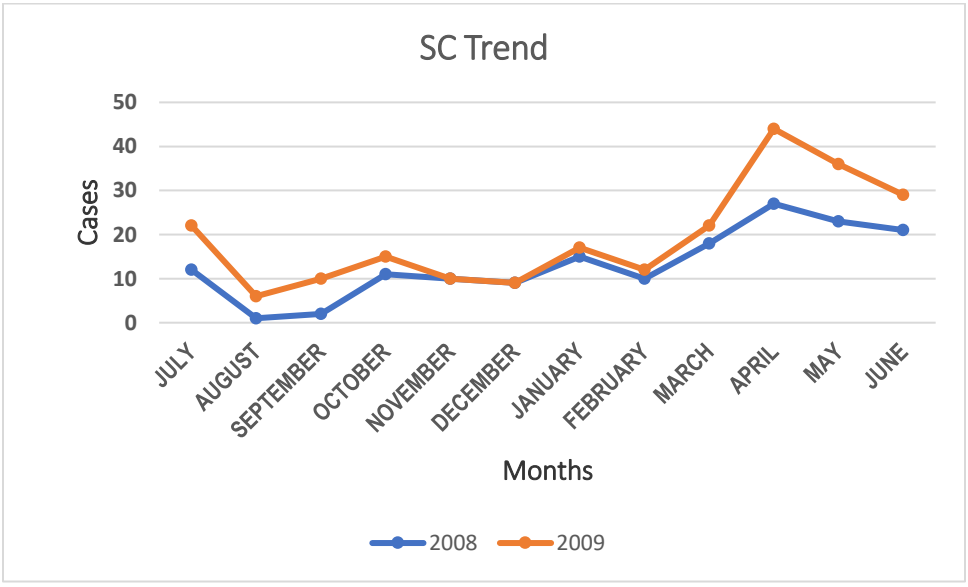


Fig 16: SC Trends of the district in 2008 and 2009 E.C

Tuberculosis and Leprosy

A total of 326 tuberculosis cases were reported to the district in 2009 E.C. From the total TB cases, 44 were pulmonary tuberculosis (PTB) negative, 222 were PTB positive and 60 were extra PTB. The TB detection rate was 60 % and TB treatment completion rate was 60%, were as TB treatment cure rate and TB treatment success rate were 72% and 78.3% respectively with no TB defaulter and with no death on TB treatment in 2009 E.C. Patients screened for HIV were 326 and there were no leprosy cases in the district.

Human Immune-Deficiency Virus (HIV)/ Acquired Immune Deficiency Syndrome (AIDS)

In the district a total of 13,035 clients were screened for HIV antibody tests in 2009 E.C out of this in VCT were 728, PITC were 7461 and 4846 were PMTCT tested in different health facilities. Total PLWHA were 9, patients on ART were 9 and on pre-ART were 5 Patients.

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Discussion

Despite the presence of high coverage of long-lasting insecticide treated nets and indoor residual spray still malaria was the top cause of morbidity in both adults and children. The assumption behind was, the district was hotspot for malaria, presence of stagnant water in the community and geographical and climatic condition. This description was similar with the health profile description conducted in different areas (1).

When we see the Antenatal care (ANC) rate, the districts health office in 2009 E.C. expected 5937 pregnancies to attend the first Antenatal care (ANC) and achieved 6937 (117%) pregnancies and 6019 (101%) attend the fourth ANC. Percentage of deliveries attended by skilled birth attendants was 73.4% and the contraceptive acceptance rate was 75.9 %. This result was not similar with other descriptions (1, 2)

Safe water coverage of the district was 39.2 %. All health centers, health posts and most of the schools do not have water supply. This indicated by, in 2009 E.C there was outbreak of scabies and all kebeles were affected.

Limitations

Absence and inconsistence of appropriate data in different Sectors for example, mortality records, employment and unemployment rates and inconsistent population data.

There was no data of some important health indicators and vital statistics information.

Conclusion

Malaria was the top cause of morbidity in Misrak badewacho district both in adults and children followed by pneumonia, diarrhea, severe acute malnutrition and helminthiasis. All health centers, health posts and most of the schools did not have water supply and safe water coverage of the district was poor.

Recommendation

Effective use of malaria prevention and control measure to reduce malaria incidence should be focused by the community, health posts, and health center and district health office.

Important health indicators and vital statistics data's should be organized.

The necessary intervention should be taken to improve the districts water supply coverage.

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Chapter Five- Scientific Manuscript

5.1 Dysentery outbreak investigation in Mizan Tepi University, Bench-Maji Zone, SNNPR, Ethiopia 2019

Kidist Jifar[1*], Prof Alemayehu Worku[1] and Dr. Fufa Abunna[2]

Address: [1] Addis Ababa university school of public health [2] Addis Ababa university faculty of veterinary medicine

Email: - Kidist Jifar kidistjifar@yahoo.com Prof Alemayehu Worku alemayehuwy@yahoo.com

Dr Fufa Abuna drfufex@gmail.com

Abstract

Introduction: Dysentery is an infectious gastrointestinal disorder, characterized by inflammation of the intestines, mainly the large intestine *Shigella flexneri* is the most common cause of bloody diarrhea. We investigated dysentery to describe cases, identify risk factors and implement intervention in Mizan Tepi University.

Methods: Unmatched 1:2 case control design was used from January 29/2019 to February, 14/2019. Data was collected using structured questionnaire, analysis was carried out by using SPSS version 20. Scale map displayed by using Arc GIS 10.2. Drinking water sample was also collected for Microbiological test and isolate the species. To measure the significance of association we used logistic regression and results were reported as odds ratio and 95% CI

Result: A total of 50 cases (AR: 9.3/1000 Population) with zero death of bloody diarrhea were identified from January 29/2019 to February, 14/2019. The mean age of cases was 21(SD $\pm$ 1.4), whereas their age ranged from 18 to 26 years. Male accounted 33 (66%). Contact with dysentery cases [AOR 6.3(95% CI 5.164_15.123) and absence of detergent for hand wash [AOR 5.4 (95% CI (1.946_14.839) was identified as risk factors. On the other hand, boiling water for drinking and proper hand washing after visiting toilet found to be protective with [AOR 0.10 (95% CI 0.012_0.945)] and [AOR 0.25 (95% CI 0.086_0.742)] respectively.

Conclusions: Common source outbreak was identified, absence of detergent and contact with dysentery case was identified as risk factors.

Recommendations: We recommend to the university to improve awareness on personal hygiene including use of detergents for hand wash. We also recommend latrine facilities should be made operational with functional water supply.

Key Word: Dysentery, Outbreak, Mizan Tepi University, Ethiopia, 2019.

Introduction

Dysentery is an infectious gastrointestinal disorder, characterized by inflammation of the intestines, mainly the large intestine(1). World Health Organization (WHO) defines dysentery as any episode of diarrhea with blood. *Shigella flexneri* is the most common cause of bloody diarrhea. The main dysentery signs and symptoms are pain and cramping in the lower abdominal region, pass stool mixed with blood and high body temperatures is the most common in dysentery. Dysentery with fever is quite common in children(2). Large-scale outbreak may be caused by *Shigella flexneri*. The incubation period of *Shigella flexneri* is from 1 to 4 days. Dysentery can mainly spread among people through contaminated food and water as well as poor sanitation(3).

Dysentery is endemic throughout the world. More than one million people are estimated to die and 165 million cases from *Shigella* infection each year(4). Children and immune compromised persons are prone to the infection. The mortality rate is greater in children younger than 5 years of age in Asia(5). About 99 % of infections caused by *Shigella* occur in developing countries, and the majority of cases (~70%), and of deaths (~60%), occur among children less than five years of age(6). In the past two decades major outbreaks have occurred in Africa, South Asia and Central America(7). Diarrhea is the second most common cause of death among children <5 years of age worldwide, accounting for 1.87 million deaths per year. Globally 21% of all deaths in children less than five years of age are estimated to be due to diarrheal infections(8). The annual incidence rate of shigellosis in Bangladesh has been reported to be as high as 13.2 cases per 1,000 children less than five years age(9).

In Africa, an estimate of 115 people dies of diarrheal diseases every hour, mostly Cause by *shigellosis* and *salmonellosis*. There are four species of *Shigell*a, which includes *S. dysenter, S. flexneri, S. boydii* and *S. sonnei.* From this species *S. dysenter* and *S. flexneri* more common in developing country(4). High burden dysentery in developing countries where there is an increased misuse of antimicrobial agents, diagnostic challenges due to lack of adequate facilities, there is limited awareness of the prevalence of infections and prevention methods(10).

In Ethiopia, one in every 17 Ethiopian children dies under one year age and one in every 11 children dies under five years age. According to the Ethiopian demographic and health survey (EDHS) report of 2011, 3% had diarrhea with blood in to the two-week periods before the survey (4). There were different prevalence rates in different regions. A study conducted in Gondar on

children with diarrhea isolated Shigella species with prevalence of 5.2%. Another related study conducted in Jimma also reported an isolation rate 5.8%. A total of 345 among food handlers participate in Arba Minch University for stool examination of whom, stool cultures reveal 3% *Shigella* isolate(11) and also isolated from 34.6% of the patients who attended health facilities in Hawassa(12).

Investigation of dysentery outbreak was carried out in Mizan Tepi University, Bench-Maji zone, SNNPR following the notification from the Zonal PHEM. The aim of undertaking the investigation was to confirm presence of an outbreak, to identify the causative agents, to identify source of the epidemic, to assess the extent of the outbreak in terms of person, place and time affected area and geographic spread of an outbreak to identify contributing factors for the spread of the epidemic.

Materials and Methods

Study area and Study period

The outbreak investigation was conducted in Mizan Tepi University, mizan town of Bench maji Zone, SNNPR, Ethiopia, from January 29/2019 to 14th of february,2019. Mizan Tepi university is one of the public University in Ethiopia established in 2006 at the coordinates of 6°58'5"N 35°34'5"E. The university located at 855Km far from Western part of the southern nation nationalities people regional city (Hawassa) and 583 Km far from capital city Addis Ababa. The University had a total of 5412 students in 2019 G.C, of these 3308 (61.1%) were males, whereas 2104 (38.8%) were females. The study was conducted from January 29/2019 to 14th of February, 2019.

Study Design

Both descriptive and case- control study design was conducted. Dysentery cases were reported by using line-lists compiled by the zonal health department of PHEM core process. We used the national PHEM guide line case definition of a suspected dysentery case in an outbreak setting- in an area where there was a dysentery epidemic, a patient that develops dysentery, with or without abdominal cramp (2).Controls without symptoms of dysentery taken from the students in the university. The selection of cases and controls made conveniently (unmatched). A total of 50 Cases and 100 controls were interviewed with standard questionnaire, which made the ratio of case to control was 1:2

Target population

All students in Mizan-Tepi University where cases and controls recruited

Study population

Those all cases developed signs and symptom of dysentery were enrolled as "cases" while those without sign and symptom, living in the same room or compound were enrolled as "controls".

Inclusion and Exclusion criteria

Inclusion Criteria

Cases: All 50 dysentery cases sent by line list that had symptoms of diarrhea (mucoid or bloody diarrhea, fever, and abdominal cramps) who agreed to participate in the study were included.

Controls: Any students of the University during the study period who shared the same room or compound to a case and who did not develop signs and symptoms of dysentery and agreed to participate were included.

Exclusion criteria

Those **Cases** and **Controls** who refused to participate in the study were excluded and others staffs of the university rather than the students also excluded.

Standard case definitions

Suspected case: A person with diarrhea with visible blood in stool

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

Data collection method

We obtained line list data from zonal health department PHEM core process**.** Both quantitative and qualitative data were collected through interview, observation, discussion, report (line list) reviews and using standard questioner to collect data of case and control. Selected cases and controls were recruited from the same room or compound. Data was collected by principal investigator including regional, zonal and district PHEM officers and sample were taken by regional laboratory technician.

Laboratory Investigation

Water sample were collected and transported to EPHI (Ethiopian public health institute) microbiology laboratory keeping in cold chain for bacteriological analysis using standard water sampling procedure. Samples were taken from Pipe water and River (shonga).

Environmental observation

Environmental assessment was undertaken in the compound, specifically in food preparation area, water access sources, latrine facilities, bathing and washing facility and solid waste disposal area. A team of investigators inspected the hygiene and sanitation of the university community.

Data quality control

Collected data was verified daily during the investigation period and in addition to this when entering the data in to the computer by using Epi-Info version7 software, the missing variables and consistency of filling of questionnaires and completeness of data was checked out carefully.

Data entry and Analysis

Descriptive analysis was performed using univariate statistics to report means and standard deviation (SDs) for continuous variables and frequency for the categorical variables. Proportion and summary statistics for dependents and independents variable were generated before cross-tabulation were made. Chi-square test were used to determine the association between categorical variables and Fisher exact test was used for statistical test. Bivariate and multivariable binary logistic regression was performed to describe test for interaction, relationship and crude odd ratio (COR) and adjusted odd ratio (AOR) for the association of each selected independent variables with utilization of latrine while controlling of other variables. The significance level was defined as a p-value of less than 0.05. *Bivariate* and *Multivariable* logistic regression analysis was applied. Results were displayed using maps, tables and graphs and it was interpreted using Odd Ratio (OR), P-value < 0.05 and 95% Confidence Interval (CI).

Ethical issue

Support letter was written from regional health bureau and we obtained support and willingness to conduct the study from zonal health department. The purpose of the investigation was clearly explained for all respondents. The current study was conducted as epidemic monitoring activity of the Regional health bureau. As a result, ethical clearance was not processed.

Results

Descriptive Epidemiology

A total of 50 cases with zero death of bloody diarrhea were identified from late of January 29/ 2019 to February 14, 2019. The number of cases were increased from February 2 _6/2019. out of the total of 50 dysentery cases about 33(66%) students were males and 17 (34%) were females

with the mean age of 21 (SD_+1.4) while their crude age was ranged between 18 to 26 years old. Meanwhile about 100% of cases and 95% of control were single in terms of marital status. Regarding clinical manifestation, the majority of students presented with the symptoms of bloody diarrhea (100%), abdominal cramp (96%), fever (54%) and Nausea and vomiting (28%).

Attack rate was calculated as "number of all cases over the number of all students during the occurrence of current dysentery outbreak in Mizan Tepi University". From morbidity data as a whole, overall attack rate (AR) of the cases were estimated to be 9.3 cases per 1,000 populations, however it found to be varies with gender. Attack rate observed among male students was higher than the female students, while affected ratio male to female was approximately 1:2.

The date of onset of the primary case was verified on January 29/2019. The index case was 23 years old male, 2nd year student who came from Agriculture department and his residence was block 31. When he came to the university clinic, presented with typical sign and symptom of bacillary dysentery. The highest cases were registered on February, 04/ 2019. The information obtained from the index cases was not found to be different from other cases in having any recent travel history, feeding and drinking outside the compound. Among cases and control, about 40(80%) of cases and 82(82%) of control ate their meal in the compound, while 10% and 8% of cases and control ate their meal outside the compound.

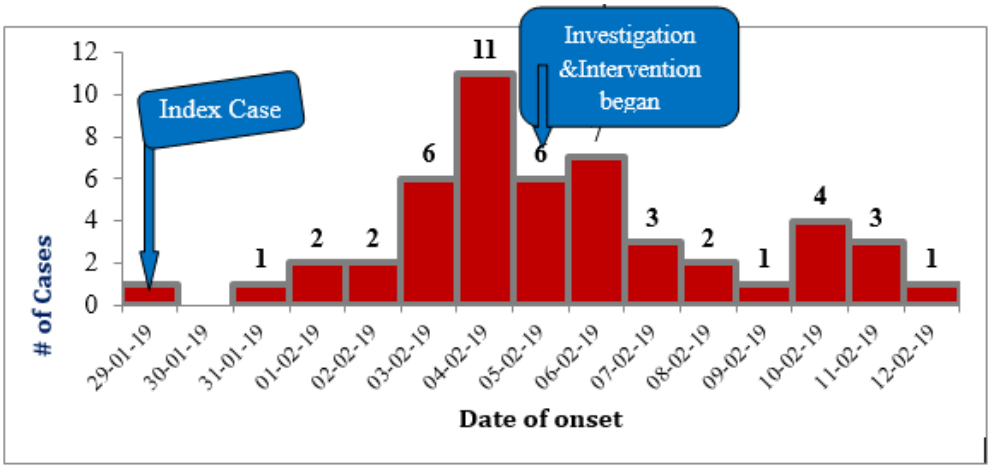

Figure 4: Epidemic Curve by Date of Onset of all bloody diarrhea cases in Mizan Tepi University Bench-Maji zone, SNNPR, Ethiopia, 2019

Analytical investigation

Factors associated with an outbreak

Bivariate analysis

The selected variables were tested for their individual contribution or association for the occurrence of outbreak through binary logistic analysis. During bivariate analysis, statistically significant independent variables were contact dysentery case OR 6.9 (95% CI: 0.068-0.308)] and Storing food for later use OR 3.4(95%CI 0.124_0.6761 were risk factors for the occurrence of dysentery. But, treat drinking water with chemicals/boiling [OR 0.125(95%CI 1.811_35.32) Presence of functional toilet OR 0.34(95%CI 1.25_6.974)] closed water fetching materials OR 0.1(95%CI 0.04-0.43) proper hand washing after visiting toilet OR 0.18(95%CI 2.547_12.758) were protective factors.

