Addis Ababa University, College of Health Science, School of Public Health, Department of Preventive Medicine, Field Epidemiology and Laboratory Training Program (EFELTP)

Compiled Body of Work in Field Epidemiology

By: Kefyalew Amene (BSc)

Compiled Body of Work Submitted to the School of Graduate Studies of Addis Ababa University in Partial Fulfilment for the Degree of Master of Public Health in Field Epidemiology

June 2019
Addis Ababa, Ethiopia

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Approval by Examining Board

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Chairman, Committee of School Graduate

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Advisor

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Internal Examiner

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External Examiner

COMPILED BODY OF WORK FOR FIELD EPIDEMIOLOGY TRAINING PROGRAM RESIDENCY OUTPUTS, ADDIS ABABA, 2019

BY: KEFYALEW AMENE

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Abbreviations/Acronyms

AIDS	……..	Acquired immune deficiency syndrome
AAUSPH	……..	Addis Ababa University School of Public Health
AIDS	……..	Acquired Immune Deficiency Syndrome
ANC	……..	Ante natal care
ART	……..	Anti-retro viral therapy
BCG	……..	Bacilli Chalmette Guerin
CBN	……..	Community Base Nutrition
CFR	……..	Case Fatality Rate
CI		Confidence Interval
CRS	……..	Congenital Rubella Syndrome
EOC		Emergency Operation Center
CSA	……..	Central Statistical Agency
DMFSO	……..	Disaster Management and Food Security Office
DPPC	……..	Disaster Preparedness and Prevention Commission
EDHS	……..	Ethiopian Demographic Health Survey
EPHI	……..	Ethiopian Public Health Institute
EPI		Expanded Program on Immunization
GTBPS		General Tadesse Biru Primary School
EPHI	……..	Ethiopian Public Health Institute
FAO	……..	Food and Agriculture Organization
FMOH	……..	Federal Ministry of Health
FSCO	……..	Food Security Coordination Office
GZDM	……..	Gedeo Zone Disaster Management
HEWs	……..	Health Extension Workers
HMIS	……..	Health Information Management System
HSDP	……..	Health Sector Development Program
HSTP	……..	Health Sector Transformation Plan
IDP	……..	Internal Displaced populations
IDSR	……..	Integrated Disease Surveillance and Response
IOM	……..	International Organization for Migration
MCH	……..	Maternal and Child Health
MDG	……..	Millennium Development Goal
MDSR	……..	Maternal Death Surveillance and Response
MNCH	……..	Maternal, Neonatal and Child Health
NCDs	……..	Non-Communicable Diseases
NDRMC	……..	National Disaster and Risk Management Commission
NGO	……..	Non-Governmental Organization
NPHEMC	……..	National Public Health Emergency Management Center
OR	……..	Odds Ratio

OTP	……..	Outpatient Therapeutic Program
PHEM	……..	Public Health Emergency Management
PITC	……..	Provider Initiative Testing and Counseling
PNC	……..	Post Natal Care
RRT	……..	Rapid Response Team
SAM	……..	Severe Acute Malnutrition
SCI	……..	Save the Children International
SNNPR	……..	South Nation Nationalities and Peoples Region
SUN	……..	Scale Up Nutrition
TSF	……..	Targeted Supplementary Feeding
TTBA	……..	Trained Traditional Birth Attendant
UNHCR	……..	United Nations High Commissioner for Refugees
UNICEF	……..	United Nations Children's Emergency Fund
UNOCHA	……..	United Nations Office for Coordination of Humanitarian Affairs
VZV	……..	Varicella Zoster Virus
WFP	……..	World Food Program
WHO	……..	World Health Organization

Executive Summary

This document contains a two years field epidemiology training program outputs to be submitted to Addis Ababa University, School of Public Health, Department of Preventive Medicine for partial fulfillment of master's degree in Field Epidemiology. This document is organized by classifying in to seven chapters. These seven chapters are outbreak investigation one, outbreak investigation two, surveillance data analysis, surveillance system evaluation, narrative summary of disaster situation visited, health profile description projectand epi-project thesis proposal.

Chapter one contains report of first outbreak investigation. The outbreak was rubella outbreak at General Tadesse Biru Primary School, Addis Ababa, Ethiopia 2018. Unmatched case-control study was conducted to investigate the outbreak in which I was leading the investigation.

Chapter two is about outbreak investigation two. This outbreak was suspected chickenpox outbreak, which was occurred in Aleltu Soldier Training Center, North Shewa Zone of Oromia region. Unmatched case-control study was conducted to investigate this suspected outbreak and I was the leading this investigation.

Chapter three is about analysis of five years (2013-2017) malnutrition surveillance data of Addis Ababa City Administration. A retrospective record review data analysis was conducted. Cases and deaths were described epidemiologically and trend of cases was also seen. Incidence rate of malnutrition and trend of cases through time was determined.

Chapter four addresses MDSR surveillance system evaluation in Addis Ababa City Administration, Ethiopia, 2018. It describes the status of the system in the city administration towards meeting its establishment objectives. System attributes including simplicity, flexibility, usefulness, stability, acceptability, representativeness, timeliness, data quality, sensitivity, cost and predictive value positive were described in regard to MDSR system.

Chapter five presents a narrative summary of disaster situation visited. The disaster situation was about Internally Displaced Populations (IDPs), which was happened in Kochere and Yirga chefe woredas found in Gedeo zone of SNNP region, Ethiopia due to Ethnic based border conflict between SNNP and Oromia regions.

Chapter six contains health profile description of woreda 05 of Nefas silk sub-city, Addis Ababa, Ethiopia 2018. Health and health related information were presented, which can be used for evidence based planning and effective utilization of limited resources. These data can be used to identify risk factors and prioritize public health problems to take appropriate interventions.

The last chapter (chapter seven) contains the epi-project proposal. The epi-project proposal was developed to assess predisposing factors of undernutrition in Addis Ababa city administration 2019. Unmatched case-control study will be conducted to identify the predisposing risk factors of undernutrition in the city administration.

Chapter One: Outbreak Investigation One

1. Rubella Outbreak investigation at General Tadesse Biru Primary School, Addis Ababa, Ethiopia 2018

1.1 Abstract

Introduction: Rubella virus causes rubella disease. Rubella occurs worldwide. Rubella can cause congenital rubella syndrome in the newborn. Worldwide above 100,000 children per year born with congenital rubella syndrome. In African countries, including Ethiopia, congenital rubella syndromeis widely under-recognized as a public health problem, and information on rubella and congenital rubella syndromeepidemiology is very limited. Rubella vaccination has not been introduced into the infant vaccination schedule in Ethiopia.

Objective: The objective of this outbreak investigation was to confirm existence of the outbreak, describe cases epidemiologically and control it.

Methodology: A1:2 unmatched case-control study was conducted at General Tadesse Biru Primary School, Addis Ababa from February 3-25/2018. A total of 41cases and 82controls included in the study. 4cases and 8controls were selected from the community, identified during active case searching. Controls were selected conveniently from the same school. Data was collected by using structured questioner. Data analysis was done using Epi-info software version7.2.1.0. Bivariate and multivariate logistic regression analysis was done to determine association. Variables with P-value less than 0.25 in bivariate analysis were included in multivariate logistic analysis. Results were summarized in tables and graphs. Verbal informed consent was received from Addis Ababa City Regional Health Bureau, General Tadesse Biru Primary Schooland study participants.

Result: A total of 41 rubella cases were identified. The index case and source of outbreak were not identified. Sample positivity rate for measles were zero and 20% for rubella. The first case was seen on 5th January, pick on 18th January (4cases) and last case seen on 19th February/2018. Most 23(56.1%) cases were females and 17(41.46%) cases were among grade 1and 2 students. The median age of the cases was 10years (IQR = 4). The overall attack rate in the school was 1.39% and highest attack rate (2.22%) seen among grade 1-4 students. The overall case fatality rate was zero. All cases were complaining rash and 80.49% had fever. Multivariate logistic regression analysis revealed that educational status of grade 3-4 and 5-7 had 0.13 and 0.12 time reduced risk of developing rubella disease than educational status of grade 1-2 at P-value of less than 0.05, respectively.