Multivariable analysis

During multivariate analysis, variables that were significantly associated at the bivariate analysis further examined in the logistic regression to see their relative effects on the outcome variable through multivariable analysis. From multivariate logistic regression, risk factor that remained statistically significantly associated with the occurrence of outbreaks were, absence of detergent after the use of latrine for hand wash [AOR 5.4 (95% CI (1.946_14.839)], direct contact history with the patient [AOR 6.8 (95% CI (3.243_14.606], ate raw or uncooked food in a compound or around compound [AOR 3.9(95% CI 1.448_10.501)]. On the other hand protective factors that remained statistically significantly associated with the diseases on multivariate logistic regression analysis were treat water with chemicals/ boil for drinking with [AOR 0.10(95% CI 0.012_0.945)] and Proper hand Washing after visiting toilet [AOR 0.25(95% CI 0.086_0.742)]

Table 2: Bivariate Analysis of Risk and Protective Factors for Dysentery Outbreak, Mizan Tepi University Bench-Maji zone, SNNPR Ethiopia, 2019

Variables	Yes	Case	Control	COR(95% CI)	AOR(95% CI)
	No	**N=50**	**N=100**		
Presence of any sick person in a dormitory	Yes	42(28)	44(29.3)	6.7(0.34_0.224)	6.3(5.164_15.123) *
	No	8(5.3)	56(37.3)		
Treat water with chemicals/ boil for drinking	Yes	2(1.3)	25(16.6)	0.12(1.811_35.32)	0.10(0.012_0.945) *
	No	48(32)	75(50)		
Presence of detergent after the use of latrine for hand wash	Plain water only	40(26)	47(31)	4.5(2.034_ 10.003)	5.4(1.946_14.839) *
	With soap	10(6.6)	53(35)		
Ate raw or uncooked food in & around compound	Yes	29(19)	25(16.6)	4.1(0.117_ 0.497)	3.9(1.448_10.501) *
	No	21(15)	75(50)		
Proper hand Washing after visiting of toilet	Yes	27(18)	87(58)	0.18(2.547_12.758)	0.25(0.086_0.742) *
	No	23(15)	13(8.6)		
Direct contacted history with one bloody diarrhea patient	Yes	33(22)	22(14)	6.9(0.068-0.308)	6.8(3.243_14.606*
	No	17(11)	78(52)		

Laboratory Investigation

Laboratory investigation was carried out by Ethiopian public health institute. Stool samples collected for microbiological culture were positive for *Shigella flexneri*. The laboratory results of water samples shown it was not potable water.

Environmental observation

We observed different areas that is, access for hygiene and Sanitation facility, access for drinking water, washing clothes, utensils, personal hygiene, food preparation area, hand washing facility with soap, environmental hygiene, general inspection around food preparation and access to functional latrines. During our observation we saw students wash their cloths in Shonga River which pass through the university compound because of shortage of pipe water and also they wash their hands before going to student's cafeteria in this river sometimes. There were no functional latrine in students' dormitory and because of this students were suffered during the outbreak because the diarrhea was frequent.

Outbreak Prevention and Control Activities

Zonal level response task force were established from different sectors such as Health, Education, Political leader, Water, and team from FMoH, RHB also included and chaired by

Mizan Tepi university head/president. The task force were organized in to five thematic areas. These were:-

- Surveillance team
- Social Mobilization team
- Case Management team
- WASH team
- Regulatory (inspection team)
- Logistic and Supply team

The task force were meet regularly at 5:00 PM to monitor and evaluate daily team activities report, challenges and set directions how to resolve faced challenges.

Discussions

According to national guideline the dysentery outbreak threshold is unusually increasing in number of cases or doubling of cases on subsequent weeks (13). Therefore, we confirmed the existence of dysentery outbreak. The peak of epidemic curve was seen on February 4th, 2019 and the curve fell dawn within few days after getting its peak. This sharp increase and decrease of the epidemic curve is typical characteristic of common source type of epidemic (13).

The extent of this outbreak is likely to be due to water point contamination. The latter decline might be due to investigation and interventions done. Epidemic curve can determine the probable period of exposure (13). The cases have a date of onset which ranges from January 29 to February 14 /2019, which indicates that the epidemic has lasted for more than one incubation period might be due to secondary person to person transmission.

Male were account three-fourth of dysentery cases, which is male were more affected than female. It was consistent with study done in Addis Ababa University, where among affected over 99% were male. Overall attack rate (AR) was 9.3 per 1,000 populations. Hand washing with soap is the single most effective and inexpensive way to prevent diarrhea and ARI. According to UNICEF, cleaning hand washing with soap before eating and after using the toilet into an ingrained habit can save more lives than any single vaccine or medical intervention, cutting deaths from diarrhea by 50% and deaths from acute respiratory infections by one-quarter. This study found that, proper hand washing with soap after visiting toilet also significantly associated with diseases which emphasized that those who properly wash their hand after visiting toilet were 75% less

likely to develop dysentery disease as compared with those who were not properly washed. In other way due to lack of access of detergent for hand wash at critical time were found to be about 5.4 times more likely to develop dysentery as compared with those who wash their hands with water and soap.

Those who had direct contact with dysentery cases were 6.8 times more likely to develop dysentery compared to those who were not contact dysentery cases. As described on the descriptive, finding the analytical finding also support the source and mode of transmission which is close contact with patients. This can be due to Shigellosis epidemics usually occur in areas with crowding and poor sanitary conditions, where person-to -person transmission or contamination of food or water by the organism is common (14). Others, eating (having) raw or uncooked food item were highly significant for developing dysentery.

From January 29 to February 14, 2019, there was confirmed dysentery outbreak in Mizan Tepi University in Bench-Maji zone due to Shigella *flexneri*. 50 cases with no death, of them, 66% were male with the mean age of 21years (SD± 1.4) which was ranged from 18_26 years old affected by current outbreak.

The present study found that transmission of the disease exacerbated with lack of access for safe and potable water, contamination of water sources, inadequate sanitation, and poor personal and environmental hygiene.

We recommend to the university to improve awareness on personal hygiene including use of detergents for hand wash. We also recommend latrine facilities should be made operational with functional water supply.

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.Chapter six- Scientific Abstract

6.1 Dysentery outbreak investigation in Mizan Tepi University, Bench-Maji Zone, SNNPR, Ethiopia 2019

Kidist Jifar[1*], Prof Alemayehu Worku[1] and Dr. Fufa Abunna[2]

Address: [1] Addis Ababa university school of public health [2] Addis Ababa university faculty of veterinary medicine

Email: - Kidist Jifar kidistjifar@yahoo.com Prof Alemayehu Worku alemayehuwy@yahoo.com

Dr Fufa Abuna drfufex@gmail.com

Abstract

Introduction: Dysentery is an infectious gastrointestinal disorder, characterized by inflammation of the intestines, mainly the large intestine *Shigella flexneri* is the most common cause of bloody diarrhea. We investigated dysentery to describe cases, identify risk factors and implement intervention in Mizan Tepi University.

Methods: Unmatched 1:2 case control design was used from January 29/2019 to February, 14/2019. Data was collected using structured questionnaire, analysis was carried out by using SPSS version 20. Scale map displayed by using Arc GIS 10.2. Drinking water sample was also collected for Microbiological test and isolate the species. To measure the significance of association we used logistic regression and results were reported as odds ratio and 95% CI

Result: A total of 50 cases (AR: 9.3/1000 Population) with zero death of bloody diarrhea were identified from January 29/2019 to February, 14/2019. The mean age of cases was 21(SD $\pm$ 1.4), whereas their age ranged from 18 to 26 years. Male accounted 33 (66%). Contact with dysentery cases [AOR 6.3(95% CI 5.164_15.123) and absence of detergent for hand wash [AOR 5.4 (95% CI (1.946_14.839) was identified as risk factors. On the other hand, boiling water for drinking and proper hand washing after visiting toilet found to be protective with [AOR 0.10 (95% CI 0.012_0.945)] and [AOR 0.25 (95% CI 0.086_0.742)] respectively.

Conclusions: Common source outbreak was identified, absence of detergent and contact with dysentery case was identified as risk factors.

Recommendations: We recommend to the university to improve awareness on personal hygiene including use of detergents for hand wash. We also recommend latrine facilities should be made operational with functional water supply.

Key Word: Dysentery, Outbreak, Mizan Tepi University, Ethiopia, 2019

Chapter Seven- Narrative Description of Disaster Situation

7.1 *Meher Season* emergency health and nutrition needs assessment conducted in SIDAMA and GEDEO zones of SNNPR, Ethiopia

Introduction

Ethiopia has been conducting human health and nutrition emergency needs assessment twice a year during *Meher and Belg* seasons. The *Meher* assessment is always conducted following the main harvesting season to see the level of production and map the different hazards occurred and to predict the potential economic, health and social threats. During the assessment possible human health and nutrition risks were expected to be identified and numbers of beneficiaries were estimated. Finally based on the results of the assessment humanitarian document was prepared and distributed to all concerned partners to fill the gaps identified to stops and minimize public health consequences.

This assessment was led by Disaster Risk Management and Food Security Sector in collaboration with other governmental sectors like Ministry of Health, Ministry of Water and Energy, Ministry of Education, Ministry of agriculture and livestock, National Metrology Agency and respective regional bureaus and non-governmental organizations involved were WHO, UNICEF, World Vision, FAO, World food program, Goal international, Save the children international and others.

Southern Nations, Nationalities and Peoples Regional State is one of the 9 Regions in the Federal republic of Ethiopia with estimated total population of 18,951,895 residing in about 18,000 sq. km, and has 56 ethnic groups. The assessment was conducted in 10 Zones and 1 Special District, from each Zone two or three districts were selected based on emergency health and nutrition problems in consultations with the RHB, zonal HB and Disaster Risk Management and Food Security Sector. This health assessment as part of Meher needs assessment was conducted in two zones (Sidama and Gedeo) and five hotspot districts from these two zones were selected and assessed. The assessment was conducted from November 21 to December 5, 2018 in these hot spot districts. The assessment gave particular emphasis on the emergency health and nutrition situation and needs.

The purpose of this assessment is to identify areas where emergency health and nutrition assistance is needed for the upcoming six months (January to June 2011 E.C) and to determine the gap in the capacity of the health system in addressing anticipated risks so as to develop response plan.

Objectives

General objective

- To assess the extent, types, , severity and likelihood of different risks in selected districts

Specific objectives

- To assess the current capacity of the districts health system to manage emergencies
- To assess the type and risk of epidemics of different public health emergencies of the most vulnerable districts

Materials and Methods

Study Area

The assessment was conducted in Sidama and Gedeo Zones of SNNP region. From Sidama zone 3 (Loka abaya, bona zuria and arorresa) from Gedeo zone 2 (Wonago and yirgachefe) districts were selected and assessed based on their risk trend.

Study design

A cross sectional study design was used to assess and identify human health and nutrition emergency needs.

Assessment Team and Assessment Tools

Six experts from Regional DRMFSS, ministry of water and energy, Regional HB, Ministry of education, Regional livestock and fisheries bureau and GOAL were participated in the assessment. One day orientation was given for all assessment team at Regional DRMFSS before deployment to zones.

Two different structured questioners (pretested?) were used to collect health and nutrition related data at district and zonal levels. The questioners addresses socio-demographic profile, health profile, status of epidemic prevention and control, risk factors, availability of emergency drug at zonal and district levels and it goes through asking nutrition status and situations related to flooding.

Source of Data

Secondary data were collected through discussion and interview from Zonal Health department and district health offices. Heads of zonal and district health offices, PHEM officers and other expertise were interviewed in the data collection. Briefing by different sectors of the zones were made to the team members before departing to the selected districts and also debriefing by the assessment team was done for respective government officials at last and discussions were under gone about the findings of the assessment.

Assessment findings

Sidama zone

Socio-demography

Sidama zone is comprising 19 districts and 4 city administrations with the total population of 3,893,816 (1,985,846 females). Source??

Table 14: Demographic characteristics of Sidama zone, loka abaya, bona Zuria and Aroressa District in, 2017/18

S.N	Zone/district	population	Male	Female	HH	< 5	PW	CBA(15_49)
1	Loka Abaya	132,051.00	65629	66422	26949	20613	4569	30768
2	Bona Zuria	161,412.00	79092	82320	32941	25196	5584	37609
3	Aroressa	225,480.00	110485	14995	46016	35197	7801	52537
4	Sidama Zone	3,893,816	1,907,969	1,985,846	794,656	607940	134,726	907,259

Health and Nutrition at Zonal and District level

Coordination and Emergency management

To manage emergencies accordingly the preparedness of the districts and the presence of functional emergency coordination and forum are very vital. Based on this, the assessment was conducted in Sidama zone on selected Districts:-Loka abaya, Bona zuria and Aroressa district.

Zonal health department has 03 functional PHEM officers, whereas in assessed districts and health facilities there were functional PHEM officer and PHEM focal persons based on the standard respectively. In a zonal health department and all three assessed district health offices,

Multi-sectorial Public Health Emergency Management (PHEM) coordination forums were established. However, only one-third of them meets only when there is a public health emergency situation.

Rapid Response Team (RRT) is found at all districts and health facilities level but regular meeting and functionality remained under questions. All assessed districts have Emergency Preparedness and Response plan (EPRP). From those, Aroressa and Bona zuria districts supported their EPRP with accessible emergency preparedness and response fund (28,000 – 50,000 ETB).

AWD, Measles and Meningitis in Dara, Boricha, Wondo Genet, Aleta Cuko and Bona zuria Districts planned as anticipated epidemics. However, zonal health department did not allocate emergency preparedness and response fund beyond EPRP.

Top five causes of Morbidity

Based on the health service statistics 2011 (E.C), the top five causes of morbidity for adults & under five children from May to October in three assessed districts and health facilities were briefly described in table below. Pneumonia, diarrheal diseases and all respiratory diseases were listed as major top five morbidity and mortality in under 5 year children's, whereas Acute febrile illness, Helminthiases and urinary tract infection also found to be top morbidity and mortality cause in adults in Loka abaya, Bona Zuria and Aroressa districts.

Table 15: The top five Causes of Morbidity in Loka abaya, Bona Zuria and Aroressa Districts in Sidama zone, 2017/18

S.N	Loka abaya Woreda		Aroressa Woreda		Bona Zuria Woreda	
	Morbidity in under 5 children's	**Morbidity in Adults**	**Morbidity in under 5 children's**	**Morbidity in Adults**	**Morbidity in under 5 children's**	**Morbidity in Adults**
1	Pneumonia	Typhoid fever	Pneumonia	Pneumonia	Pneumonia	Acute febrile illness
2	Diarrhoea(no bloody)	UTI	Diarrhea	Diarrhea	Diarrheal diseases	Helminthiases
3	Moderate acute malnutrition	Acute febrile illness	SAM	Trauma	Helminthiases	Pneumonia
4	All respiratory disease	Malaria all type	All respiratory diseases	UTI	Diarrheal diseases with dehydration	Trauma
5	Malaria all type	Helminthiases	Acute febrile illness	Acute febrile illness	Acute febrile illness	Diarrheal diseases

Outbreaks

According to information collected from assessed districts, there was no outbreak of any disease for the last three months and there was no ongoing outbreak.

Preparedness

Emergency and drug supplies was not sufficient for one month in two districts (Loka abaya and Bona-zuria) to manage AWD, malaria and Measles and also other medicine and supplies like management of Meningitis cases are not available in Districts.

Risk Factors

Malaria

Sidama Zone has malaria endemic areas and has high risk areas with mosquito breeding sites, and potentially interrupting rivers. It has 173 malaria endemic kebeles with 1,272,084 population at risk.

Among assessed districts, Loka abaya district 26 (100%) kebeles are malarias and have high risk areas with mosquito breeding sites and 132,051 populations are at risk. Bona zuria district have 12 (44%) malarias kebeles and 71,739 populations are at risk and also 07 (21%) kebeles are malarias in Aroressa and 64,265 populations are at risk. LLIN and IRS coverage was 92% and 33% respectively in Loka abaya district, but in two districts neither IRS nor LLTNS implemented.

Cases of malaria reported in the recent months was found to be reduced by 65% in Loka abaya, (334 in 2017, 116 in 2018) but it increased by 22% in Aroressa district (362 in 2017, 444 in 2018) as compared with the same successive months in the last year from May- October (2017), however malaria was not the top five causes of morbidity for all above five and under five years of age of the population in the districts.