Conclusion: Most probably the outbreak was driven by contact at school and sharing of common transportation service then spread to the community through school children.Most of the cases were females. Educational status of grade 5-8 had reduced risk of developing rubella disease than educational status of grade 1-2.

Recommendation: All level health departments should convince such organizations and the community about significance of early notification and health facility visit. Ministry of Health need to consider an assessment to include rubella among 21 prioritized diseases under surveillance.

Key words: Rubella, Outbreak investigation, School, Addis Ababa, Ethiopia 2018.

1.2 Introduction

Rubella also known as German measles or three-day measles, is an infection caused by the rubella virus, a toga virus that is enveloped and has a single-stranded RNA genome. This disease is often mild with half of people not realizing that they are infected.

The virus tends to peak during the spring in countries with temperate climates. Before the vaccine against rubella was introduced in 1969, widespread outbreaks usually occurred every 6–9 years in the United States and 3–5 years in Europe, mostly affecting children in the 5-9 years old age group. [1].

Statement of the problem

Rubella can cause congenital rubella syndrome (CRS) in the newborn. As per the World Health Organization (WHO) estimate worldwide more than 100,000 children per year are born with CRS. Special surveillance investigations in developing countries in Africa, the Americans Asia, Eastern Europe and the Eastern Mediterranean have documented incidence rates of CRS ranging from 0.4 to 4.3 per 1 000 live births [2, 3].

In African countries, including Ethiopia, CRS is widely under-recognized as a public health problem, and information on rubella and CRS epidemiology is very limited. Data on the burden of disease in developing countries have been also considered insufficient to make global recommendations for vaccine use. Surveillance for rubella or CRS does not exist in Ethiopia; however, the measles case-based surveillance system, established in 2004, includes laboratory testing for the detection of measles and rubella-specific antibodies. The measles case-based surveillance system has helped greatly in terms of documenting the epidemiology of measles in Ethiopia. However, little is known of the magnitude and distribution of other febrile rash illnesses including rubella [4-7].

Rubella vaccination has not been introduced into the infant vaccination schedule in Ethiopia. In the major urban centers, some private practitioners provide rubella vaccination to infants at 9 months of age or older in the form of measles-rubella vaccine. However, these private sector vaccination services are not monitored, and the rubella vaccination coverage in the general population is unknown [8].

Rubella is still common in some regions of the world and Susan E. Reef, team lead for rubella at the C.D.C.’s global immunization division, who joined in the announcement, said there was no chance it would be eradicated worldwide before 2020. The move in many countries towards accelerated measles control and measles elimination raises the question of the marginal cost of including rubella control strategies with this initiative [4, 9].

Rationale of the study

As indicated in the problem of statement, the burden of rubella is almost worldwide. Some countries had eradicated the disease from their country due to high attention they give to the disease, integrated effort, strong surveillance, data availability and provision of vaccine. In developing countries including Ethiopia there is very low attention towards the disease, no strong surveillance system on rubella and no complete and sufficient data to recommend the vaccination. Due to these and other problems rubella persists a problem of developing countries causing many economy and life lose. This outbreak investigation aims to increase the attention given for rubella by showing the magnitude and burden of the disease and providing recommendations to prevent future outbreaks.

Significance of the study

As the obstacles in preventing and eradicating the disease are identified, government concern towards the disease increased and recommendations are applied fully as soon as possible with regular monitoring and evaluation of data (case and activity data) the disease will be prevented and eradicated from the country. Thus, the country will get economic advantage from the reduced cost for rubella intervention and healthy productive citizens. Attendants of cases will also spend their time in productive activities rather than staying with patients in psychologically depressed condition. This will contribute to increase the national life expectancy rate, pull attention of tourists and investors from foreign to visit and invest in the country. This intern contributes to develop the economy of the country.

1.3 Literature Review

Rubella was first described in the mid-eighteenth century. Friedrich Hoffmann made the first clinical description of rubella in 1740, which was confirmed by de Bergen in 1752 and Orlow in 1758. In 1814, George de Maton first suggested that it be considered a disease distinct from both measles and scarlet fever. All these physicians were German, and the disease was known as Rötheln (contemporary German Röteln), hence the common name of "German measles". It was formally recognized as an individual entity in 1881, at the International Congress of Medicine in London [10].

In 1969 a live attenuated virus vaccine was licensed. In the early 1970s, a triple vaccine containing attenuated measles, mumps and rubella (MMR) viruses was introduced. Since the introduction of vaccine, occurrences have become rare in those countries with high uptake rates. By 2006, confirmed cases in the Americas had dropped below 3000 a year. However, a 2007 outbreak in Argentina, Brazil, and Chile pushed the cases to 13,000 that year. All countries which have documented large outbreaks of CRS now have national rubella vaccination policies [4-6].

On January 22, 2014, the World Health Organization (WHO) and the Pan American Health Organization declared and certified Colombia free of rubella and became the first Latin American country to eliminate the disease within its borders. On April 29, 2015, the Americas became the first WHO region to officially eradicate the disease. The last non-imported cases occurred in 2009 in Argentina and Brazil [11]. Rubella is the third disease to be eliminated from the western hemisphere with vaccination after smallpox and polio [4, 9].

The syndrome (CRS) follows intrauterine infection by the rubella virus and comprises cardiac, cerebral, ophthalmic and auditory defects. It may also cause prematurity, low birth weight, and neonatal thrombocytopenia, anemia and hepatitis. The risk of major defects or organogenesis is highest for infection in the first trimester. CRS is the main reason a vaccine for rubella was developed. Many mothers who contract rubella within the first critical trimester either have a miscarriage or a stillborn baby [12].

Rubella is usually spread through the air via coughs of people who are infected. People are infectious during the week before and after the appearance of the rash. Babies with CRS may spread the virus for more than a year. Only humans are infected and Insects do not spread the disease. Once recovered, people are immune to future infections. Testing is available that can verify immunity.

Rubella has symptoms that are similar to those of flu. However, the primary symptom of rubella virus infection is the appearance of a rash (exanthema) on the face which spreads to the trunk and limbs and usually fades after three days (that is why it is often referred to as three-day measles). The facial rash usually clears as it spreads to other parts of the body. Other symptoms include low grade fever, swollen glands (sub-occipital and posterior

cervical lymphadenopathy), joint pains, headache, and conjunctivitis. Up to 60% of older girls or women experience joint pain or arthritic type symptoms with rubella. Coryza in rubella may convert to pneumonia, either direct viral pneumonia or secondary bacterial pneumonia, and bronchitis (either viral bronchitis or secondary bacterial bronchitis) [13].

Diagnosis is confirmed by finding the virus in the blood, throat, or urine. Testing the blood for antibodies may also be useful. Rubella virus specific IgM antibodies are present in people recently infected by rubella virus, but these antibodies can persist for over a year, and a positive test result needs to be interpreted with caution. The presence of these antibodies along with, or a short time after, the characteristic rash confirms the diagnosis [14].

Rubella infections are prevented by active immunization programs using live attenuated virus vaccines. The vaccine is now usually given as part of the MMR vaccine. WHO recommends the first dose be given at 12 to 18 months of age with a second dose at 36 months. It is recommended that all susceptible non-pregnant women of childbearing age should be offered rubella vaccination. Due to concerns about possible teratogenicity, use of MMR vaccine is not recommended during pregnancy. Instead, susceptible pregnant women should be vaccinated as soon as possible in the postpartum period [15].

There is no specific treatment for rubella; however, management is a matter of responding to symptoms to diminish discomfort. Treatment of newborn babies is focused on management of the complications. Congenital heart defects and cataracts can be corrected by direct surgery. Rubella infection of children and adults is usually mild, self-limiting and often asymptomatic. The prognosis in children born with CRS is poor [16].

Suspected rubella cases

On January 26/2018 (Friday) one of EPHI staff had received a rumor of suspected measles outbreak at General Tadesse Biru Primary School (GTBPS), Gulele sub city, Addis Ababa, Ethiopia. On the same day EPHI has communicated Addis Ababa Regional Health Bureau (AACAHB) about the event (suspected rubella outbreak). But at that time they had no information about the case. Then, AACAHB together with World Health Organization (WHO) staff (physician) had visited the school and most of suspected cases were absent due to their illness. Finally, they got two students with reported sign and symptoms. After they observe and ask suspected cases for sign and symptoms they diagnosed it as suspected chickenpox rather than suspected rubella.

On Monday January 29/2018, a team from EPHI and AACAHB had visited GTBPS and discussed with the School Director about the issue. However, since the school was closed for semester break we couldn't get the chance to see the signs of the suspected cases on that day. Thereforethe school director gave us list of 13 suspected cases (students) with their address (parent phone number and residence) and except one case from Sululta all of these cases were from Burayu town of Oromia region, Ethiopia. Then together with Burayu Town Health Office, Burayu Health Center and Burayu town HEWs, EPHI has started to contact cases with received addresses.

1.4 Objective

General objective

- To confirm existence of the outbreak, describe cases epidemiologically and control the outbreak at General Tadesse Biru Primary School, Addis Ababa, Ethiopia 2018.

Specific objectives

The specific objectives of investigating this rubella outbreak includes:

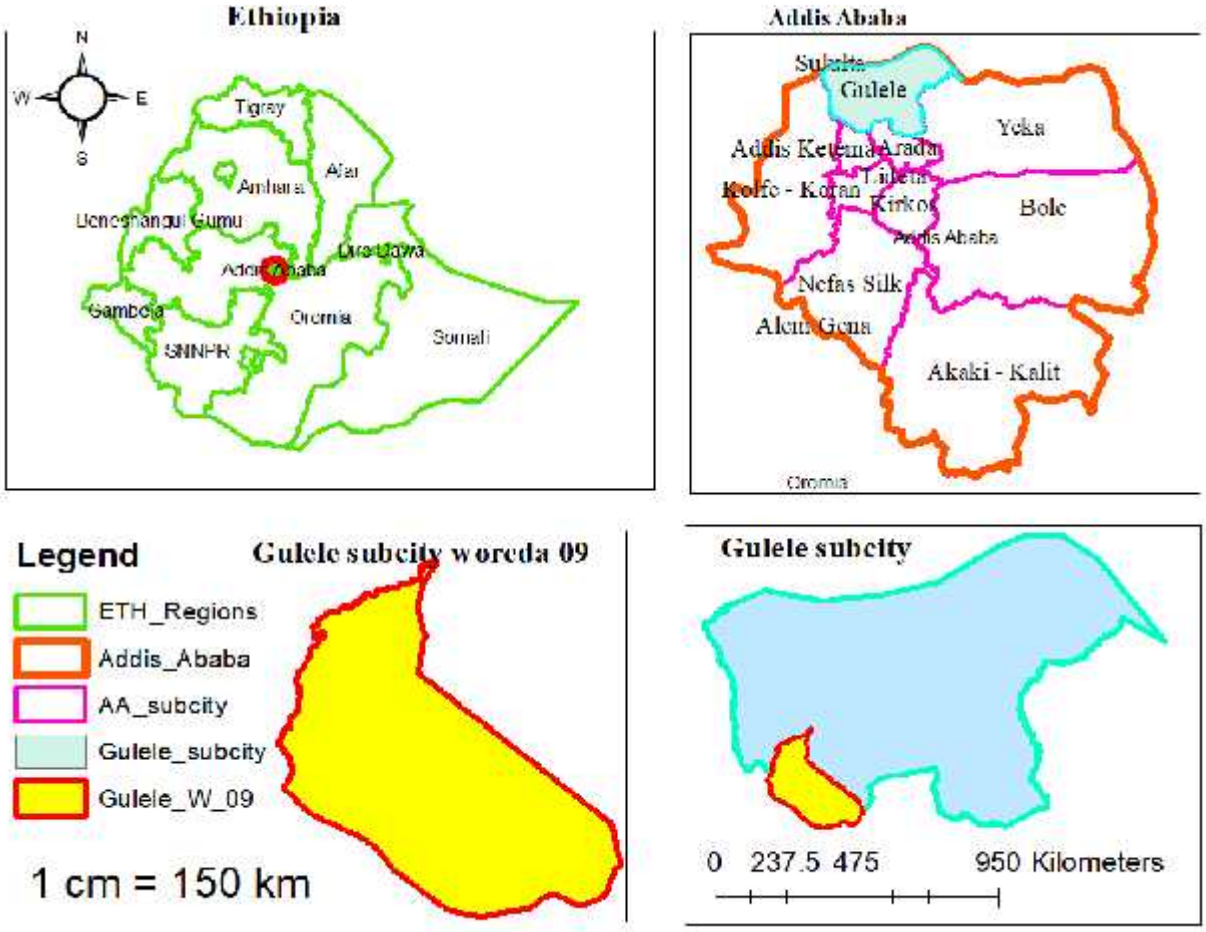
- ❖ To confirm the existence of the outbreak
- ❖ To describe cases epidemiologically by person, place and time
- ❖ To identify the source of the outbreak and other associated risk factors
- ❖ To control and prevent current and future outbreak trough appropriate intervention measures

1.5 Methods and Materials

Study area, period and population

Investigation area

The investigation was conducted at General Tadesse Biru Primary School found in District 09 of Gulele Sub city, Addis Ababa, Ethiopia 2018. General Tadesse Biru Primary School was opened in September/2017. The school has a total of 3 divisions in separate compounds (Kindergarten (KG), grade 1-4 and grade 5-8). Currently the school has a total of 2669 students (1375 males and 1294 females) in all the three divisions **(Source: school's director).**



Map 1: Map of Ethiopia, Addis Ababa, Gulele Sub-city and Woreda 09 of Gulele sub-city, February 2018.

Investigation period

The investigation was conducted from February 3 -25/2018.

Investigation population

The population under investigation was all students at General Tadesse Biru Primary School. Additional four cases (by community active case searching) and eight controls for these cases were also included from the community.

Investigation Design

The investigation team had planned to clarify and verify the rumor received on 26/01/2018 such as from where the rumor was received, who was reporting it, what is the confirmed diagnosis of the event etc. Then we went to General Tadesse Biru Primary School to verify the rumor and got more information from the school about the suspected cases. After that, the investigation team had received contacts of suspected cases and met them physically for observation of clinical signs and interviewing for symptoms and possible risk factors. Additionally, we had also asked suspected cases and their families for more additional information and presence of individuals with similar complaints in the community (active cases searching). We had also visited Burayu Health Center for medical record and line list review and Health Extension workers (HEWs) working in the town were also contacted for interview about the event. We had also contacted the national measles laboratory located at EPHI for measles case-based review and to know results of collected samples.

Unmatched Case-control study was also conducted on all cases (41) and selected controls (82). All suspected cases were included and controls were selected by convenient sampling method. All selected controls (82) had almost similar exposure with the cases. Eight controls were selected from the community for the four cases traced from the same community by active case searching and all the rest cases and controls were selected from the same school (General Tadesse Biru Primary School). Two controls were selected for a single case.