Table 16: Malaria cases in Loka abaya, Bona zuria and Aroressa District 2017 Vs 2018

Month	Loka abaya district				Bona zuria district				Aroressa District			
	Cases		Death		Cases		Death		Cases		Death	
	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018
May	33	28	0	0	0	5	0	0	0	101	0	0
June	44	19	0	0	1	5	0	0	12	108	0	0
July	123	21	0	0	1	3	0	0	15	54	0	0
August	102	24	0	0	0	1	0	0	93	51	0	0
Sept	101	18	0	0	2	1	0	0	202	76	0	0
October	8	6	0	0	0	1	0	0	52	54	0	0

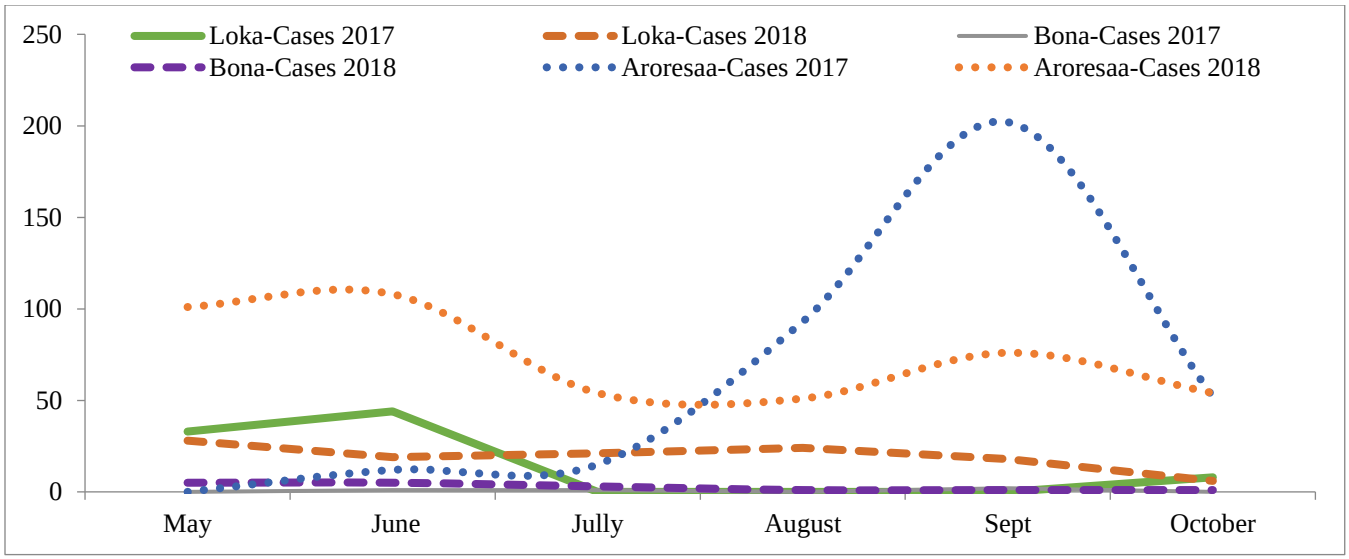

Fig 17. Monthly malaria trend in 2017 VS 2018 in Loka abaya, Bona –Zuria and Aroressa district in Sidama Zone, SNNPR

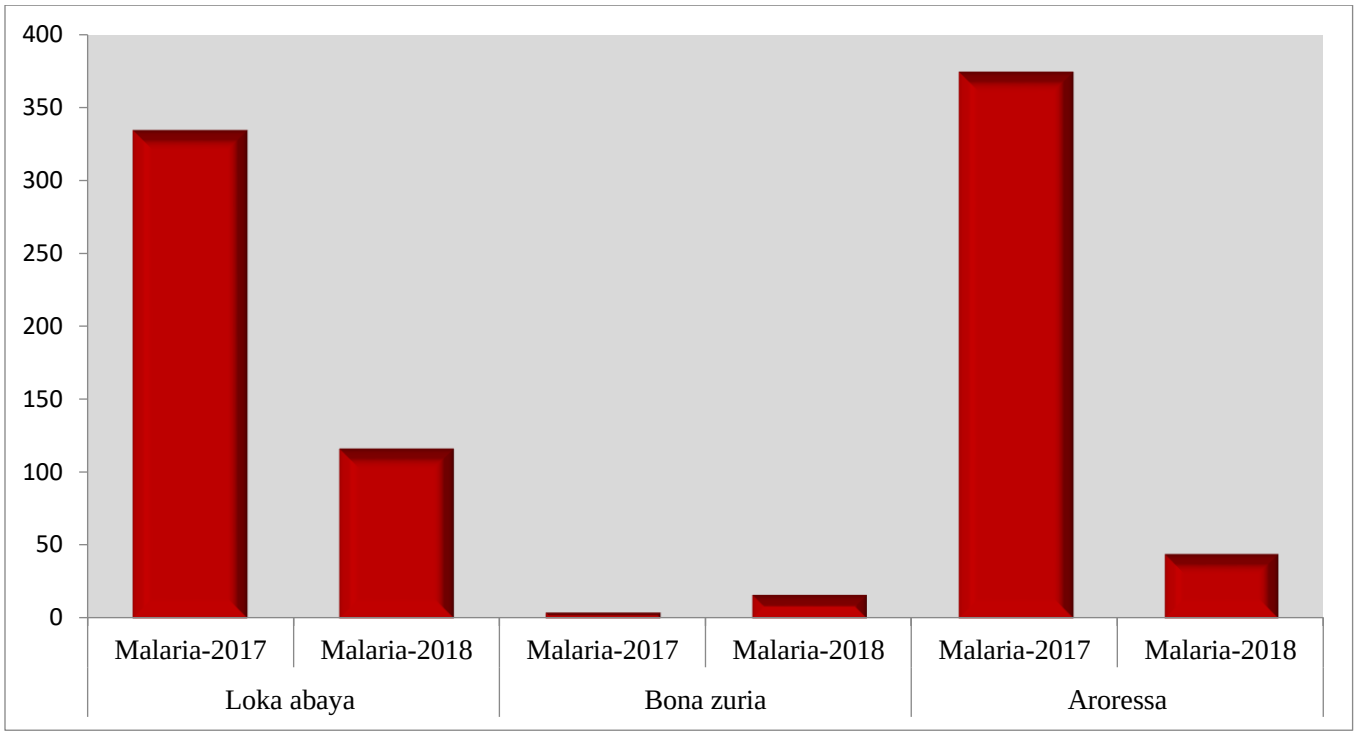

Fig 18. Malaria Case load from (May _ October) during 2017 Vs 2018 in three districts of Sidama Zone SNNPR

Meningitis

There was no meningitis epidemic in the last three years in the assessed Districts and no vaccination has been conducted.

AWD

In the last three years AWD outbreak was occurred in Loka abaya district between 20/11/2009 to 10/01/2010, but in remaining two districts no AWD outbreak occurred. Regarding latrine coverage, in Loka abaya and Bona zuria districts the coverage was 82% and in Aroressa it was 39%. Latrine utilizations also measured exclusive usage of their latrine by all family. The rate of latrine utilization was 76% in Aroressa, 66.8 % in Loka abaya and 39% in Bona zuria district. Safe and clean water coverage was also 34% in Loka abaya, 35% in Bona Zuria and 23% in Aroressa district.

Measles

In assessed Districts, there was no on-going Measles outbreak for the last three months. The Measles coverage for (2018) in Loka abaya, Bona zuria, and Aroressa districts was 94%, 92% and 98.2% respectively. SIA was not conducted at all three assessed districts in a year.

Nutrition- SAM and MAM management

Facilities with SAM management

Over 739 functional health facilities with SAM management (15 hospitals, 125 HCs, & 599 health posts) providing public health service in a zone. Among 140 health centers and hospitals, only 68% (n=95) of them were providing SC service, whereas all health posts (100%) are providing OTP services at the community level.

Table 17: Facilities with SAM management in Loka abaya, Bona Zuria and Aroressa Districts, Sidama zone, 2011 E.C

	Loka abaya District						Bona Zuria District						Aroressa District						Sidama Zone					
Month	# of HSPs	# Health canters	# Health posts	# of SC	# of OTP	# of OTP/SC report	# of HSPs	# Health canters	# Health posts	# of SC	# of OTP	# of OTP/SC report	# of HSPs	# Health canters	# Health posts	# of SC	# of OTP	# of OTP/SC report	# of HSPs	# Health canters	# Health posts	# of SC	# of OTP	# of OTP/SC report
May	1	6	26	6	26	26	1	5	27	4	27	27	1	8	33	1	33	33	15	125	599	95	525	525
June	1	6	26	6	26	26	1	5	27	4	27	27	1	8	33	1	33	33	15	125	599	95	525	525
July	1	6	26	6	26	26	1	5	27	4	27	27	1	8	33	1	33	33	15	125	599	95	525	525
Aug	1	6	26	6	26	26	1	5	27	4	27	27	1	8	33	1	33	33	15	125	599	95	525	525
Sept	1	6	26	6	26	26	1	5	27	4	27	27	1	8	33	1	33	33	15	125	599	95	525	525
Oct	1	6	26	6	26	26	1	5	27	4	27	27	1	8	33	1	33	33	15	125	599	95	525	525

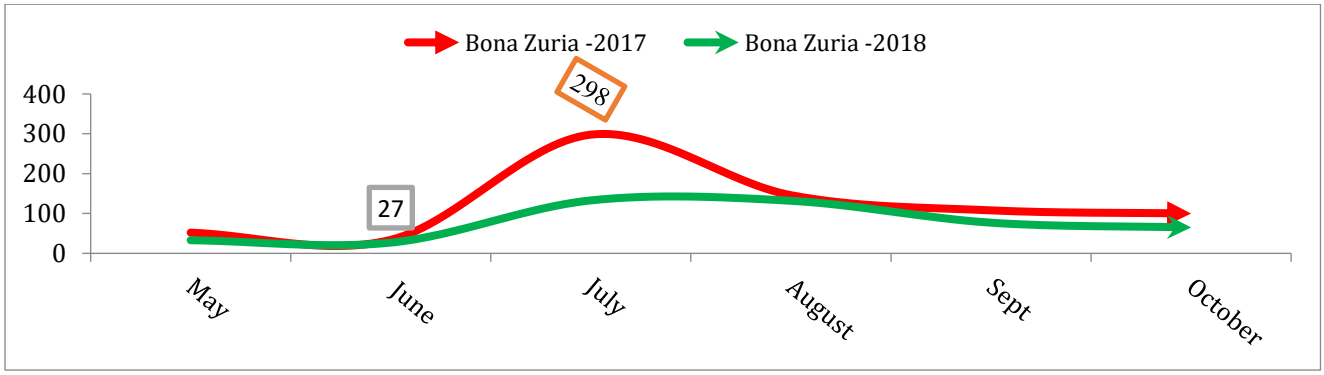

Figure 19: Monthly distribution of SAM admission cases in 2017 and 2018 for Bona Zuria

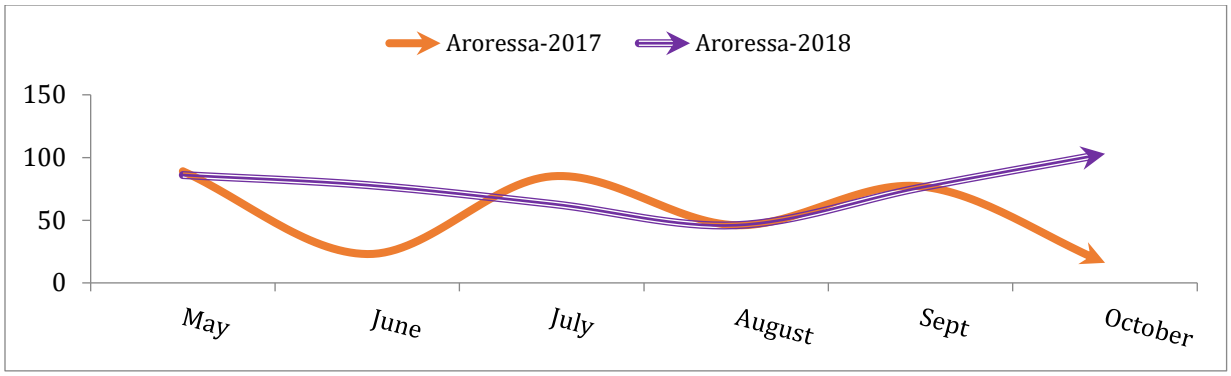

Figure 20: Monthly distribution of SAM admission cases in 2017 and 2018 for Aroressa District

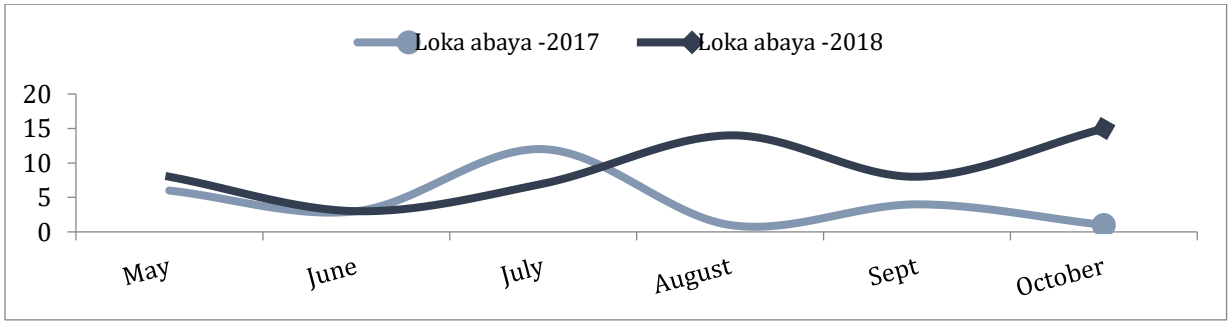

Figure 21: Monthly distribution of SAM admission cases in 2017 and 2018 for Loka abaya district

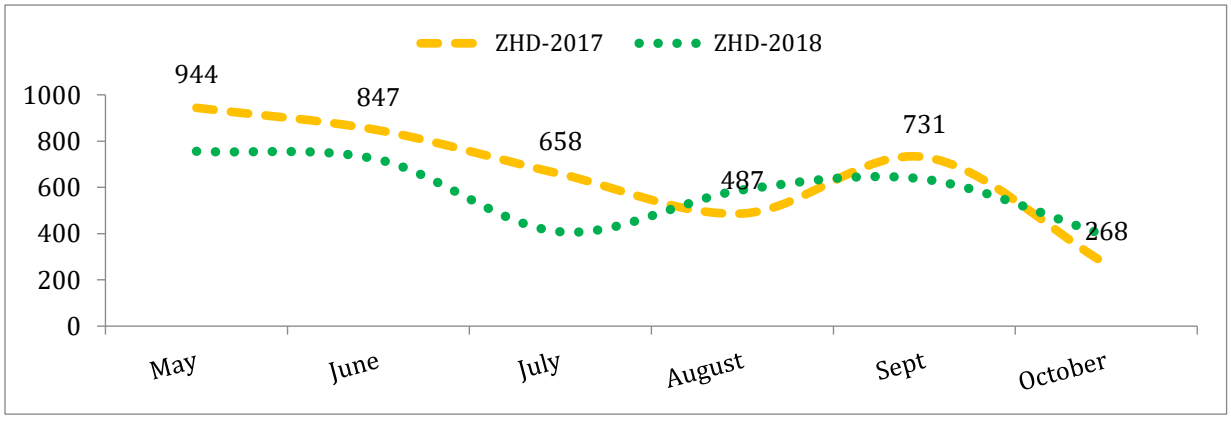

Figure 22: Monthly distribution of SAM admission cases in 2017 and 2018 in Sidama Zone

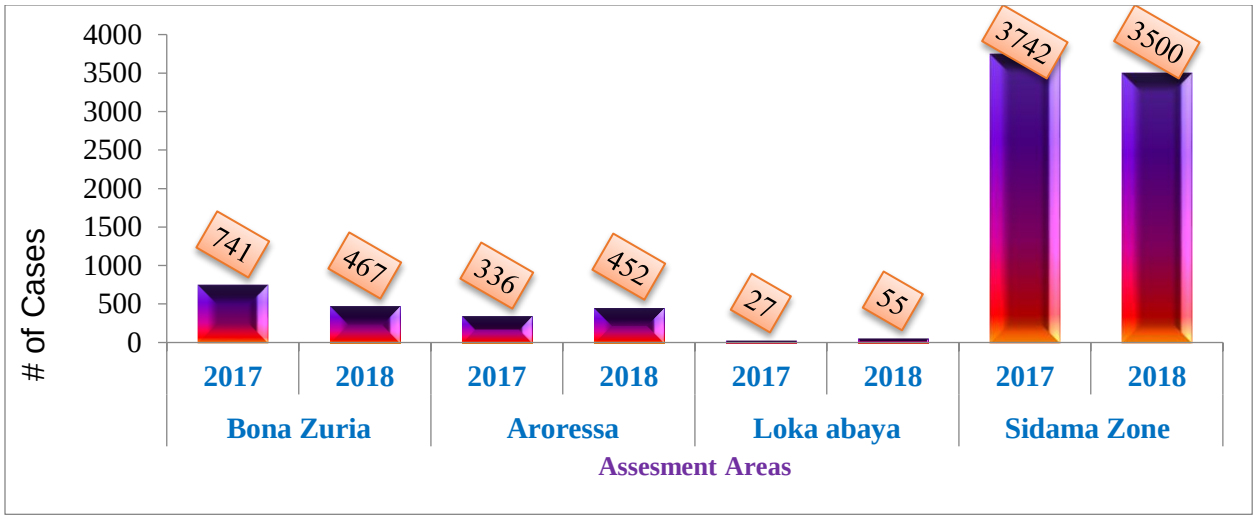

Figure 23: Sever acute malnutrition caseloads from May-Oct during 2017 Vs 2018 in assessed zone and districts

Availability of therapeutic supplies, reporting and training on nutrition

There was enough therapeutic supply in three assessed Districts for three month at District level, except CSB^{++} and 2nd line drugs.