Data Collection Tools and Procedures

Structured questionnaire was used for the data collection from the cases and controls. The questioner included pertinent variables such as socio demographic variables (age, sex, educational status of cases and parents…), possible risk factor variables (family size, travel history, contact history…), awareness assessment variables (symptom, transmission, prevention, treatment, risk group…) and the like.

Dependent and independent variables

Dependent variables

- Case
- Rubella awareness level

Independent variables

- Age
- Sex
- Residence
- Religion
- Ethnicity
- House condition
- Distance from house to health center
- Family size
- Awareness on modes of transmission
- Cases educational status
- Cases parents educational status

Data quality control

To maintain data quality questions were explained for data collectors and each question was requested clearly for cases and controls in similar manner. Data completeness and consistency was also checked before finishing the interview.

Data analysis

Data was entered and analyzed by using Epi-enfo software version 7.2.1.0 and Microsoft office excel 2013. Simple mathematical operations like addition and division of numbers were done by excel. Bivariate and multivariate logistic regression analysis were also used to test association.

Ethical Consideration

EPHI had communicated AACAHB PHEM in turn AACAHB PHEM had communicated Gulele sub city PHEM about the objective, methodology, confidentiality and other issues of the investigation. After that informed verbal consent was received from all concerned offices to conduct the investigation.

Dissemination of investigation result

The final output of this investigation will be submitted to Addis Ababa University School of Public Health Department of Preventive Medicine, AACAHB PHEM unit and EPHI, FMOH and EFELTP

Laboratory methods

As many diseases share similar sign and symptoms; measles, rubella and Chicken pox also have very similar characteristics in which laboratory confirmation is mandatory in order to differentiate them. According to the Ethiopian national measles Surveillance and Outbreak Management guideline, a minimum of five (5) adequate samples need to be collected [10]. Therefore, a total of eleven (11) adequate serum samples were collected from different suspected cases to be processed at EPHI national measles laboratory. After knowing the result of these samples, the rest suspected cases were linked epidemiologically.

Operational Definitions

Case: any student from GTBPS who fulfills the criteria for suspected rubella case during the study period.
Case Fatality Rate (CFR): The case fatality rate is the proportion of cases resulting in death.

Confirmed Rubella case: A suspected case from which rubella IgM antibody detected *or* rubella virus isolated *or* rubella viral RNA detected by RT-PCR *or* significant rise in rubella IgG antibody in paired sera. [17]
Control: was selected student from GTBPS with almost similar characteristics (exposure) to the cases except complaining sign and symptoms of the disease during the study period.

Epidemiologically linked Rubella Case: A suspected case which has not been adequately tested by laboratory and was in contact with a laboratory-confirmed rubella case 12–23 days before the onset of symptoms [17].

Rubella outbreak: If 2 or more laboratory-confirmed cases which are temporally related (with dates of rash onset occurring between 12 and 46 days apart) and epidemiologically or virologically linked, or both. [17]
Rubella outbreaks: A cluster 5 or more IgM confirmed rubella cases occurring within a month period within a district [18].
Suspected rubella case: is any person with fever and generalized maculopapular rash orclinician diagnosed rubella [18].

Ventilation: a house is said to be ventilated, when it has at least one window.

1.6 Result

Background

A total of 41 rubella cases were identified by home to home active case searching, line list review and General Tadesse Biru Primary School (GTBPS) visit. Of these, 4 cases (out of General Tadesse Biru Primary School and students in other schools) were traced from the community during active case searching. After observing signs and interviewing about symptoms of suspected cases, the investigation team had tentatively diagnosed as suspected chickenpox cases. Although the school conducted registration of suspected cases; they didn't identify the index case for the school (source of infection also not known too) because they give emphasis when the number of cases were becoming high (increased). The school had notified to Selam Health Center (government health center) lately due to weak leakage between the school and health departments.

Laboratory Investigation result

For the confirmation of the suspected outbreak diagnosis; a total of five (5) serum samples were collected from suspected cases and transferred to the national measles laboratory found in EPHI for which none of the samples were tested positive for measles, one sample tested positive for rubella virus and one sample giving intermediate result. With recommendation by laboratory personnel additional six serum samples were collected from suspected cases having recovered rash since the antibody persists and can be detected until 28 days from rash onset for more confirmation of the laboratory result (especially rubella positivity) in consideration of sample collection problems (17). Out of the six serum samples five of them were processed and all tested negative for measles, 1 positive for rubella and 1 equivocal result was found. A total of 11 serum samples were collected; of which 10 of them were processed and all tested negative for measles, two tested positives for rubella and two give equivocal result.

Descriptive Analysis

In describing cases epidemiologically 23(56.1%) of the cases were females and 17(41.46%) of cases were from grade 1-2 students followed by grade 3-4 10(24.39%). The overall attack rate in the school was 1.54% and highest attack rate (2.22%) was seen among grade 1-4 students. The attack rate among female students were 1.78%. No one had developed complication and the overall case fatality rate in both sexes and age groups was zero.

The median age of the cases was 10 years (IQR = 4). Only 4 cases (who is not a student at General Tadesse Biru Primary School but has contact with students from that school) were traced from the community by active case searching with age greater than 15 years. Most of the cases were in the age group of 5 to 9 and 10 to 14 years (43.9% each).

Bivariate analysis of age and sex variable revealed that, half of the cases 9(50%) among males were between age group of 5 - <10 years followed by 10 - <15 years 8(44.44%), while the most affected age group among female cases were 10 - <15 years 10(43.48%) followed by 5 - <10 years 9(39.13%).

The analysis also revealed that students from 2 regions (Addis Ababa and Oromia), 4 zones/sub cities and 5 main kebeles were affected by the outbreak. Most 28(68.29%) of the cases were from Oromia region. In analyzing cases distribution by zone/sub city, more than half 25(60.97%) of them were from Burayu town followed by Gulele Sub city 11(26.83%), Sululta 3(7.32%) and Kolfe keraniyo 2(4.88%). The investigation results also revealed that 8(19.51%) of the cases were from Keta kebele followed by Gefersa 7(17.07%), and majority 19(46.34%) of the cases didn't know the specific place (kebele) name of their residence (Fig 2).

All cases were Oromo by ethnicity and almost half 19(46.34%) of the cases were protestant religion follower followed by orthodox 13(31.71%) and Muslims 9(21.95%). In relation to cases parent educational status more than half 22(53.66%) of them had learned above secondary school followed by primary and secondary school (12.20% each). Most 30(73.17%) of the cases didn't know average monthly income of the family.

Table 1.1: Socio-Demographic characteristics of cases, General Tadesse Biru Primary School, Addis Ababa, Ethiopia 2018.

Variable	Category	N(%)
Sex	Male	18(43.9%)
	Female	23(56.1%)
Residence	Addis Ababa	13(31.71%)
	Oromia	28(68.29%)
Age group	0-4	0(0%)
	5-9	18(43.9%)
	10-14	18(43.9%)
	15 – 19	2(4.88%)
	20 – 24	2(4.88%)
	25 – 29	1(2.44%)
Religion	Orthodox	13(31.71%)
	Muslim	9(21.95%)
	Protestant	19(46.34%)
Parent educational status	Illiterate	3(7.32%)
	read and write	4(9.76%)
	Elementary	5(12.2%)
	Secondary	5(12.2%)
	above secondary	22(53.66%)
	I don't know	2(4.88%)
Patient educational status	Kg	1(2.44%)
	1-2	17(41.46%)

	3-4	10(24.39%)
	5-6	8(19.51%)
	7-8	4(9.76)
	above 8	1(2.44%)

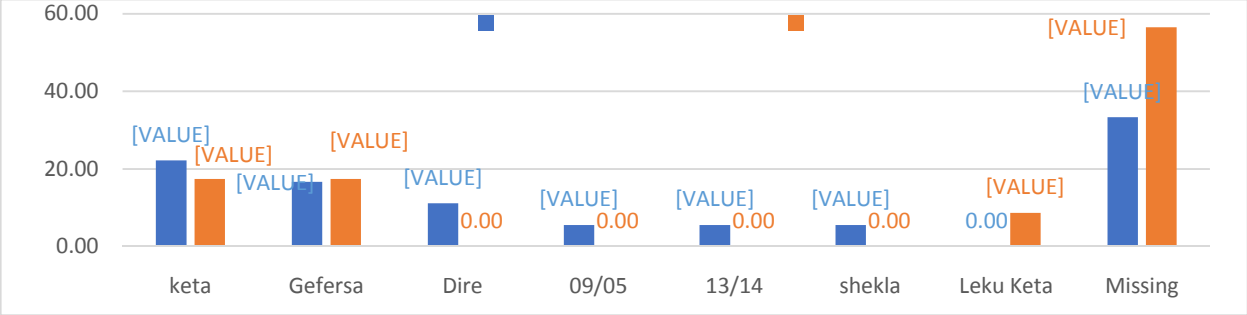


Figure 1.1: Distribution of rubella cases by specific place/kebele name and sex, General Tadesse Biru Primary School, Addis Ababa, Ethiopia 2018.

The first case was seen on 5th January/2018 and last case on 19th February/2018. Due to late investigation because of late notification almost one third (29.27%) of the cases didn't remember disease onset date. High number of cases was seen (pick) on 18th January/2018 (4 cases) (Fig 3). In most of the cases 18(43.90%) the rash had started from their face followed by trunk 13(31.71%). Cases were complaining rash 41(100%), fever 33(80.49%), arthralgia 30(73.17%), loss of appetite 24(58.54%), lymphadenopathy 23(56.1%) and cough 22(53.66%) (Fig 4).

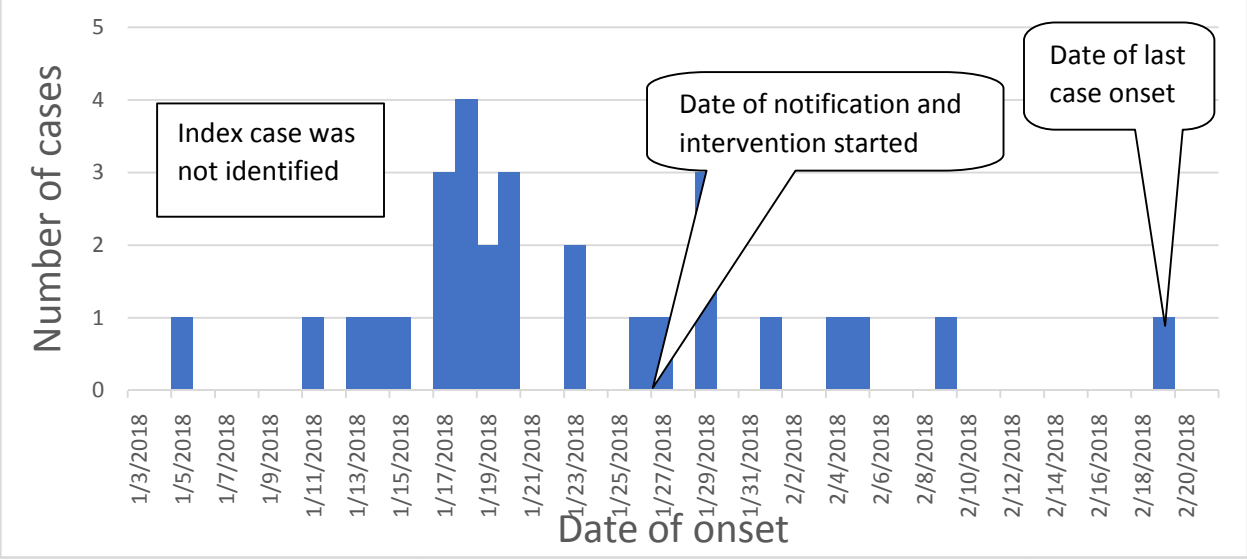


Figure 1.2: Epi-curve of rubella cases by date of onset, General Tadesse Biru Primary School, Addis Ababa, Ethiopia 2018.

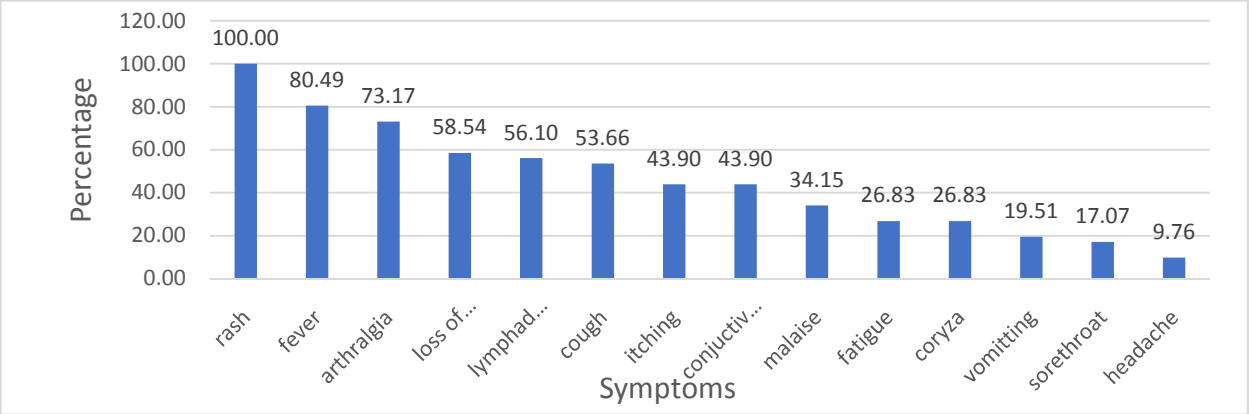


Figure 1.3: Distribution of rubella cases by symptoms, General Tadesse Biru Primary School, Addis Ababa, Ethiopia 2018.

In analyzing the house condition, 36(87.80%) of cases have a house with at least one window and 24(58.54%) of cases leave within 2 kilo meter distance from a health facility. The maximum family size of the cases was twelve and the lowest was two. Almost half of the cases 21(51.22%) have family size of less than or equal to five.

Table 1.2: Distribution of rubella cases and controls by house condition, distance from health facility and family size General Tadesse Biru Primary School, Addis Ababa, Ethiopia2018.

House condition	**Cases n(%)**	**Controls n(%)**
not-ventilated	5(12.20%)	4(4.88%)
Ventilated	36(87.80%)	78(95.12%)
Distance from house to HC		
greater than 2km	17(41.46%)	41(50%)
less than or equal to 2km	24(58.54%)	41(50%)
Family size		
1-5	21(51.22%)	44(53.66%)
6-10	19(46.34%)	37(45.12%)
11-15	1(2.44%)	1(1.22%)

Twenty-seven (65.85%) of the cases didn't know modes of transmission as well methods to prevent transmission. Out of those who know modes of transmission and prevention; 5(35.71%) of cases know that rubella can be transmitted by close contact with affected individual and avoiding of close contact with rubella patients and isolation prevents its transmission. Six (42.86%) of the cases had replied more than one method of prevention (Table 3).

Majority 16(39.02%) of the cases know that any age of any sex can be affected by rubella (Fig 5) and 12(29.27%) cases perceive that rubella is cured by medical treatment followed by traditional treatment 7(17.07%) (Fig 6). Of the total 41 cases; more than half 26(63.42%) of them didn't

take any treatment. Of those who take any type of treatment; 10(66.67 %) of them had used modern type of treatment (antibiotics, TTC ointment and antipyretic) and the rest used traditional type of treatment like perfuming and fendisha (Fig 7). All of the cases had no travel history to any place out of their residence within 21 days before the rash onset and all of the cases had contact history with active rubella cases at the school and/or in the family before their illness.