SC accessed with safe water was 12% in Aroressa, 66% in loka and 67% in Bona zuria

On the aspect of capacity building training on management of acute malnutrition, all HCW who assigned at SC and HEW had received basic training on case management of acute severe malnutrition and moderate malnutrition.

Screening performance for children under five

Nutrition screening for children & PLW was conducted in all three districts in monthly basis. Screening data was collected from May to October, 2017/2018 in the assessed Districts and zonal health department. The last screening was conducted during October/2018. The screening modality type in all assessed districts including at zonal level being carried out at routinely base. The screening coverage was 85% in loka, 92% in Aroressa and 96% in Bona zuria.

Screening Performances at Sidama zone

According to May – October monthly screening result of Sidama zone, the highest screening coverage for under five children in June 2018 was 80% and the lowest was 72% in August 2018. Similarly, the screening coverage for PLW's was between 80% in May and 67% in August 2018

Disaster Situation

During the *meher* time there was land slide in Bona zuria district at bedesa chicho kebele and 88 HH were temporarily displaced and also there was flooding in Loka abaya district at bukito and abaya zuria kebele and 6042 population were affected.

Table 18: Potentially affected locations and populations (Potential affected areas by type of disaster or risks)

No	Potential Emergencies(Risks	Districts	Estimated affected population
1	Land slide	Chire ,Aroresa,Hula,	2500
2	Flood	Loka Abaya, Boricha, Aroresa	37,300
3	AWD	Dara, Wonsho, Arbegona, Chire, Bensa, Loka abaya, Aroresa, Boricha, Wondogenet, Bona, Hula, Bursa	3805 (0.1%)
4	Malaria	Boricha,Loka abaya,	304059
5	Measles	Loka Abaya, Boricha, Aroresa,	1352

Gedeo zone

Socio-Demography

Gedeo zone is located in the southern part of SNNPR comprising 6 rural and 2 urban districts and 156 kebeles with the total population of 1,165163 (585,414 females). The zone has 01 Referal Hospital and 03 Primary Hospital.

Table 19- Socio- Demographic information of the Gedeo zone in 2018

S. N	Districts	Total population	Male	Female	< 5	PLW	CBA(15_49)
1	Wonago	156274	76575	79699	24394	5407	36412
2	Yirga Chefe	261189	127983	133206	40779	937	60857
3	Gedio Zone	1,165163	579749	585,414	182,038	40314	271716

Table 18 - Health Institution profile of Gedeo Zone 2018

S/N	District	HP	HC	Hospital	HC wz water	HC wz out water	% of Water
1	Wonago	20	06	0	02	4	33%
2	Yirga Chefe	31	07	01	04	03	57%
3	Zone	147	35	04	12	23	34%

Health

Coordination and management system

To manage emergencies accordingly the preparedness of the Districts and the presence of functional emergency coordination and forum are very important. Based on this assessment Multi-sector Public Health Emergency Management (PHEM) coordination forums were established in both of the assessed districts but not functional. Zone Health Department has 02 functional PHEM Officers. Both districts and their HCs have functional 1 PHEM Officer and PHEM Focal respectively. None of the two districts have planned accessible emergency fund even though the amount is very minimal.

Morbidity

The assessed district indicated that higher morbidity attributed to Typhoid,Pneumonia, AFI, diarrhia and skin infection than others diseases. Diarrhia and AFI was the commenest morbidity in the under five children and Pneumonea was the commonest morbidity in the above five years age group. Severe malnutrition also stayed one of the top causes of morbidity among under five children in those assessed districts.

Table 20: Top five causes of morbidity in under five and above five age groups in Wonago and Yirga chefe from May to October 2018

	Wonago District		**Yirga Chefe District**	
Rank	**Under 5 years**	**Above 5 years**	**Under 5 years**	**Above 5 years**
1	Pneumonia	AFI	Diarrhoea	Typhoid
2	Diarrhoea	Pneumonia	Pneumonia	SAM
3	AFI	Helminthiasis	URTI	Scabies
4	SAM	Typhoid	Malaria	Malaria
5	Helminthiasis	Diarrhoea	AFI	Chicken pox

Outbreak situation

The main diseases in focus were all the 21 diseases under surveillance with special attention to Malaria, AWD, Measles, Meningitis and Malnutrition. Cases of malaria were detected in both districts.

AWD

In the past three months no AWD was registered with in the health institutions of assessed districts. The latrine coverage of the zone is 85% whereas utilization is 59%. In the assessed two districts minimum coverage in Wonago 74% with utilization rate of 22% and the maximum coverage in Yirga Chefe 93% with utilization rate of 25%. The maximum safe water coverage is 58% registered in Yirga chefe and the lowest is Wonago with37% coverage.

Measles

In the assessed districts no measles cases were detected from May-Octo 2018. The coverage of measles vaccination in the selected districts ranges from 90% (Wonago) and 88% (Yirga Chefe). However no supplementary immunization activities (SIA) undergone in both districts in the last 6 months from the assessment.

Meningitis

In both districts there were no confirmed and suspected cases of meningitis reported in the past 6 months.

Malaria

Malaria is the top cause of morbidity for both under-fives and above five years of age. Highest number of malaria cases was registered in yirga chefe which is 474 cases and 232 cases from May to October 2018 respectively. However, no death was registered in both districts due to malaria.

Risk factors for outbreak prone diseases

Both of the assessed districts mentioned their anticipation for coming seasons there will be an outbreak of AWD, malaria, Malnutrition because of rivers with possible interruption, unprotected water development and low coverage of LLIN and IRS. So the prevention and control measures are being used appropriately by the community with a good practice of guiding from the HEW based on the role and responsibility stated in prevention and control measures at community level by promoting knowledge, attitude, and practice towards the comparable advantage and disadvantage of it.

Aavailability of emergency drugs

In both Districts, the availability of emergency drugs and supplies were assessed. Based on the findings both districts have emergency drugs and supplies, but not in enough amount.

Nutrition

Nutrition is one part of the non-food assessment it helps to assess the nutritional status of the community in the selected districts. As the assessment is shortly planned and required to bring as fast as possible current status, basic data was collected on nutrition from HP, HC and district level.

The Community based Management of Acute Malnutrition program has been implemented in all the assessed sites. In all assessed sites many health workers including health extension workers are found to be trained on malnutrition case management, though there is a need of refreshment trainings; the necessary drug and therapeutic food supplies were available. The situation of malnutrition is not as worsen as expected and this is mainly attributed to the ongoing nutritional interventions by the government and nutrition actor organizations.

Zonal SAM admission trend in under 5 from May –October months showed some increment from 3581 in 2017 to 5544 in 2018**.** The overall nutrition situation in the assessed districts is poor with SAM admission ranging from 425 cases in Wonago and 1259 cases in Yirga chefe out of total cases from May to October 2018. The aggregate zonal proxy SAM rate and GAM rate from May to October 2018 is 0.67% and 9% respectively, which falls under acceptable range but needs special attention as there are aggravating factors.

Discussion

All woreda have responsibility for functional PHEM coordination forum. It is responsible to assess woredas emergency situation at some interval days. Unfortunately, none of the woreda PHEM committee is functional. The nutrition situation as well looks stable till now, though admissions of children and PLW screened for SAM and MAM during community health day (CHD) is considered high. The implication is whenever there is better community mobilization and door to door services, a lot of children malnourished still remain hidden at home without getting the service during the routine service delivery, though the case is already there. It also implies the prevalence or existence of Malnutrition in the community is still significantly high. However from the analysis of food security perspective i.e. the rain condition was so unfavorable for crop production and the expected production is minimal to zero, the livestock condition is being affected and would be more affected, there was no better crop production as well in the neighboring *meher* producing kebeles, i.e. all would need to by crops and sale live stocks, the price of cheap crops has even raised to four fold and live stock price went down by half and the term of trade (TOT) does not favor all households and this aggravates the food security gap. Besides making use of alternative unsafe source of drinking water is already in place, with signs poor immunity the nutritional situation is expected to be in challenge if immediate actions are taken to minimize the household food security gaps ahead and health deliveries and nutritional programs are strengthened further.

Limitation and Recommendation for both zones

Limitations

- ✓ Shortage of Operational cost/ budget to overcome the emergency situations
- ✓ Shortage of safe drinking water at health facility levels
- ✓ Shortage of Drugs and medical supplies to control outbreak anticipated diseases (Malnutrition, Malaria, Measles, AWD)
- ✓ Shortage of getting real time and credible data both at district and zonal level
- ✓ Poor coordination among multi sectoral body both at district and zonal level for early detection and control an epidemic
- ✓ Shortage of logistic to access hard to reach districts and kebeles
- ✓ Poor utilization of latrine
- ✓ Poor utilization of LLINs and shortage of chemicals for spray
- ✓ Shortage of therapeutic food and supplementary feeding services

Recommendations

- ✓ Strengthen the rapid response team through provision of refreshment training, allocating operational budget for RRT, transport, and strengthen the district emergency task forces as well as coordination forums.
- ✓ Allocate reactive emergency fund to strengthen emergency response.
- ✓ Promoting community knowledge on appropriate use of latrine side-to-side upgrading and availing to improved latrine.
- ✓ Strengthen close monitoring of malnourished children and Pregnant and lactating Women (PLW) with timely delivery of required supplies to treat them

References

1. Loka abaya woreda health office 2011/2018 Mid-year plan versus performance report.
2. Bona zuria woreda health office 2011/2018 Mid-year plan versus performance report.
3. Sidama zone health department 2011/2018 Mid-year plan versus performance report
4. Wonago woreda health office 2011/2018 Mid-year plan versus performance report.
5. Yirgachefe woreda health office 2011/2018 Mid-year plan versus performance report.
6. Gedeo zone health department 2011/2018 Mid-year plan versus performance report.
7. SNNPR PHEM 2011/2018 EPRP report.

Chapter eight-proposal of epidemiologic research project

8.1 Assessment of Knowledge, Attitudes and Practices regarding Anthrax among community in Nyangatom Woreda, South omo zone, SNNPR Ethiopia 2019

Introduction

Anthrax is a zoonotic disease of great Public health importance. A zoonotic disease is an infection transmitted between animals and humans and forms approximately 60% of all human infective organisms with a diversity of animal hosts including wildlife, pets and domestic animals [1]. Domestic livestock and companion animals are an important source of transmitting anthrax to humans, mostly due to the close interactions between these animals and the people who come into contact with them [2]. Keeping animals is a major source of rural livelihoods in many developing countries, but these animals pose a risk of exposing the families who keep them to diseases. Understanding the occurrence and transmission of this disease is of vital importance in creating evidence-based control measures and policies that are required to protect both human and animal health [3] However, human and financial resources available to support government and institutional veterinary and public health services are becoming more and more limited in many countries world-wide. Therefore there is a need for evident information, based on research, to convince donors and government institutions to allocate enough resources to support veterinary and public health services [4]

This study assessed Knowledge, Attitude and Practices (KAP) of anthrax among community in Nyangatom woreda of south omo zone.

Statement of the problem

Livestock, companion animals and wildlife play a crucial role in our day to day life. They provide food, companionship, socio-cultural activities and are a source of income in various ways as they have an important economic role by sale and services of these animals and their products. However, this dependence on animals makes people vulnerable to zoonotic diseases with anthrax being among the priority zoonotic disease in Ethiopia. Some of the practices such as direct contact and opening up carcasses without proper protective gears make people to be at greater risk of infection with this disease.

Anthrax is usually fatal or may lead to prolonged illness. In most cases someone infected with this disease does not receive immediate and appropriate medical attention because of misdiagnosis and over diagnosis in the readily available health facilities. Anthrax is endemic in Ethiopia with frequent occurrence of outbreaks especially in pastoral areas of the country. It is therefore imperative to study the knowledge, perception, and identify risky practices of this disease in a bid to employ a "One Health" concept. For the purpose of early recognition, detection and notification, the community needs to have correct knowledge regarding the disease. Health messages have been conveyed to the public through various media and forum but the level of knowledge among community members was not well known. Attitude towards anthrax and practices regarding early recognition, detection and notification and health seeking behavior in this community had not been properly documented too. In the presence of this information gap, this study was undertaken to assess knowledge, attitudes and practices regarding anthrax among community.

Objectives

General objectives

The general objective of the study was to assess knowledge, attitudes and practices regarding anthrax disease among community members in Nyangatom woreda South omo zone, SNNPR.

Specific objectives

- To assess knowledge regarding cause, transmission, symptoms and prevention of anthrax in humans and animals among community
- To describe the attitudes towards anthrax

Materials and Methods

Study area

The study area Nyangatom district of south omo zone is 735 km from Awassa the regions capitals and 204 km from the zonal capital jinka town. The district is surrounded by Salamago district in the North, Dasenech district and Kenya in the South, South Sudan in the West and Hammer in the East. The district has 20 kebeles 19 of them are rural. The district has a total population of 23,568.

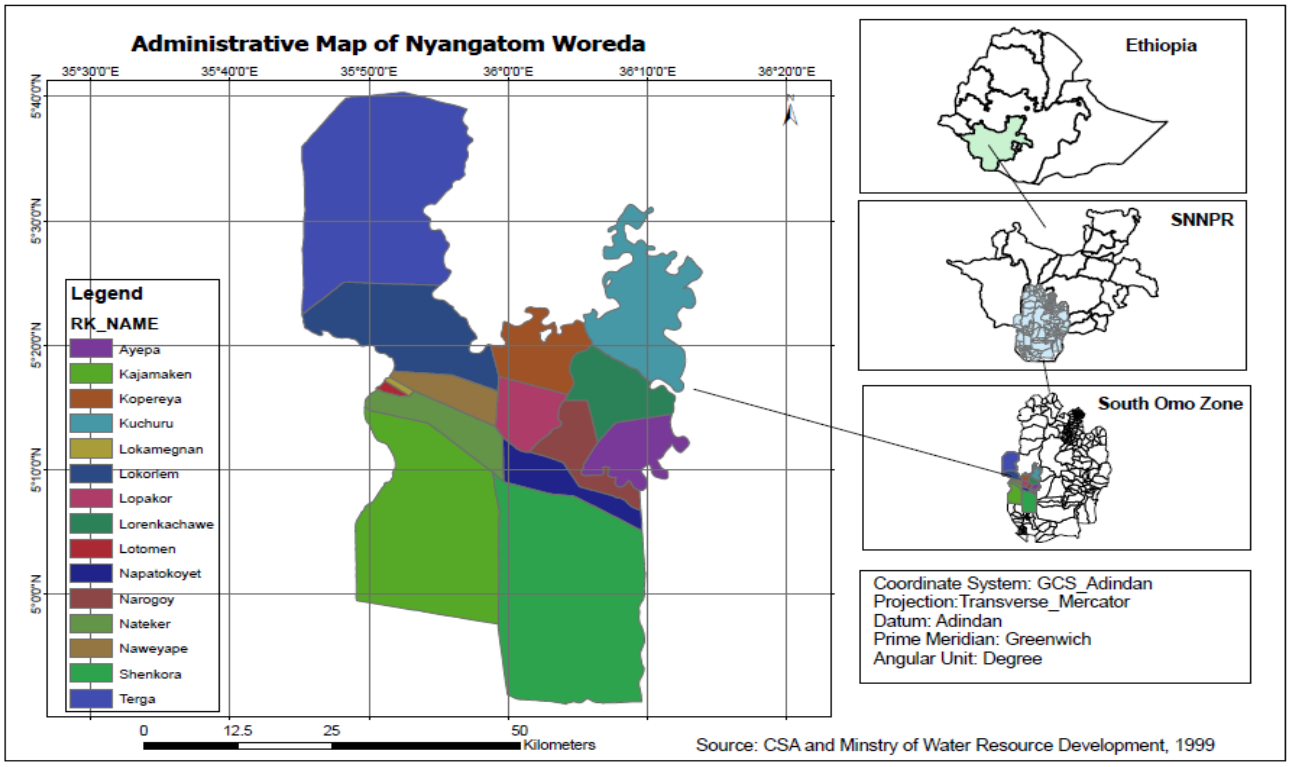

Figure 24. Administrative map of Nyangatom District

Study Design and Data Collection

A community based descriptive cross sectional study design will be used to assess knowledge, attitude and practice of the community regarding anthrax. Structured questionnaire will be administrated to conveniently selected HH in urban & rural Kebeles; and document reviews will be used to collect data.