Table 1.3: Distribution of rubella cases and controls by methods of preventing transmission, General Tadesse Biru Primary School, Addis Ababa, Ethiopia 2018.

Methods of preventing transmission	Cases n(%)	Controls n(%)
avoid contact	5(35.71)	19
isolation	5(35.71)	10
vaccination	4(28.57)	7
avoid sharing of cloth	2(14.29)	5
medication	2(14.29)	0
avoid sharing material	1(7.14)	2
keeping personal hygiene	1(7.14)	0(0%)
Avoid blood contact	0(0%)	3(3.66%)

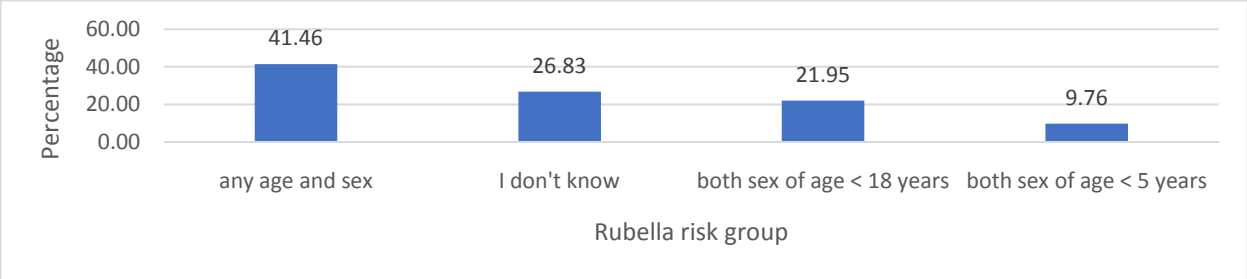


Figure 1.3: Distribution of rubella cases perception by rubella risk group, General Tadesse Biru Primary School, Addis Ababa, Ethiopia 2018.

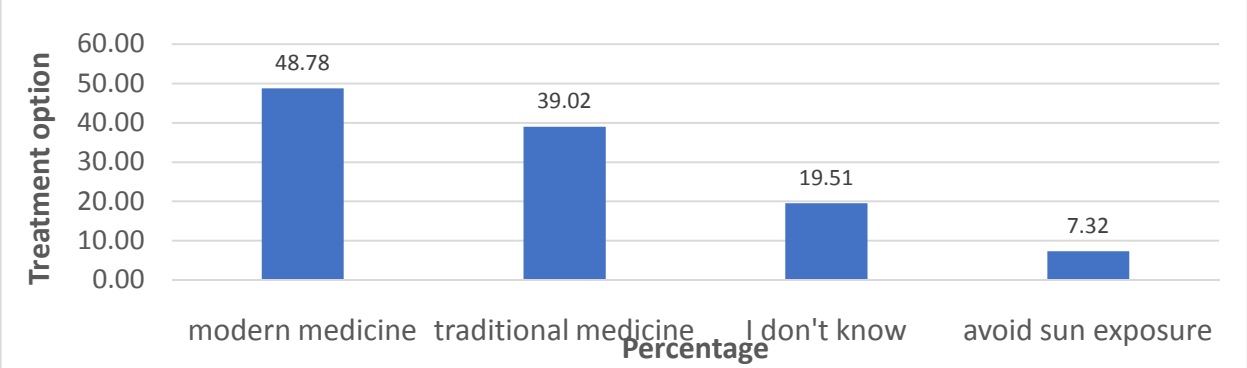


Figure 1.4: Distribution of cases perception for rubella treatment options, General Tadesse Biru Primary School, Addis Ababa, Ethiopia 2018.

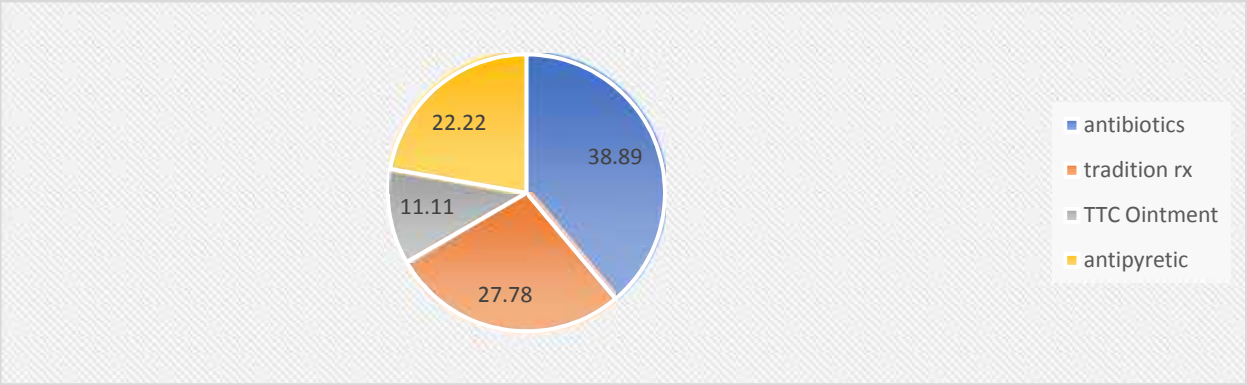


Figure 1.5: Distribution of rubella cases by type of treatment taken, General Tadesse Biru Primary School, Addis Ababa, Ethiopia 2018.

Majority 29(70.73%) of the cases didn't went to health facility to seek medical treatment (Fig 8). From those seeking medical treatment, most 7(58.33%) of cases went to health facility within 2 days of rash onset. The rash has persisted for more than 3 days in almost half of the cases 20(48.78%) (Table 4).

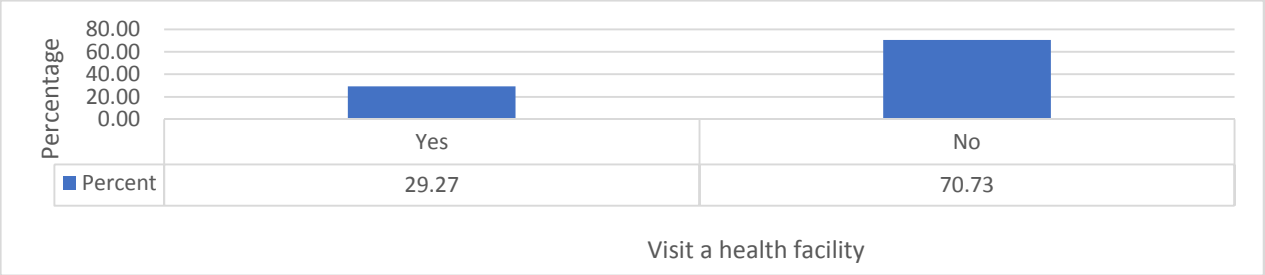


Figure 1.6: Distribution of rubella cases by health facility visit, General Tadesse Biru Primary School, Addis Ababa, Ethiopia 2018.

Table 1.4: Distribution of rubella cases by duration of rash, General Tadesse Biru Primary School, 2018.

Duration of rash in day	Case n(%)
less than or equal to 3 days	13(31.71%)
Greater than 3 days	20(48.78%)
Don't remember	8(19.51%)
Total	41

Hypothesis Generation

Based on the finding from the descriptive analysis, the investigation team had developed the following hypothesis.

The risk of contracting rubella disease have an association with:

- Educational status of cases and their family
- Awareness status on modes of transmission
- Age group and Female sex

Risk factor analysis

A total of 41 cases (all cases) and 82 controls, from the same school and community having almost similar exposure and characteristics with cases were selected conveniently. Most of the controls 46(56.1%) were males and 36 (43.9%) females. Majority 56(68.29%) of controls were in age group of 10 to 14 years. The median age of controls was 12 (IQR =2.5). Majority 37(45.12%) of controls were from grade 5-6 followed by grade 3-4 16(19.51%). Forty-six (56.10%) of the controls parent had learned above secondary school.

Table 1.5: Socio-demographic characteristics of cases and controls, General Tadesse Biru Primary School, Addis Ababa, Ethiopia 2018**.**

Variable	Options	Control	Case
		n (%)	n (%)
Sex	Male	36 (43.9%)	23 (56.1%)
	Female	46(56.1%)	18(43.9%)
Age group	0-<5	2(2.44%)	0(0%)
	5 - <10	12(14.63%)	18(43.9%)
	10 - <15	56(68.29%)	18(43.9%)
	15 - <20	9(10.98%)	2(4.88%)
	20 - <25	2(2.44%)	2(4.88%)
	25 - <30	1(1.22%)	1(2.44%)
Cases/control educational status	Kg	3(3.66%)	1(2.44%)
	Grade 1-2	9(10.98%)	17(41.46%)
	Grade 3-4	16(19.51%)	10(24.39%)
	Grade 5-6	37(45.12%)	8(19.51%)
	Grade 7-8	14(17.07%)	4(9.76%)
	Above8	3(3.66%)	1(2.44%)
Parent educational	Above Secondary school	46(56.1%)	22(53.66%)

status	Secondary school	12(14.63%)	5(12.2%)
	Elementary school	8(9.76%)	5(12.2%)
	Read and Write	4(4.88%)	4(9.76%)
	Illiterate	2(2.44%)	3(7.32%)
	I don't know	10(12.2%)	2(4.88%)

Majority 78(95.12%) of the controls had house with at least one window and 48(58.54%) of them didn't know modes of transmission for rubella. Most of the controls 57(69.51%) perceive that rubella can affect any sex of any age group.

Hypothesis testing

Bivariate logistic regression model was used to test the association between all possible risk factors hypothesized above to have an association with contracting rubella disease. Educational status of cases and their family, cases awareness status on modes of transmission, age group and sex were the variables included in the bivariate logistic regression model. Those variables with P-value less than or equal to 0.25 were included in multiple logistic regression model to control confounding effect of one variable on the other. Educational level of the patient and their family and sex were the variables included in multivariate logistic regression model. Of those variables, educational status of grade 5-6 and 7-8 had 0.13 and 0.12 times reduced risk of developing rubella disease than a person of grade 1-2 at 95% CI of 0.04-0.42 and 0.03-0.52, respectively.

Table 1.6: Multivariate logistic regression analysis of possible Rubella risk factors, General Tadesse Biru Primary School, Addis Ababa, Ethiopia 2018.

Variable	Category	Case	Control	COR (P-Value)	AOR(95% CI)
Sex	Male	18(43.9%)	46(51.10%)	0.61(0.20)	0.55(0.22-1.35)
	Female	23(56.1%)	36(43.90%)	*1*	*1*
Patient educational status	Grade 3-4	10(24.39%)	16(19.51%)	0.31(0.05)	0.44(0.12-1.57)
	Grade 5-6	8(19.51%)	36(43.90%)	0.11(0.00)	0.13(0.04-0.42)
	Grade 7-8	4(9.76%)	14(17.07%)	0.14(0.01)	0.12(0.03-0.52)
	Above grade 8	1(2.44%)	3(3.66%)	0.16(0.13)	0.21(0.01-2.97)
	KG class	1(2.44%)	3(3.66%)	0.16(0.13)	0.12(0.01-1.60)
	Grade 1-2	17(41.46%)	10(12.20%)	*1*	*1*
Family educational status	illiterate	3(7.32%)		3.14(0.23)	3.56(0.45-28.44)
	read and write	4(9.76%)	4(4.88%)	2.09(0.33)	1.77(0.31-10.18)
	elementary	5(12.20%)	8(9.76%)	1.30(0.67)	1.67(0.42-6.66)
	secondary	5(12.20%)	12(14.63%)	0.87(0.82)	0.87(0.24-3.16)
	above secondary	22(53.66%)	46(56.10%)	*1*	*1*

- ***1* reference and P-value is significant at < 0.05.**

1.7 Discussion

This rubella outbreak investigation revealed that the school was newly opened by this year and currently it is teaching 2669 students (1375 males and 1294 females). According to WHO guideline for rubella outbreak investigation and response in the WHO European region, 41.5% of the cases had fulfilled the clinical criteria for rubella surveillance and all of the cases fit with rubella outbreak definition. All cases had also fulfilled the surveillance cases definition for suspected rubella case and the outbreak definition. Therefore, the suspected outbreak was declared as confirmed rubella outbreak [17]. Such an outbreak was happened for the first time since the school opening.

A total of more than 50 cases were affected by the outbreak (Schools report) and only 41 of them were identified/traced by using the case definition for rubella and interviewed. No case had developed complication and no death was happened. The occurrence of the outbreak causes student absenteeism from the school but, it didn't cause an increase in health facility visit. Case parents were absent from their work and stay at home with their children causing productivity loss. This indicates peoples perceive that rubella has no medical treatment, rather traditional home treatment.

A total of 11 serum samples were collected (only 10 serum samples were processed) from suspected cases and sent to the National Measles Laboratory located at EPHI giving positivity rate of 20% which was very low compared to sample positivity rate of an outbreak occurred in Beshangul region (57%) and Addis Ababa (40%). Initially all collected samples were tested for measles and all resulted negative. This was also true for an outbreak occurred in case Beshangul Gumuz region. Although, all samples are tested negative for measles, some of the samples were tested positive for rubella, indicating increased incidence of rubella cases in the absence of surveillance system in the country [19, 20].

In this unmatched case-control study, a total of 123 participants (41 cases and 82 controls) were included, which was more than two times and 1.4 times less than the number of study participants conducted at German Navy and Zimbabwe, respectively. Out of those 123 study participants, 52% of them were males, while all and 51.7% the study participants were males in a study conducted at German Navy and Zimbabwe [21, 22].

Most of study participants were in the age group of 10-14 years which is different from study conducted at Zimbabwe and German Navy where most of the study participants were in age group of 5-9 and 21-25 years respectively. The median age of cases and controls in this study was 10 years (IQR=4) and 12 years (IQR =2.5), respectively which is higher than a study conducted at Zimbabwe where it was 6.5 years (IQR=4) and 5.5 years (IQR=8) for cases and controls respectively. The median age in an outbreak occurred in a school found in Addis Ababa was 4.6 years, lower than current study finding [20, 21, 22].

In this study the overall attack rate in the school was 1.39% which was higher than attack rate in Dibate woreda (AR=0.3%) and very low than attack rate in Wombera district (AR=8.8%) and another outbreak occurred in a school found in Addis Ababa (AR=10.92 %). The attack rate among female students (1.78%) were higher than attack rate in males (1.31%) which was comparable finding with another outbreak occurred in school found in Addis Ababa. The highest attack rate (2.22%) was seen among grade 1-4 students in this study while highest attack rate (14.57%) was seen in PKG students in an outbreak occurred in Addis Ababa. The cases fatality rate for both outbreaks was the same, which is zero [19, 20].

A study conducted in Ethiopia using data from measles case-based surveillance revealed 54% of the patients were female which is somewhat comparable with finding in this study, where 56.1% of cases were female. In an outbreak occurred in the two districts (Wombera and Dibate) found in Metekel Zone of Beshangul Gumuz Region of Ethiopia both sexes were affected almost equally (51% female and 49% male cases) but still female cases dominate. These findings also supported by finding from outbreak investigation conducted in Addis Ababa. A study conducted in Ethiopia also revealed 94.7% of the cases were under 15 years of age, which is higher than finding in this study where 87.8% of the cases were under 15 years of age [8, 19, 20].