Source Population:

All households living in Nyangatom district of south omo Zone SNNPR

Study population:

Households in the selected Kebeles of the district

Sampling Procedure

The district has a total of 19 rural and 1 urban kebeles. Out of these kebeles 5 kebeles will be selected by simple random sampling. Each kebele will be considered as one cluster and simple random sampling method will be used to recruit study subjects. H.H registry or family folder will be used as sampling frame. Randomly selected households with targeted age group will be included in the study. If random selection falls to households with no eligible age group the next house hold will be included to the study.

Sample Size Determination

The sample size is calculated by using the standard sample size calculation formula using one sample proportion. The following assumption will be considered: the proportion will be 50 %(p=0.5), the confidence interval will be 95% (α=0.05), the marginal error of the study will be 5 %(e=.05) and 10% non-response rate will be added. Based on the above assumptions the minimum sample size required for the study will be

$$n = \frac{(z\alpha/2)^2 P (1-P)}{d^2}$$

Where, $z\alpha/2=1.96$, $p=0.5$ and $d=0.05$

$$n = \frac{(1.96)^2 0.5(1-0.5)}{} = 384$$

(0 .05)2

10 % non-Reponses rate = 38

n = 422

Where

n= the number of households to be interviewed

d= margin of error

P= proportion of participant

Inclusion and Exclusion Criteria

Inclusion Criteria

Any house hold volunteer to participate in the study and available at home during data collection period.

Exclusion Criteria

People residing temporarily and those who refused to participate will be excluded as well as family members from same house hold.

Data Analysis:

The data will be entered and analyzed using Epi Info Version7, Microsoft excel and SPSS version 20 and results will be presented using descriptive table and charts.

Quality Control

Training will be given for all data collectors prior to data collection period. Close supervision will also be conducted during data collection. The investigator will check missed and incorrect data and revisiting will be conducted to fill missed information.

Ethical Considerations

The study will be conducted after ethical clearance from school of public health (SPH) and Addis Ababa University Medical faculty Institution Review Board. Supporting letter will also be

written by SPH to SNNPR health bureau, South omo Zone health Department and Nyangatom district health office. Confidentiality of the information will be assured and privacy of the information will also be maintained. Additionally, informed consent will be developed and we will ask for the interviewees their consent to take part in the study .They will be enrolled in the study if they decide to do so. They have also the right and the freedom to withdraw themselves from the study and are not obliged to answer all of the questions.

Dissemination of results

The research findings will be submitted to Addis Ababa University School of public health (SPH) and disseminated to Nyangatom district health office, South omo Zone health Department, SNNP Regional Health bureau, Federal Minister of Health and other fund raising bodies. Therefore, they can use the results for planning and implementation of intervention programs. Any attempt will also be made to present the paper on annual scientific meeting and conferences and to publish on reputable research journals.

Work plan

Table 21: Work plan for major activities to be conducted during the project.

Phase	Activity	April (weeks)				May (weeks)				June (weeks)				July (weeks)				August (weeks)			
1	Proposal preparation																				
2	Submission of draft proposal for mentors																				
3	Accept suggestions and comments from mentors																				
4	Submit proposal to the school for approval																				
5	Selection & Training of data collectors																				
6	Data collection																				

7	Data analysis and report writing																			
8	Present draft complied result for comment																			
9	Final thesis report																			
10	Present compiled work																			

Budget

Table 22: Budget breakdown for epi project 2019

Budget category	Measurement	Quantity	Number of days	Unit cost	Total cost
1 Training					
1.1. Principal investigator	Person * no of days* unit cost	1	3	450	1350
1.2. Field supervisors	>>	3	10	200	6000
1.3. Data collectors	>>	6	10	200	12,000
1.4. Data entry clerk	>>	2	12	200	4800
Subtotal					**24,150**
2 Transport					

2.1. Fuel	Liters	405		20	8100
2.2. Car rent	Number	1	12	1000	12,000
Subtotal					**20,100**
3.Stationary supplies					
3.1.Questioner printing and duplication	number	400	--	3	1200
3.2. Pen	pack	2		170	340
3.3. Pencil	Pack	2		25	50
3.4. Eraser	Number	12		20	240
3.5. Pencil sharper	Number	12		15	180
3.6. Flip chart	Number	2		85	170
3.7. Marker	Pack	2		100	200
Subtotal					**2380**
Total					**46,630**
Contingency 5%					**2331**
Grand total					**48,961**

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1. WHO. working to overcome the global impact of NTD, first WHO report on neglected tropical disease. 2010.
2. Tylor L. LS, and M. Risk factor for human disease emergency.Phylosophical Transactions of The Royal society of London Biological science. 2001;29,356(1411):983_ 9.
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Chapter nine-Other Additional Output Reports

9.1 Weekly Bulletin of PHEM Report -Epidemiologic Week 12/2019, SNNP Regional Health Bureau.

South Nations Natonalities and People's Regional State Health Bureau
Public Health Emergency Management (PHEM) Core Process, 2019
WEEKLY PHEM BULLETIN
Epidemiologic Week 12, 2019 (16 - 22/07/2011 E.C); Hawassa; Tele:0462120281; phemsnnpr@gmail.com

Highlight of the Week (12/2019,SNNPR)

- Officers and logistic deployed to IDP (Internal displaced people) sites that is Gedeo zone, basketo spe.woreda and melekoza woreda to mitigate the problem.
- Two deaths and 57 cases of Anthrax were reported during the week and regional team were deployed to investigate the outbreak occurred in bench maji zone menit goldia woreda.
- Remarkable consideration and integration with all concerned stalk holders must be boldly aligned in order to avert Zoonotic origin public health risks through the implementation of existed One-Health strategy in practice

1. Report completeness

In this epidemiological week, the regional report completeness is 96% but three zones (Bench maji 83%, segen 75% and sheka 56%) reported below the targeted ladder of the region that is 90%

Out of expected 4,642 governmental health facilities in the region 4,454 health facilities submitted PHEM report on the week. Report timeliness of the week is 95.9%

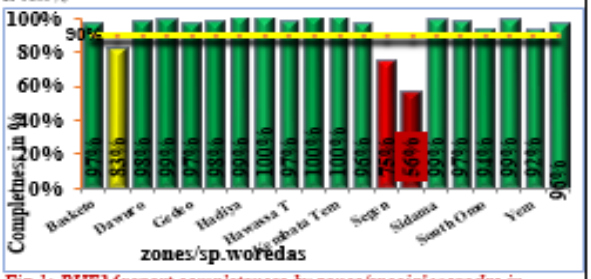

Fig.1: PHEM report completeness by zones/special woredas in SNNPR, Week 12, 2019

2. Malaria

Over 28,330 total malaria suspected cases examined by using either RDT or microscopy in a Week 12/2019. There were 3,474 confirmed cases 2,374 (68.3%) as P. falciparum & 1,100 (31.6%) as P.vivax. About 99% (3,388) cases of malaria reported from OPD, while the remaining malaria cases from IP with no death due to malaria.

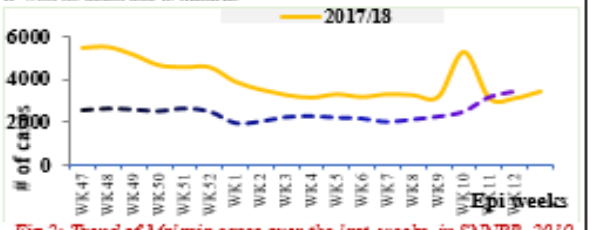

Fig.2: Trend of Malaria cases over the last weeks in SNNPR, 2019

When we compare this week cases (3410) with the last week (3154) it increased by 256 cases. Of, 3,410 total malaria cases reported in a week sidama, Gamo gofa and South omo take the lion share of the report.

Basketo sp.woreda, South Omo & Bench maji zone reported high number of malaria incidence rate regardless of the number of cases.

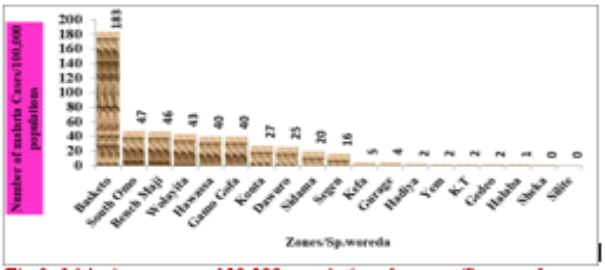

Fig.3: Malaria cases per 100,000 populations by zones/Sp.woredas in SNNPR, Week 12, 2019

For the last one month (*Table 2*), top 10 malarious woredas captured from high –to- low malaria cases. Based on this Salamago, Konso, Lanfuro, Hawassa sub city & Menit shasha have taken places of 1st _5th rank reporting 277, 163,132,118 & 106 malaria cases respectively on monthly base.

Table 2: Top 10 woredas with highest malaria case in last one month, SNNPR, Week 12,2019.

#	Woredas	week 09	week 10	week 11	week 12	Total
1	Salamago WoHO	24	73	106	74	277
2	Konso WoHO	29		47	87	163
3	Lanfuro WoHO	19	28	36	49	132
4	Hawassa sub city	31	21	40	26	118
5	Menit Shasha WoHO	24	52	0	30	106
6	Dale WoHO	23	23	26	29	101
7	Gedebano Gutazer Wolen	23	26	18	34	101
8	Enidguagn WoHO	26	32	23	16	97
9	Bonicha WoHO	5	16	47	27	95
10	Gumer	5	0	2	82	89

Of the top 10 leading woredas in zones during week-12, damot gale Salamago, arba minch, dawuro konto, & dirashe reported the first top five cases of malaria.

Strengthening PHEM is safeguarding the community from public health threats

Table 3: Top 10 woredas with highest malaria case in Week 12,2019.

#	Woredas	Malaria cases
1	Damot Gale WoHO	375
2	Salamago WoHO	209
3	Arba Minch taHO	180
4	Dugona Fango WoHO	179
5	Daramalo WoHO	151
6	Basketo	139
7	Bero WoHO	93
8	Uba Debretsahay WoHO	78
9	Loma WoHO	76
10	Guraferda WoHO	70

3. Meningitis

Suspected meningitis cases decreased by 5 as compared to last week report that is 13. The highest cases were reported from Halaba (3) & Tula (2) hospitals.

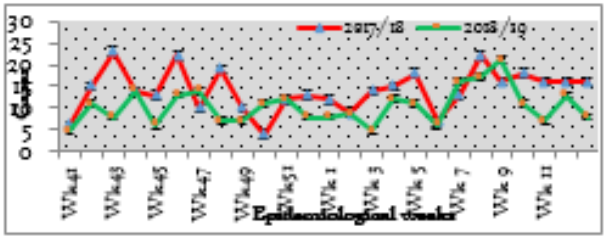

Fig.5: Trend of suspected meningitis cases over the weeks in SNNPR, Week 12, 2019.

4. Dysentery

There were 1208 cases of dysentery reported with no admissions & death in a week. The number of dysentery cases increased by 791 as compared with last week (417).

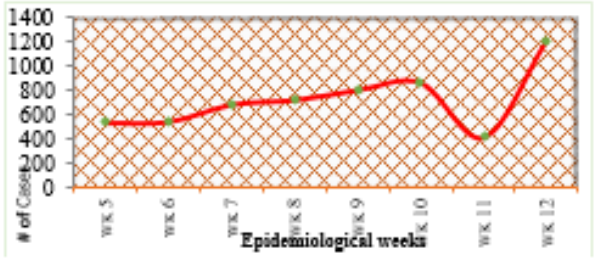

Fig. 6: Trend of dysentery cases for the last weeks, SNNPR, 2019

The highest cases reported from Gurage (256) Sidama (241) South Omo (139) and segen (128) zones.

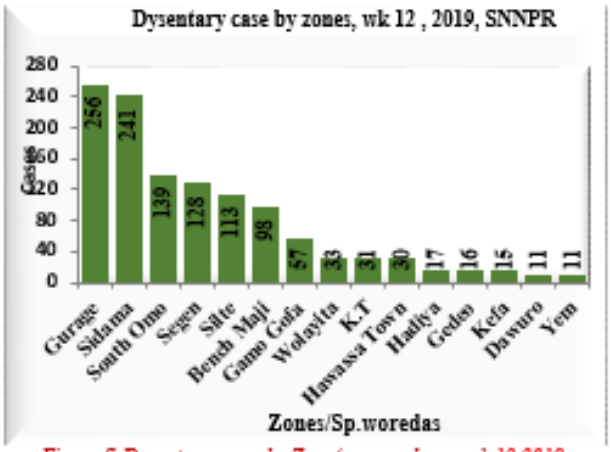

Figure.7:Dysentery cases by Zone/sp.woredas, week 12,2019

5. Severe Acute Malnutrition (SAM)

A total of 1170 SAM cases reported during a week, of w/c 916 (78.2%) cases from OTP & those requiring in-patient treatments constituted 254 (21.7%) of total admissions during the week.

The number of OTP cases increased by 259 cases and the number of SC also increased by 116 compared to the last week report.

There were 6 deaths in this week which reported from Gedeb woreda (4), Bulle woreda (1) and Kochore (1).

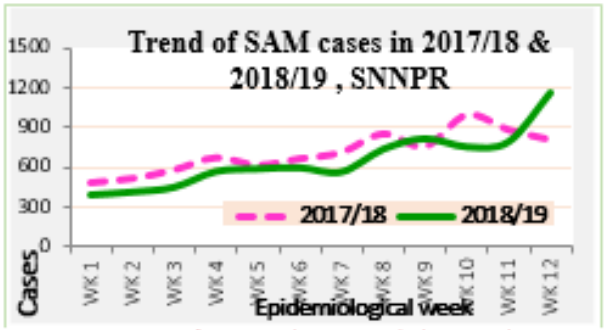

Figure.8: Comparison of SAM cases by year over the last 12 weeks

Malnutrition continued to be major public health problem in SNNP region, especially in Gedeo zone which accounted nearly 49.4% (579/1170) of children under five suffering from severe acute malnutrition.

Sidama and Hadiya zones also followed taking a places of 2nd and 3rd with their high caseloads of severe acute malnutrition.

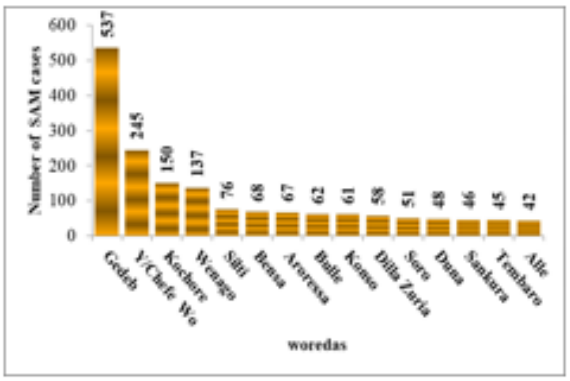

Figure 9: SAM cases by woreda week 12, 2019

As Weekly trends of SAM illustrated in figure 10, Gedeo Zone woreda's reported high number of SAM cases (Yirga Chefe, Gedeb, Kochore &Wenago) and remains on the top leading woreda for the last consecutives weeks.
Internal displacement, food insecurity and social crises due to conflicts remained aggravating factors for critical malnutrition.

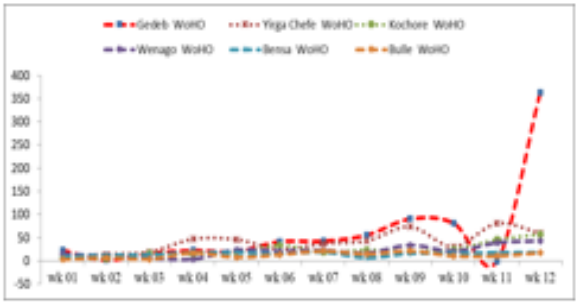

Figure. 10: Trend of SAM cases in six highest reporting woreda in SNNPR, Week 01/19 - 12/19

6. Measles

Eight suspected measles cases received from different woredas.

7. AFP

No AFP/Polio suspected cases reported in the region.

8. AWD

There was no AWD case reported in the region during the week.

9. NNT

In this week, no NNT case reported.

10. MDSR :
There were 02 maternal death report from Bolloso sore woreda and One perinatal death report from Worabe hospital.

11. No cases and deaths of yellow fever, AHI, SARS, Pandemic influenza, Viral Hemorrhagic Fever, Guinea worm, Smallpox, and Rabies reported in the region

Contact us:
Email: phemsnnpr@gmail.com
Tele: 0462120281
Your comments will have a significant role in improving our bulletin!
About this newsletter:
The PHEM bulletin is the weekly bulletin of the south Nations nationalities and People's Regional State Health Bureau, Public health emergency management core process. It is prepared and disseminated on a weekly basis

Annexes

Annex 1: Dysentery Outbreak Investigation Questionnaire

_____ Date_____

No.	Question	Coding Classification	Go To
1. Demography			
1.1	Status	1 Case 2. Control	
1.2	Responder	_____	
1.3	Address	Region_____ Zone_____ Woreda_____ Kebele_____ Got _____House No_____	
1.4	Ethnicity	1. Amhara 2. Oromo 3.Wolayita 4.Bench 5.Maji 6.Tigre 7.Gurage 8.Other(Specify)_____	
1.5	Age	_____ Year (s)	
1.6	Sex	1.Male 2.Female	
1.7	Residence	1.Dormitory 2.outside the compound	
1.8	What is your religion	1. Orthodox 2. Protestant 3. Muslim 4. Catholic 5. other_____	
1.9	What is your marital status?	1. Single 2. Married 3.Widowed 4.Divorced 5. Not applicable	
1.10	College/department		
1.11	Year of study	1.1st 2. 2nd 3. 3rd 4. 4th	
1.12	Status of meal use in the compound	1. Café 2. Non cafe	
1.13	Block no		
1.14	How many no of students in your dormitory?	_____	
2. Knowledge about diarrheal disease			
2.1	Do you know about diarrheal disease?	1.Yes 2.No	If No skip to 3.1
2.2	How do you think diarrheal disease transmit?	1.Contaminated food 2.Contaminated water 3.Contact with patient 4.Other(specify) _____	
2.3	What are you doing when you face diarrhea disease (none probing)?	1. Go to health facility 2.Seek traditional healer 3. Use ORS 4.Use holy water 5. stay at home 6 .Other(specify) _____	
2.4	Do you think diarrhea disease is preventable?	1. Yes 2. No 3. I don't know	If 2 or 3 skip to

No.	Question	Coding Classification	Go To
			Q2.7
2.5	How do you prevent diarrhea disease (none probing)?	1. Food hygiene 2.Using purified water 3.Hand washing 4.Using toilet 5. Other(specify) _____	
3. Past History about diarrheal disease			
3.1	Have you ever been sick of diarrhea disease?	1.Yes 2.No	If No skip to Q 3.6
3.2	Date and year of last sickness with diarrhea disease?	_____ . I don't know	
3.3	Where did you manage (none proving)?	1.At health facility 2.At home 3. Others,_____	
4. Clinical Pictures(Current infection)			
4.1	Do you have diarrheal disease recently?	1.Yes 2.No	If No skip to Q 4.7
4.2	When did the symptoms begin?	_____ dd/mm/yyy	
4.3	Do you have the following symptoms?	1. diarrhea 2.Vomiting 3.fever 4.abdominal cramp 5.nausia 6.Other(specify)_____	
4.4	If you have diarrhea, types of diarrhea	1. Watery 2.bloody 3. mucoid	
4.5	Frequency of diarrhea per day	1. 0ne 2.twice 3. Three and above	
4.6	Did you go to health facility?	1.yes 2 No	
4.7	If yes, date seen at health facility?		
4.8	If no Q4.7 what treatment did you take?	1. _____ 2. I don't know	
4.9	Is there any sick other person in your dorm?	1. Yes 2. No	
4.10	If yes, is that before or after your symptoms began?	1, Before 2 After 3. At the same time	
5. **Travel and Exposure History**			
5.1	Did you travel in the past 3days outside of your campus before your symptoms onset?	1.Yes 2.No	
5.2	If, yes where	_____	
5.3	Did you eat food outside the cafe?	1.yes 2.No	
5.4	If yes Q 5.4, where?	1.street vender 2.Restuarant around the campus 3. Mass ceremony area 4. Other specify	
6. WASH			
6.1	What is the source of drinking water?	1. Pipe water 2. River 8. Bottled water 9.Other(specify) _____	
6.2	What is the water source for washing utensils and clothes?	1.Pipe water 2.River 3.Other(specify) _____	

No.	Question	Coding Classification	Go To
6.3	What type of container are you using to fetch water from the source?	1.Jerry cane 2.Bucket 3.Bottle Other(specify) _____	
6.4	Do you eat raw/uncooked food?	1.Yes 2.No	
6.5	In the past 3 days of your symptoms onset what kind of uncooked food did you eat?	1. Raw meat 2. Raw green vegetables 3. Raw fruit 4. Raw milk Other(specify) _____	
6.6	Do you store cocked food for later use	1.Yes 2.No	
6.7	Do you re-heat cooked food if not eaten immediately?	1.Yes 2.No	
6.8	How do you keep the cooked food?	1. plastic bag 2.dish 3.Other(specify) _____	
6.9	What did you eat last before onset?		
6.10	Is the toilet room functional in your floor?	1.Yes 2.No	
6.11	If yes Q6.15, is it clean?	1.yes 3.No	
6.12	Is there hand washing facility inside the rest room?	1.Yes 2.No	
6.13	When do you wash your hand (none probing)?	1.After visiting toilet 2.Before eating food 3.Before preparing food 4.Other(specify) _____	
6.14	What items are you using for hand washing?	1. Plain water 2. Soap 3.Other(specify)_____	

Annex 2: Checklist for Evaluation of Maternal Death Surveillance and Response (MDSR) System in Hawassa city administration, SNNPR Ethiopia

Zonal Level Questionnaire

Respondent_____

Interviewer: _____

Date_____

General

1. Is there a national manual for surveillance? Yes/ No
2. ***If yes***, describe (last update, diseases included, case definitions, surveillance and control,

   Integrated or different for each disease):_____.

3. Do you have standard case definitions for the Country's priority diseases like AWD,

   AFP polio), malaria, RF, typhoid fever, epidemic fever and measles? Yes / No

4. If yes, **Observe** [1 to n priority diseases] is the standard case definition for each

   Priority disease_____

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

   Yes/ No

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

   Months? Yes / No

7. What are the reporting health facilities for the surveillance system?

   a. Public health facilities b. NGO health facilities

   c. Military health facilities d. Private health facilities

   e. Others_____

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

   Weekly: ___/12 times the number of districts

   Immediately**:** -------/times the number of districts

9. Number of weekly reports received on time: ____/12 times the number of districts
10. Was there any report of the immediately reportable diseases in the past 1 month?

Yes/ No

11. If yes, with in what time is the report received after detection of the

Case/ diseases? a. Less than 1 hour b. 2-24 hour c. 1- 2 days

d. 3- 7 days e. After 1 week

12. How do you report to the next high level? a. Mail b. Fax C. telephone d. Radio e. Electronic Other
13. Does the zone level describe data by person (case based, outbreaks, and sentinel)?

Yes/ No

If yes, (Obs) Observed description of data by age and sex

14. Describe data by place, time and person? Yes/No
15. Perform trend analysis? Yes/ No

If yes, Obs , line graph of cases by time and list disease(s) for which line graph is

16. Observed a._____ b._____ c._____ d._____ e._____
17. Do the zone have an action threshold defined for AWD, Measles, AFP (polio),

and malaria? Yes / No

18. Who is responsible for the analysis of the collected data? _____
19. How often do you analyze the collected data?
a. Daily b. Weekly c. Every 2 weeks d. Monthly e. Quarterly f. As needed……..
20. Do you have an appropriate denominators establish the threshold? Yes / No
21. **If yes, Obs** presence of demographic data (E.g. population by district and hard

to reach groups)

Outbreak Investigation

22. Is there any outbreak in the zone in the last year? Yes/No

If yes, number of outbreaks investigated:_____

23. List of diseases:_____.

24. Number of outbreaks investigated and in which risk factors were looked for:___.
25. Number of outbreaks in which findings were used for action:_____.

[Observe report]

26. Number of districts that looked for risk factors [observe in reports]
27. Number of districts that used the data for action [observe in final report] _____

Epidemic preparedness (relevant for epidemic prone diseases

28. Dose the zone established epidemic management committee? Yes/No
29. Do you have plan for epidemic preparedness and response? Yes/No

If yes, Obs, a written plan of epidemic preparedness and response

30. Has the zone had emergency stocks of drugs, vaccines, and supplies at all

times in past 1 year? Yes/ No

31. Has the zone experienced shortage of drugs, vaccines or supplies during

the most recent epidemic (or outbreak)? Yes/ No

32. Doses the standard case management protocol for AWD, Malaria,

AFP (polio), measles and others exists in all health facilities? Yes/No

33. Is there a budget line for epidemic response? Yes / No

If **yes, Obs**. minutes (or report) of meetings of epidemic management committee

34. Does the region have a rapid response team for epidemic? Yes/No

Response to epidemics

35. Dose the epidemic responded within 48 hours of notification from zone level? Yes/No

If yes, Obs (from written reports with trend and intervention)

Feedback

36. Dose a report is regularly produced to disseminate surveillance data from the zone?

Yes/No

If, yes Obs: the presence of a report of **s**urveillance data

37. How many feedback reports has the zone level produced in the last year?_____

Supervision

38. Did you conduct supervision last 6month? Yes/No
39. If yes, how many supervisory visits have you made in the last 6 months?____
40. If no , what is reasons for not making all required supervisory visits.

(Text)_____

_____

Training

41. Have you received any post-basic training in epidemic management? Yes/No

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

42. How many of your staffs trained in surveillance? _____

Resources

43. For data management

a) Computer & Printer Yes/No
b) Photocopier Yes/No
c) Data manager Yes/No
d) Statistical package Yes/No

44. Communications availability

a) Telephone service Yes/No
b) Fax Yes/No
c) Radio call Yes/No
d) Internet Yes/No

Surveillance

45. Is there a budget line for surveillance in at zone? Yes/No

If yes, is it sufficient Yes/No

46. If No, what option did you use at zonal level?_____

How could surveillance be improved? _____

_____.

47. What opportunities are there for integration of surveillance activities and

functions (Core activities, training, supervision, guidelines, resources etc.)?

a._____

b._____

c. _____

Attributes and level of

a) Usefulness:

48. Total population under surveillance in the zone_____
49. How many cases and deaths reported in the zone last year?

Measles cases _____Deaths _____

50. Does the surveillance system help?

a) To detect outbreaks of these selected priority diseases early? Yes / No
b) To estimate the magnitude of morbidity , mortality and factors related to these

Diseases? Yes/ No

c) Permit assessment of the effect of prevention and control programs? Yes/ No

b) Simplicity:

51. Do you feel that additional data collected on a case are time consuming? Yes/No
52. How long it takes to fill the format? a, <5 minute b-10-15minuts c- >15 minutes

c) Flexibility:

53. Do you think that the current reporting formats used for other newly occurring health

event (disease) without much difficulty? Yes / No

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

Ifyes, how?_____

d) Data Quality:

55. Are the data collection formats for these priority diseases clear and easy to fill for all the data collectors/ reporting sites? Yes/ No

56. Are the reporting site / data collectors trained/ supervised regularly? Yes/No

If, **Obe:** Review the last months report of these diseases

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

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

e) Acceptability:

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

If yes, how many are active participants (of the expected to)? _____

60. **If no**, what is the reason for their poor participation in the surveillance activity?

a) Lack of understanding of the relevance of the data to be collected
b) No feedback / or recognition given by the higher bodies for their contribution; i.e. no dissemination of the analysis data back to reporting facilities
c) Reporting formats are difficult to understand
d) Report formats are time consuming
e) If Others: _____.

f) Representativeness:

61. What is the health service coverage of the district/ **zone**/ region? _____%
62. Do you think, the populations under surveillance have good health seeking

behavior for these diseases? Yes/ No

63. Who do you think is well represented by the surveillance data? urban / rural

g) Timeliness:

64. What proportion of districts reports in acceptable time? ----------%

h) Stability

65. Was the new BPR restructuring affect the procedures and activities of the surveillance of these diseases? Yes/No

66. Was there lack of resources that interrupt the surveillance system? Yes/No

Health facility Questionnaire (Hospital /Health center

District_____

Name of health facility_____

Type of health facility _____

Respondent_____

Date _____

Interviewer: _____

General Information

1. Is there PHEM/IDSR national Guide line or manual at this site? Yes / No

If yes, Obs; for the existence **PHEM/IDSR** national guide line or manual

2. Is there a clinical register in health facilities? Yes/ No

If yes, **Obs** the existence of a clinical register

3. Is there the health facilities correctly register cases during the previous 30 days? Yes/No

If yes, **Obs**; the clinical register

4. Do you have a standard case definition for: (each priority disease)
   a) AWD, Yes/No
   b) AFP (polio) Yes/No
   c) Measles Yes/No
   d) Malaria Yes/No

If yes, Obs the standard case definition for: (each priority disease)

5. Dose of health facilities use standardized case definitions for the country's priority diseases**.** Yes/ No

If yes, Obs; the respondent correctly diagnosing one of the country's priority diseases

using a standard case definition (Interview about of these)

6. Dose the health facilities have the capacity to collect the following specimens?
   a) sputum Y N N/A
   b) Stool Y N N/A
   c) Blood Y N N/A
   d) CSF Y N N/A

7. If yes, Obs the presence of materials required to collect
   a) Stool Yes No N/A
   b) blood/serum Yes No N/A
   c) CSF Yes No N/A

8. Do you have the capacity to handle sputum, stool, blood/serum and CSF until shipment at this facility? Yes No N/A

If yes, Obs presence of status cold chain at health facility.

9. Dose the health facility that have the capacity to ship specimens to a higher level Lab? Yes No N/A

If yes, Obs presence of transport media for stool at health facility.

10. Have you lacked appropriate surveillance forms at any time during the last 6 months?
    Yes No N/A

If yes, what the reason?_____

11. Observed that the last monthly report agreed with the register for 4 diseases (1 for each targeted group [eradication; elimination; epidemic prone; major public health importance])
    a. **Obs** Measles Yes No N/A
    b. **Obs** Malaria Yes No N/A
    c. **Obs** AFP (polio) Yes No N/A
    d. **Obs** AWD Yes No N/A

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

Obs Weekly: _____ /12 times the number of health post sites

Obs immediately: _____/--- times the number of health post sites

13. **On time (use national deadlines)**

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

Obs Number of immediately reports submitted on time: ___/-- times the number of sites

14. How do you report?

a/Telephone b/ Fax c/ Mail d/ Radio e/ Electronic f/ Other

15. How can reporting be improved? Your suggestion

_____

_____

_____

16. Describe data by person, place and time (outbreaks, sentinel) Yes No N/A

If yes, Obs data

17. Is there trend analysis Performed? Yes No N/A

If yes, Obs line graph of cases by time

18. Do you have an action threshold for any of the priority diseases? Yes No N/A

If yes, what is it (Ask for 2 priority diseases)?

Malaria cases ____ % increase

Measles cases____ % increase

19. Who is responsible for data analysis? _____

20. How often do you analyze the collected data?

a) Daily b) Weekly c) Every 2 weeks d) Monthly e) Quarterly

f) As needed……..

21. Presence of demographic data at site (E.g. population <5 yr., population by village, total

Population) Yes / No

Epidemic preparedness

22. Is there standard case management protocol for epidemic prone diseases at health facilities? Yes No N/A

If yes, Obs the existence of a written case management protocol for 1 epidemic prone disease

Epidemic response

23. Has the health facility implemented prevention and control measures based on local data

for at least one epidemic prone disease? Yes No N/A

Feedback

24. Have you received feedback report in the last year from higher level? Yes/No

If yes, how many feedback reports has the health facility received in the last year? ___

Obs; at least 1 report received

25. Have you conduct meeting with community in the last 6 month? Yes No N/A

If yes, how often? a) Weekly b) every two weeks c) monthly d) quarterly e) as needed

Supervision

26. Did you supervise health posts in the last 6months? Yes No N/A

27. If yes, how many times have you been supervised in the last 6 months?_____

Obs; supervision report or any evidence of supervision in last 6 months

28. Did you get any supportive supervision from higher level in the last 6 months? Yes No N/A

If yes, Obs; supervision report or any evidence for appropriate review of surveillance

Training

29. Have you trained in disease surveillance and epidemic management? Yes No N/A

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

_____.

30. Number of Staffs trained in disease surveillance and epidemic management_____.

Resources

31. Logistics

a) Electricity Yes/No

b) Bicycles Yes/No

c) Motor cycles Yes/No

d) Vehicles Yes/No

32. For data management

a) Stationery Yes/No

b) Calculator Yes/No

c) Computer Yes/No

d) Software Yes/No

e) Printer Yes/No

33. Communications available

a) Telephone service Yes/No

b) Fax Yes/No

c) Radio call Yes/No

d) Computers Yes/No

34. Information education and communication materials

a) Posters Yes/No

b) Megaphone Yes/No

c) TV Yes/No

d) Other: Yes/No

35. Hygiene and sanitation materials

a) Spray pump Yes/No

b) Disinfectant Yes/No

36. List Personal Protection materials (PPE) available in health facility

_____ _____ _____

_____.

Attributes

a) Usefulness

40. Total population of the district under surveillance_____

41. How many cases and deaths reported in the district from the following disease past 6month ?.

a) AWD cases _____Deaths _____

b) Malaria cases _____Deaths _____

c) Measles cases _____Deaths _____

42. Does the surveillance system help?

a) To detect outbreaks of these selected priority diseases early? Yes / No

b) To estimate the magnitude of morbidity , mortality and factors related to these diseases? Yes/ No

c) Permit assessment of the effect of prevention and control programs? Yes/ No

b) Simplicity

43. Do you feel that data collections on a case report form are time consuming? Yes/No

44. If yes, how long it takes to fill the format? a, <5 minute b- 10-15minuts c- >15 minutes

c) Flexibility

45. Do you think that the current reporting formats used for other newly occurring health event (disease) without much difficulty? Yes / No

46. Do you think that any change in the existing procedure of case detection,

reporting, and formats will be difficult to implement? Yes/ No

If yes , how_____**.**

d) Data Quality

49. Are the data collection formats for these priority diseases clear and easy to fill for

all the data collectors/ reporting sites? Yes/ No

50. Are the reporting site / data collectors trained/ supervised regularly? Yes/No

If, **Obe:** Review the last months report of these diseases

51. Average number of ***unknown or blank responses*** to variables in

each of the reported forms _____

52. Percent of reports which are complete(that is with no blank or

Unknown responses) from the total reports _____

e) Acceptability

53. Do you think all the reporting agents accept and well engaged to the

surveillance activities? Yes/No

If yes, how many are active participants (of the expected to)? _____

53. **If no**, what is the reason for their poor participation in the surveillance

activity?

a) Lack of understanding of the relevance of the data to be collected
b) No feedback / or recognition given by the higher bodies.

c) Reporting formats are difficult to understand

d) Report formats are time consuming

e) If Others: _____.

f) Representativeness

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

55. Do you think, the populations under surveillance have good health seeking behavior for these priority diseases? Yes/ No

56. Who do you think is well represented by the surveillance data? urban / rural

g) Timeliness

57. What proportion of health facilities reports in acceptable time? ----------%

h) Stability

58. Was there lack of resources that interrupt the surveillance system? Yes/No

If yes, how did you manage it?_____

59. What do you suggest to overcome such problems?_____.

Annex 3: Checklist for Health Profile Assessment of Misrak Badewacho District, Hadiya Zone, SNNPR, Ethiopia 2018

1. Administrative set up

Region_____ Zone _____ Woreda_____

Woreda boundaries North _____South _____East _____west_____

Total number of kebeles _____Urban _____Rural_____

Historical Aspects of the area (Culture & Tourism office)

Woreda at a glance/look/: where it is_____

The name (how & why)_____

How the Woreda was formed_____

Any other historical aspect_____

Geographic and climate condition

Woreda map_____

Location distance from zone_____ From Hawassa _____ direction _____

Annual rain fall (average) _____ Max _____Min _____

Climatic zones__ Highland _____% Midland _____% Lowland _____%

Accessibility to main roads_____

Square km of the area_____

Altitude of the area_____

Latitude of the area_____

Maximum temp_____

Minimum temp_____

Annual temp (average)_____High Low

Demography Information

Religion:

Orthodox_____

Muslim_____

Protestant_____

Catholic _____

Others_____

Ethnic composition/language _____

Total population of Woreda _____ Male _____ Female_____ Urban _____Rural _ _____

Total house hold _____

Average house hold population _____

S.n	Name of Kebele	Total Population	Distance from the capital	Remark
1				
2				
3				
4				

Total live births _____

Under one year population_____

Under five year population_____

< 15 years population_____

>64 years population_____

Women 15_49 years of age_____ Reproductive year female population____

Social situation:

Number of NGOs working on public health _____

Number of youth club in the woreda _____

Total number of libraries_____

Economic situation:

Main source of the economy/income/_____ agriculture _____ business _____employee ___ _____

Average income per HH/year _____

Main crops _____

Employment rate_____

Unemployment rate_____

Transport, Electricity and Telecommunication technology

Number of telecommunication center in the woreda

Number of facilities giving internet services at the woreda

Roads connecting to woreda

Water Supply

Source of water_____

Woreda water supply coverage _____

Number of pipe water supply_____

Is there chlorination of water_____

Frequency of chlorination_____

Education

Total number of enrolled elementary schools _____Male ____Female_____

Total number of enrolled secondary schools _____ Male___ Female_____

Total number of TVET ___Total number of students ____Male ___Female__

Total number of teachers at elementary_____ Male _____Female_____

Total number of teachers at colleges _____Male _____Female_____

Schools with water supply _____Toilets _____Schools with functional latrines _____Male latrine _____Female latrine _____

Schools with HIV/other Health clubs_____

College with HIV/other Health clubs_____

K.G _____

Educational status of the community

Total school age children (target) _____

School dropout _____why? _____ _____

Total educated people as a whole Male _____Female _____

Table 1 .Top 10 disease morbidity and mortality

	Morbidity				Mortality			Remark
Rank	Disease	No of cases	%	Rank	Disease	No of cases	%	
1				1				
2				2				
3				3				
4				4				

5				5				
6				6				
7				7				
8				8				
9				9				
10				10				

Health service

Number of hospitals_____

Number of health center_____

Number of health posts_____

Total birth_____

Percent of NM low birth weight_____

Percent of low birth weight_____

Abortion rate_____

Child women ration_____

Dependency ration_____

Immunization coverage_____

ITN coverage_____

Health service coverage _____

Health institution to population ratio _____Hospital _____Health Center _____
Health post _____to population ratio

Table 2 Vital Statistics and Health Indicators

Indicator	**Number (%)**
Infant Mortality Rate	
Neonatal mortality rate	
Child Mortality Rate	
Crude Birth Rate	
Total still births	
Crude Death Rate	
Maternal Mortality Rate	
Contraceptive Prevalence rate	
ANC rate	
Postnatal care coverage	
Contraceptive prevalence rate	
Contraceptive acceptance rate	
TB case detection rate	

Table .3 **Health staff composition**

Category in Number	**Male**	**Female**	**Total**
Medical director / MD			
Master of public health /MPH			
Health officer			

Clinical Nurses			
Midwife / MW/			
Medical lab Techno			
Pharmacist			
Environmental			
Health extension worker /HEW/			
Others			

Doctor _____
Nurse _____

HEW _____ to population ratio

Facilities (Transport, Telecommunication, Power supply)

How many of the health posts have access to

Transportation_____ (%)

Telecommunication_____ (%)

Electric power_____ (%)

Annex 4: Rapid Meher Assessment- Health and Nutrition Sector: Region/Zone level Questionnaire

Interviewer name _____ Institution: _____

Interview Date: (dd) ____/(mm)_____/2011 EFY Region: _____

Zone: _____

Main contact at this location: Name: _____ Position: _____ Tel: _____

SECTION I: SOCIO- DEMOGRAPHIC PROFILE				
Population: Region/Zone total population	M: _____F:_____		Under 5_____	Total: ____
	No. of women of reproductive age (age 15-49 yrs.) _____			
	No. of pregnant and lactating women: _____			
Special Population *(if any)*	Pastorals____	Refugees ____	IDPs____	Migrant Workers___
Number of HCs_____ Number of HPs_____ Number of Mobile health and Nutrition teams _____ Number of HEWs_____				
Water and Latrine availability at health centers (HC)	No. of health centers _____	No. of HC with water &latrine access_____		
	No. of health post _____	No. of HP with water &latrine access_____		

SECTION II: HEALTH PROFILE	
2.1. Coordination and management systems	
2.1.1. Is there a PHEM Officers at Regional level? If yes how many_____	Yes□ No□
2.1.2. Does the RHB/Zone Health Office regularly report PHEM report as scheduled dates? Observe copies and comment _____	Yes□ No□
2.1.3. Are there PHEM Officers/focal persons at Woreda and HC levels? If yes how money are there in the Woreda level_____ If yes how money are there in the HC level_____	Yes□ No□
2.1.4. Do the Woredas, health facilities and HEWs regularly report PHEM report as scheduled dates? Observe copies and comment _____	Yes□ No□
2.1.5. Are all relevant government, NGOs and UN agencies represented at Regional PHEM Coordination?	Yes□ No□
2.1.6. Is there a multi sector health coordination forum? If yes how frequently meet? ----------	Yes□ No□
2.1.7. Is there a Public Health Emergency preparedness and response plan?	Yes□ No□
2.1.8. Is there accessible emergency response fund for PHEM at regional level? If yes how much allocated----------	Yes□ No□
2.2. Mention anticipated epidemics (If yes please indicate Zone/Woreda at risk and risk population per anticipated risk: *(Use the back side)* _____,_____,_____, _____	Yes□ No□
2.3. Public Health Emergency Management	
2.3.1. Is there a trained staff on PHEM basic level (Regional/Zonal/Woreda/HFs)	Yes□ No□

If yes specify number of trained personnel per level: **Region/Total:** Female _____Male_____, **Zone:** Female_____ Male_____, **Woreda**: Female_____ Male_____	Yes□ No□
2.3.2. Is there a Regional/zonal trained Rapid Response team (RRT)?	Yes □ No □
2.3.3. Proportion of woreda with sufficient trained on HWs and HEWs on SAM (OTP/SC) and MAM (TSFP) management.	Yes □ No □

2.4. Disease outbreaks

2.4.1. Was there any outbreak in the last 3 months? YES_____ NO_____

If yes, specify the type of disease

Type of outbreak _____Number of cases _____Deaths _____(specify the time period in dd/mm/yr)_____

Type of outbreak _____Number of cases _____Deaths _____(specify the time period in dd/mm/yr)_____

Type of outbreak _____Number of cases _____Deaths _____(specify the time period in dd/mm/yr)_____

Type of outbreak _____Number of cases _____Deaths _____(specify the time period in dd/mm/yr)_____

Type of outbreak _____Number of cases _____Deaths _____(specify the time period in dd/mm/yr)_____

2.4.2. Is there any ongoing outbreak of any disease? YES_____ NO_____

Type of outbreak _____Number of cases _____Deaths _____(specify the time period in dd/mm/yr)_____

Type of outbreak _____Number of cases _____Deaths _____(specify the time period in dd/mm/yr)_____

Type of outbreak _____Number of cases _____Deaths _____(specify the time period in dd/mm/yr)_____

Drugs and medical supplies stocked out in the past 3 months

Description		Total requirement	Available	stocked out
Vaccines	Meningitis vaccine			
Drugs	Coartem			
	Artesunate (rectal)			
	Artesunate (Inj)			
	Artemether IM			
	Quinine (PO)			
	Quinine (IV)			
	Chloroquine			
	Ceftriaxione			
	Oily CAF			
	Doxycycline			
	Ringer lactate			
	ORS			
	Vit A.			

Nutrition supplies	F100			
	F75			
	RUTF			
	Resomal			
	Routine antibiotics at SC/OTP (the list can be annexed)			
	Amoxicillin			
	Sc Rx Kit(First and second line drugs, materials and milk for seven children each)			
	Sc opening kit			
	CSB++			
	RUSF			
Laboratory supplies	RDT (Malaria)			
	Pastorex (Meningitis)			
	LP set			
	TI bottle			
Kits	CTC Kit (AWD)			
Medical supplies	Gloves,			
	Syringe			
	PPE			
RH medical supplies/drugs	Individual Clean Delivery Kits			
	Emergency medicines and supplies to support care of rape survivors? (Main shortage (if any): Specify)			

SECTION III: RISK FACTORS

Diseases	**Risk factors for epidemics to occur**	**Yes**	**No**
Malaria	Malaria endemic area	Yes□ No□	
	Presence of malaria breeding site	Yes□ No□	
	Interrupted or potentially interrupting rivers	Yes□ No□	
	Unprotected irrigation in the area	Yes□ No□	
	LLINs coverage <80 No_____%_____		
	Indicate the coverage of IRS 2011EFY No_____%_____		
	Was there any prevention and control activities? If yes, Mention types of prevention and control activities taken in woreda_____	Yes□ No□	
	Number of malarious kebeles and total population in these Kebeles	Keb_____ Pop_____	

Meningitis	Was there Meningitis epidemic in the last 3 years (If yes specify date)	Yes□ No□
	Has vaccination been conducted in the past 3 years	Yes□ No□
	If yes : Indicate the date and number of people vaccinated Date_____ No__ n_____	
AWD	Was there AWD epidemic in the last three years (If yes specify date)_____up to _____	
	Latrine coverage number and percentage. No_____%_____	
	Latrine utilization No_____%_____	
	Safe water coverage No_____%_____	
Measles	Is there ongoing measles outbreak	Yes□ No□
	What is the measles vaccination No and % coverage of 2011first quarter, less than one year No_____ Percentage of coverage_____	
	Has SIA been conducted from May 2010- Oct 2018	Yes□ No□
	If yes, Indicate the month and number of children vaccinated including the age group Month_____ No_____ Age group_____	

Any other observations you made on health emergencies or any risks of epidemics?

_____

_____

What were the major challenges in your Epidemic response experience?

_____

_____

Are there systems in place to make referral to relevant service providers when cases are identified with protection concerns?

_____

SECTION IV: NUTRITION – SAM and MAM Management in Region/Zone – May to Oct 2018

SAM Management

4.1 Facilities with SAM management in Region/Zone

Month	Total Number of hospitals	Total Number of Health centers	Total Number of Health posts	Number of SC.	Number of OTP.	Total Number of OTP/SC reported
May						
June						
July						
August						
September						
October						

4.2 Admission and performance of the therapeutic feeding program for SAM management

Months	Total Number of New SAM Admission		% of SAM children cured		% of SAM children defaulted		% of SAM children died		% of SAM children non-respondent		% of SAM children other	
	2017.	2018	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018
May												
June												
July												
August												
September												
October												

4.3. Admission and performance of the therapeutic feeding program for MAM management in second Generation TFP woredas.

Months	Total Number of New MAM Admission		% of MAM children cured		% of MAM children defaulted		% of MAM children died		% of MAM children non-respondent		% of MAM children other	
	2017.	2018	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018
May												
June												
July												
August												
September												
October												

4.3. Availability of therapeutic supplies

	Yes	**No**
Is there sufficient supplies for 3 months of :		
RUTF		
F100		
F75		
2nd line drugs		
CSB++		
RUSF		
Is there sufficient woreda level storage for SAM treatment at woreda level?		

Water availability at stabilization center (SC)		
Others		

4.4. Reporting

Is there weekly SAM report? yes _____ No_____ (if yes observe)

Is there monthly MAM report from 2nd generation woredas? Yes____No_____ (if yes observe)?

4.5. Training

How many HWs have been trained on CMAM management in Region/Zone? _____,_____%

How many HEWs have been trained in CMAM management in Region/Zone? _____, _____%

MAM Management

4.6. TSFP program in the zone/region

Questions		
How many woredas in the zone are priority 1 ?	Yes	No
Was there a TSFP distribution last month?		
Is there sufficient TSFP supplies for the next 1 month (RUSF, CSB+/oil or CSB++) ?		
Is there woreda level storage of TSFP supplies for at least 2 months of supplies?		
Are children discharged from OTP referred to TSFP		
Is this a pilot (2nd generation) TSFP woreda?		
How many Woredas have been supported by an NGO in the last 3 months?		

4.7. MAM admission

How money priority 1 woredas are there in the Region/Zone_____

Month	Total MAM admission		Total MAM Cases		Total Number of Food Distribution point in the Woreda
	2017	2018	2017	2018	
May					
June					
July					
August					
September					

October					

4.8. Screening

4.8.2. What screening modality is used in the woredas? EOS _____ No of woredas _____
CHD _____ No of woredas ___ ___ ___, Routine_____ No of woredas_____
4.8.3. Vitamin A coverage _____ De-worming coverage _____

4.9. Screening performance for children in the Region/Zone

Month	Target Children 6-59 months	# of screened children	Screening Coverage (%)	# of Children with odema and MUAC <11 cm			# of children with no oedema and MUAC 11 to 11.9CM	% Proxy GAM for children	% Proxy SAM for children
				#SAM			#MAM		
				MUAC <11 cm	Oedema	Total			
May									
June									
July									
August									
September									
October									

4.10. Screening performance for Pregnant and lactating Women (PLW) in the Region/Zone

Month	Target PLW	# of screened PLW	Screening Coverage (%)	# of PLW MUAC below 23.0 cm*	% Proxy GAM for PLW
May					
June					
July					
August					
September					
October					

4.11 Any other observations you made or any risks of emergency nutrition?

_____
_____
_____

4.12 What were the major challenges in your emergency nutrition response experience?

_____
_____

4.13 Are IDPs included in the emergency nutrition response?----------
---

4.14. Are the services accessible particularly for vulnerable groups such as elderly and disabled? If not why not?----------
---

SECTION V: FLOODING

1. Was there flood disaster in the last 6 months in the **Region /Zone**? Yes□ No□
1.1. If yes, How many woredas affected _____,
1.2. Mention the names of woredas affected with flood _____,_____,
_____,_____,_____,_____,_____,
1.3. If yes, No of population affected_____
1.4. Human Death due to flooding_____ Yes□ No□**,**
1.4.1. If yes how many in number_____
1.5. Are there displaced people due to flooding? Yes□ No□
1.5.1. If Yes , how many_____ PLW
1.5.2. Children <5 yrs_____<2 yrs _____<6months_____6-23 months_____

Was there outbreak in the flood affected area Yes□ No□

If yes , Type of outbreak _____Number of cases _____Deaths _____(specify the time period)_____
Type of outbreak _____Number of cases _____Deaths _____(specify the time period)_____
Type of outbreak _____Number of cases _____Deaths _____(specify the time period)_____
Type of outbreak _____Number of cases _____Deaths _____(specify the time period)_____
Type of outbreak _____Number of cases _____Deaths _____(specify the time period)_____

Any comment

_____
_____
_____
_____
_____
_____

Summary: Requirements/Needs/ 2012 EFY/2019

Region/Zone	Type of Health and nutrition	Total estimated	Required finance

	Emergency	Beneficiaries[1]	

Region	Zone	At Risk Woredas	Type of Risk	At risk Population

Rapid Meher Assessment- Health and Nutrition Sector: Woreda Level Questionnaire

Interviewer name _____ Institution:_____

Interview Date: (dd) ____/(mm)_____/2011EFY Region:_____

Zone: _____Woreda _____

Main contact at this location: Name:_____ Position:_____ Tel:_____

SECTION I: SOCIO- DEMOGRAPHIC PROFILE				
Population: Woreda total population	M:_____F:_____	Under 5_____	Total:_____	
	No. of women of reproductive age (age 15-49 yrs.) _____			
	No. of pregnant and lactating women :_____			
Special Population *(if any)*	Pastorals____	Refugees____	IDPs____	Migrant Workers___
Number of HCs_____ Number of HPs_____ Number of Mobile health teams _____Number of HEWs_____				
Water and Latrine availability at health centers (HC)	No. of health centers _____	No. of HC with water and latrine access_____	No. of HC without water and latrine access_____	
	N0. of Health posts	No. of HP with water and latrine access_____	No. of HP without water and latrine access_____	

SECTION II: HEALTH PROFILE	
2.1. Coordination and management systems	
Is there a PHEM Officer at Woreda Health Office level? How money PHEM officers are there_____	Yes□ No□
Is there RRT in Woreda health office	Yes□ No□
Are there RRTs at HCs? If yes No. _____	Yes□ No□
Are there PHEM Officers/focal persons at HCs? If yes No. _____	Yes□ No□
Does the Woreda Health Office regularly report PHEM report as scheduled dates? If yes, Observe copies and comment _____	Yes□ No□
Do the health facilities and HEWs regularly report PHEM report as scheduled dates? If yes, Observe copies and comment _____	Yes□ No□
Is there a multi sector Health Emergency/PHEM coordination forum? If yes how frequently meet? _____	Yes□ No□
Is there a Public Health Emergency preparedness and response plan for EFY2011? Observe and comment _____	Yes□ No□
Is there accessible emergency response fund? If yes, how much allocated and/or by whom allocated_____,_____	Yes□ No□

2.2. Morbidity (List top 5 causes of Morbidity) from May to Oct 2018

a. Morbidity below 5 yrs	b. Morbidity above 5yrs	
1.	1.	
2.	2.	
3.	3.	
4.	4.	
5.	5.	

2.3. List number of cases/deaths from May to Oct 2018

Month	AWD		Malaria		Measles		Meningitis		Other (specify)
	Cases	Deaths	Cases	Deaths	Cases	Death	Cases	Death	

	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018	
May																	
June																	
July																	
August																	
September																	
October																	

2.4. Outbreak?

Was there any outbreak in the last 3 months? YES_____ NO_____

If yes, specify the type of disease

Type of outbreak _____Number of cases _____Deaths _____(specify the time period)_____

Type of outbreak _____Number of cases _____Deaths _____(specify the time period)_____

Type of outbreak _____Number of cases _____Deaths _____(specify the time period)_____

Type of outbreak _____Number of cases _____Deaths _____(specify the time period)_____

Type of outbreak _____Number of cases _____Deaths _____(specify the time period)_____

Is there any ongoing outbreak of any disease? YES_____ NO_____

Type of outbreak _____Number of cases _____Deaths _____(specify the time period)_____

Type of outbreak _____Number of cases _____Deaths _____(specify the time period)_____

Type of outbreak _____Number of cases _____Deaths _____(specify the time period)_____

2.5. Preparedness: Is there emergency drugs and supplies enough for 1 month? Or easily accessible on need?		**Comments**
Ringer Lactate (to treat AWD cases)	Yes□ No□	
ORS (to treat AWD cases):	Yes□ No□	
Doxycycline *(to treat AWD cases)*:	Yes□ No□	
Consumables : Syringes, Gloves *(for AWD management):*	Yes□ No□	
Amoxil susp (measles)	Yes□ No□	
Tetracycline ointment (measles)	Yes□ No□	
Vit A (measles)	Yes□ No□	
Coartem for Malaria	Yes□ No□	
Lab supply: RDT for Malaria	Yes□ No□	
Lab supply: RDT (pastorex) for Meningitis	Yes□ No□	
LP set	Yes□ No□	
Number of CTC kit available: (for AWD)	Yes□ No□	
Is budget allocated for emergency rapid response by the Woreda? How much allocated_____		Yes□ No□

SECTION III: RISK FACTORS		
Diseases	**Risk factors for epidemics to occur**	
Malaria	Malaria endemic area	Yes□ No□
	Presence of malaria breeding site	Yes□ No□
	Interrupted or potentially interrupting rivers	Yes□ No□
	Unprotected irrigation in the area	Yes□ No□
	LLINs coverage No_____%_____	
	Indicate the coverage of IRS 2011EFY. No_____%_____	

	Was there any prevention and control activities. If yes, what intervention was taken _____	Yes□ No□
	Number of malarious kebeles and total population in these Kebeles	Keb_____ Pop_____
Meningitis	Was there Meningitis epidemic in the last 3 years (If yes specify date) If yes, No_____%_____	Yes□ No□
	Has vaccination been conducted in the past 3 years If yes, No_____%_____	Yes□ No□
	If yes : Indicate the date and number of people vaccinated Date _____No_____%_____	
AWD	Was there AWD epidemic in the last three years (If yes specify date)	Yes□ No□
	Latrine coverage No_____%_____	
	Latrine utilization No_____%_____	
	Safe water coverage percentage %_____	
Measles	Is there ongoing measles outbreak	Yes□ No□
	What is the measles vaccination coverage of 2011 EFY 1st Quarter, less than one year No_____%_____	
	Has SIA been conducted in from May 2009- Oct 2018	Yes□ No□
	If yes, Indicate the month and number/coverage% of children vaccinated including the Month_____ Number_____Coverage (%) _ M____F ____	

Any other observations you made or any risks of epidemics?

_____

_____

What were the major challenges in your Epidemic response experience?

_____

_____

_____

SECTION IV: NUTRITION– SAM and MAM Management in the woreda – May –to -Oct 2018

4.1. Facilities with SAM management in the woreda

Month	Total Number of hospitals	Total Number of Health centers	Total Number of Health posts	Number of SC.	% of health centers/ hospitals with a SC.	Number of OTP.	% of health posts with an OTP	Total Number of OTP/SC reported	% of OTP/SC reported
May									
June									
July									
August									
September									
October									

4.2 Admission and performance of the therapeutic feeding program for SAM management

Month	Total number of new admission of SAM		% of SAM children cured		% of SAM children defaulted		% of SAM children died		% of SAM children non-respondent		% of SAM children other	
	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018
May												
June												
July												
August												
September												
October												

4.3. Availability of therapeutic supplies

	Yes	**No**
Is there sufficient supplies for 3 months of :		
RUTF		
F100		
F75		
CSB++		
RUFS		
2nd line drugs		
Is there sufficient woreda level storage for SAM treatment at woreda level?		
water availability at stabilization center (SC) if yes how many SC have safe water #_____%_____		

4.4. Reporting

Is there weekly SAM report? Yes _____ No_____ (if yes observe)
Is there monthly MAM report? Yes_____ No_____(if yes observe)

4.5. Training

How many HWs have been trained on SAM management in the Woreda? _____
How many HWs have been trained on MAM management in the Woreda? _____
How many HWs have been trained on IYCF Emergency in the Woreda? _____
How many HEWs are there in the woreda? No_____ ,% _____
How many HEWs have been trained in SAM management? No _____, %_____
How many HEWs have been trained in MAM management? No _____, %_____
How many HEWs have been trained in IYCF Emergency? No _____, %_____

4.6. MAM Management

TSFP programme in the woreda

Questions	**Yes**	**No**
Is this a priority 1 woreda?		
Was there a TSFP distribution last month?		
Is there sufficient TSFP supplies for the next 1 month (RUSF, CSB++) ?		
Is there woreda level storage of TSFP supplies for at least 2 months of supplies in the 2nd generation woredas?		
Are children discharged from OTP referred to TSFP		
Is this a pilot (2nd generation) TSFP woreda?		
Has the Woreda been supported by an NGO in the last 3 months?		

4.7. MAM admission

Month	**MAM admission**		Total MAM Cases		Total Number of Food Distribution point in the woreda
	2017	2018	2017	2018	
May					
June					
July					
August					
September					
October					

4.8. Screening

When was the last screening conducted in the woreda? _____
What screening modality is used in the woredas? EOS _____, CHD ____, Routine____, vitamin A and
Screening coverage _____ Vitamin A coverage De-worming coverage _____

4.9. Screening performance for children in the woreda

Month	Target Children 6-59 months	# of screened children	Screening Coverage (%)	# of Children with Oedema and MUAC <11cm			# of children with no Oedema and MUAC 11 to 11.9CM	% Proxy GAM for children	% Proxy SAM for children
				#SAM			#MAM		
				MUAC <11 cm	Oedema	Total			
May									
June									
July									
August									
September									
October									

4.10. Screening performance for Pregnant and lactating Women (PLW) in the woreda

Month	Target PLW	# of screened PLW	Screening Coverage (%)	# of PLW MUAC below 23.0 cm*	% Proxy GAM for PLW
May					
June					
July					
August					
September					
October					

4.11 Any other observations you made or any risks of emergency nutrition?

_____
_____
_____

4.12 What were the major challenges in your emergency nutrition response experience?

_____
_____

4.13 Are the services accessible particularly for disabled and elderly? If not why not?----------
----

SECTION V: FLOODING

4.1. Was there flood disaster in the last 6 months in the **Region /Zone**? Yes□ No□
4.1.1. If yes, How many Kebeles affected _____,
4.1.2. Names of kebeles _____,_____,_____,_____
4.1.3. Population affected_____
4.1.4. Human death due to flooding Yes□ No□**,**
4.1.5. If yes how many in number_____
4.1.6 Are there displaced people due to flooding? Yes□ No□
4.1.7. If Yes, how many PLW_____
4.1.8 If Yes, how many reproductive age women__
4.1.9 Children<5yrs_____<2 yrs _____ <6months_____ 6-23 months _____
4.1.10. Was there outbreak in the flood affected area Yes□ No□

If yes , Type of outbreak _____Number of cases _____Deaths _____(specify the time period)_____
Type of outbreak _____Number of cases _____Deaths _____(specify the time period)_____
Type of outbreak _____Number of cases _____Deaths _____(specify the time period)_____
Type of outbreak _____Number of cases _____Deaths _____(specify the time period)_____
Type of outbreak _____Number of cases _____Deaths _____(specify the time period)_____

Any comments on flooding

_____
_____
_____
_____
_____
_____

Annex 5: questionnaire to assess knowledge, attitude and practice of anthrax in Nyangatom woreda south omo zone SNNPR

This study aims to collect information on knowledge, attitudes and practices regarding anthrax among community living in Nyangatom. You are being asked to participate in this study as a community member from this area and would be grateful if you are willing to participate by answering questions from this questionnaire.

I assure you that all the information collected from you will be kept confidential. You may refuse to answer any particular question and may stop the interview at any time.

Do you agree to participate and answer questions in this study? Yes [__] No [__]

Name of participant (optional): …….....

Telephone number of participant (optional):

Woreda.....

Kebele: ……..... Got: …….....

Date of interview: dd/mm/yyyy ……

I) SOCIO-DEMOGRAPHIC INFORMATION:

Age (years) 18-30 [__] 31-40 [__] 41-55 [__] Above 55 [__]

Gender: 1-Male [__] 2-Female [__]

1. Level of education

1-None [__]

2-Primary [__]

3-Secondary [__]

4- College/University [__]

2. **Occupation**

1- Pastoral [__]

2-farmer

3-Other (specify……..

ANIMAL OWNERSHIP

Animal type	No. Female	No. Male	Total No.	Purpose
Cattle				
Goats				
Sheep				
Other (Specify)				

II) ANTHRAX KNOWLEDGE AND AWARENESS

1. Do you know of a disease called anthrax?

1-Yes [__] what are the Signs/symptoms...

2-No [__]

If yes, where did you learn about it? (Check all mentioned)

1-Newspapers and magazines [__]

2-Radio [__]

3-TV [__]

4-Veterinary officials [__]

5-Brochures, posters and books [__]

6-Medical officials [__]

7-Teachers [__]

8-Religious leaders [__]
9- Family, friends, neighbors/colleagues [__]

10-Other (Specify) ……..……...

4. What do you think causes the disease?
-Germs

-Hereditary

-Witchcraft

-Don’t know

- **How is anthrax transmitted to humans? (Select all that apply)**
- Eating infected animal product [__]
- By handling infected animals without protective clothing
- Through contaminated soil [__]

. Do not know [__]

. Have you ever seen a person with anthrax?

1-Yes [__] 2-No [__]

. If yes, where?

1-Through media (TV) [__] 2-Personal observation [__] 3-Other (specify) ……...……

. How can a person prevent him/herself from getting anthrax? (Select all that Apply)

1- Avoid anthrax infected animals [__]

2- Avoid anthrax infected people [__]

3- Burn all suspected anthrax animal carcasses

4-Bury all suspected anthrax carcasses [__]

5-Vaccinate animals annually [__]

6-Do not know [__]

9. What are the signs and symptoms of an animal with anthrax? (Select all that apply)

Sudden death [__]

Bleeding from natural orifices [__]

Unclotted dark red blood [__]

Incomplete rigor mortis [__]

-Other (specify) ……

10. What are the signs and symptoms of a person with anthrax? (check all that apply).

1-Fever [__] 2-Chills [__] 3-Fatigue (extreme tiredness) [__]

4-Skin rash/wounds [__] 5-Coughing [__] 6-Lack of appetite [__]

7-Headache [__] 8-Irritability [__] 9-Diarrhea [__]

10-Vomiting [__] 11-Excessive sweating [__]

. In your opinion, how serious a disease is anthrax in humans and animals in your area? (Check one.)

12. Very serious [__] 2- Somewhat serious [__] 3- Not very serious [__]

. What are the sources of information that you think can most effectively reach people in this area concerning anthrax? (Please choose the three most effective sources.)

- Health workers [__]
- Family, friends, neighbors and colleagues [__]
- Religious leaders [__]
- Teachers [__]
- Other (please explain): ……

IV) PEOPLES' PRACTICE

14. What animal husbandry do you practice?

1-pastoral [__] Mixed free range and zero grazing [__]

Zero grazing [__]- Other (Specify).....

Free range [__]

15. Where do you get fodder for your animals?

1-I graze in the field [__] 4- Buys commercial fodder [__]

2- Cut and carry fodder [__] 5- Other (Specify).....

16. Has any of your animal(s) been infected by anthrax?

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

17. If yes above, what actions did you take?

1- Reported to the Vet officer [__] 2- Buried the dead animal without reporting [__]

2- Consumed meat of the dead animal [__] 3- Other (Specify) ……

. Has any member of your family suffered from anthrax?

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

. If yes above, how did the person contract it?

1-Skinning dead animal [__] 4- Carrying hide form dead animal [__]

2- Eating dead animal [__] 5- Other (Specify)

3- Carrying meat from dead animal [__] .....

. From the above question; what action did you take?

1- Took the person to the nearest health facility [__]

2- Bought medicine from a chemist (Specify drugs bought) …….……

3- Took the person to a traditional healer [__] 4- Did nothing [__]

3- Other (Specify) …….

V) HISTORY OF ANTHRAX VACCINATION

. Have you had anthrax outbreak in the area? Yes [__] No [__]

. If yes, when?

Less than 6months ago [__] More than 1year ago [__]

1year ago [__] Other (Specify) ..... Don't remember [__]

. Was there vaccination during the period? Yes [__] No[__]

24. Were all animals vaccinated?)- Yes [__] No [__]

25. If No - which animals were not vaccinated and why?

.....

26. How often is vaccination against anthrax done in your area?

1-Twice a year [__] 2-Once a year [__]

3-The veterinary personnel are always available to vaccinate

4-Never available [__] 5-Other (specify).....

27. What prompts you to take your animals for vaccination?

1-To protect animals [__] 4- Because others do so [__]

2- To protect humans [__] 5- Other (Specify).....

3- Because it is a requirement [__]

. If you do not always take your animals for vaccination, what are the reasons?

1-No Vet services [__] 4- The vaccination center is far [__]

2- Financial difficulties [__] 5- Other (Specify).....

3 -Don't get informed when it occurs [__]

29. In your opinion, does vaccination of animals help to prevent anthrax?

1- Yes [__] 2- No [__] why? ……