This study shows that 78.1% of cases didn't take antibiotic which was lower than finding from study conducted at Beshangul Gumuz region in an outbreak situation where 90% of cases didn't take antibiotic. Majority (48.78%) of the cases had family size of greater than 5 which is higher than study conducted in Beshangul Gumuz region (56.3% of cases had family size of >5) [8, 19].

A study conducted at Zimbabwe also revealed that all care givers perceived rubella illness as measles and immunization is important which is supported by finding from this study. Our study revealed that 14.63% and 23.17% of cases and control, respectively know rubella is transmitted by close contact with rubella patients which is higher than finding in Zimbabwe where only 10.2% and 6.8% of cases and controls, respectively, know rubella is transmitted by close contact with rubella patients [22].

A study conducted at Zimbabwe revealed that, the majority of caregivers (97.8%) reported the situation to the health facility within two days of onset of rash but in this study no one case families (care givers) had reported to a health facility or any health department [22]. This indicates the low awareness status of the communities and the weak linkage between communities and health sectors.

From the descriptive analysis most of the cases were females (56.1%) and protestant religion follower (46.34%). Thirty-six (87.8%) of the cases were between 5 to 14 years age group. Most of the controls had better educational status than cases; 43.9% of controls were from grade 5 and 6 while 41.46% of cases were from grade 1and 2. The attack rate was also higher in grade 1-4 students (2.22%) while it was 1.29% in grade 5-8 students. Thirty-four (41.46%) of controls also know modes of transmission for rubella, which is higher than cases (34.15%). Fifty-seven

(69.51%) of controls also perceive that rubella can affect any sex of any age group which is also higher than in cases (39.02%).

All the above descriptive findings and comparisons of characteristics between cases and controls seems to have an association with contracting rubella disease in cases. However, from multivariate analysis using multivariate logistic regression model;patient education status of grade 5-8 were found to have statistically significant association with developing rubella disease.

The multi variate logistic regression analysis indicates that the risk of contracting rubella disease among students from grade 5-6 and 7-8 is 0.13 and 0.12 times reduced than students of grade 1 and 2 at P-value less than 0.05.

Since communities were perceiving that rubella has no any medical treatment, they prefer to stay at home with provision of traditional therapy such as use of perfumeing, fendisha (Amharic term) rather than visiting health facilities for complications such as secondary bacterial super infections and symptomatic treatment. This in turn challenge us to have all the cases detail history (line list which reduce recall bias) and provision of health education for health facility visitors.

The school was closed for semester break (one-week duration), which was good opportunity to minimize transmission between students. There was also good change in communities' awareness towards the event. Family members had minimized contact with cases and avoid sharing of closes to minimize transmission, which had created good opportunity to control the outbreak.

Rubella was not included among the 22 prioritized diseases and events included in the countries surveillance system. Rubella was considered after measles sample was tested negative. This might hinder allocation of budget for rubella related activities. Rubella vaccination was not included in the countries EPI program and there were no national guideline and BCC materials on rubella. This might be due to low attention given to rubella.

1.8 Public Health interventions during the investigation

During the outbreak investigation process, we had conducted active case searching and provide health education in relation to the outbreak. In the health education, we had covered the three most common differential diagnostic diseases (measles, rubella and chickenpox) of their sign and symptoms, treatment of secondary infections and complications, mode of transmission, method of prevention, and about reporting/notification of similar cases. We had also announced 8335 a free toll found at EPHI Emergency Operation Center (EOC) for notifying any public health threat including the current event. Health education was also given at schools where cases were seen and rumors were reported by Health Extension workers and Woreda PHEM Officers.

Rumors of similar event were received from Gulele Fana and Awelya Schools found under Addis Ababa City Administration were ruled out after school visit and inperson discussion with school directors. The rumor from Gulele Fana School was true but it was seen before a month and the rumor from Awelya School was not true (no any suspected case seen).

Line list format was printed and given for Burayu Health Center even though only 10 cases were registered by active case searching. A total of 11 serum samples were also collected and sent to EPHI national measles laboratory to be processed. Any new information was shared on daily basis between Oromia Regional Health Bureau and Addis Ababa City Administration PHEM unit. EPHI was working jointly with these two Regional Health Bureau PHEM units. PHEM Officers from national to woreda level, clinicians and laboratory experts from Burayu and Selam health center and Burayu town Health Extension Workers (HEWs), were participated in the outbreak response process.

1.9 Limitations

Most of the data were collected from students at the school who did not remember some variables such as onset date of their illness. This might affect the data quality and completeness. The first notification about the event was also delayed and many students was affected, even recovered, that causes recall bias. Some data collectors were not checked for completeness, causing some missed variables in the analysis.

Total number of students by age group was not available, so that, age specific attack rates was not calculated in all classified age groups. Since we (Ethiopia) have no customized standard case definition for rubella, WHO outbreak definition for European regions was used.

1.10 Conclusion and Recommendation

Although the index case and source of infection was not identified, most probably the outbreak was driven by contact at school and sharing of common transportation service then spread to the community (family) through school children. Late case identification and notification cause late investigation and control after the disease was expanded. Provision of health education at school as well community increase people's awareness towards rubella that contribute to control the outbreak.

All level health departments should work closelywith schools to have timely notification of any public health risk and unusual public health events happened in a school. FMOH need to prepare information Education and Communication materials (IEC) on rubella to be used for awareness creation. FMOH need also consider an assessment on the burden rubella disease in the country to include it among the 21 prioritized diseases under surveillance.

Finally, all level health departments should strengthen surveillance, proper case management and awareness creation or public health education about symptoms of the disease, mode of transmission and methods of prevention as a preventive and control measure. All level health departments also need convince the community about notification and significance of health facility visit for symptomatic treatment, secondary infections and other complications. All of the recommendations need to be applied as soon as possible.

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Chapter Two: Outbreak Investigation Two

2. Suspected Chickenpox outbreak Investigation at Aleltu Soldier Training Center, North Shewa zone of Oromia Region, 2019.

2.1 Abstract

Introduction: Chickenpox is highly contagious disease caused by initial infection with varicella zoster virus. A clinically apparent infection of chickenpox usually provides lifelong immunity. In 2013 there were 140 million cases of chickenpox and herpes zoster worldwide. In 2015 chickenpox resulted in 6,400 deaths globally. Death occurs in about 1 per 60,000 cases.

Objective: The objective of this outbreak investigation was to confirm existence of the outbreak, describe cases epidemiologically and control the outbreak at Aleltu Soldier Training Center found in Aleltu woreda, North Shewa Zone of Oromia region, Ethiopia 2019.

Methodology: A1:2 unmatched case-control study was conducted at Aleltu Soldier Training Center, Aleltu woreda, North Shewa Zone of Oromia region, Ethiopia from 26th March to 1stApril/2019. Controls were selected conveniently from the same training center. Data collectors had a discussion and each question was asked clearly and in similar manner for cases and controls. Data was collected using structured questioner and analyzed by Epi-info software version7.2.1.0 and Microsoft office excel 2013. Bivariate and multivariate logistic regression analysis was done to test association. Variables with p- value less than 0.25 in bivariate logistic regression analysis were included in multivariate logistic regression analysis. A verbal informed consent was obtained from Ethiopian Public Health Institute and the training center to investigate the suspected chickenpox outbreak.

Result: A total of 44 suspected chickenpox cases were identified. The index case was seen on 9th January/2019 and the first notification was around 6th March/2019. The index case was a 29 years old male patient, who had contact and travel history to an area of active suspected chickenpox outbreak within 21 days prior to his symptom onset. He was the only case having travel history to an active suspected chickenpox outbreak within the incubation period. Samples were tested negative for measles and rubella during that outbreak, similarly two samples tested negative for measles and rubella in the current outbreak. A dermatologist had diagnosed chickenpox with typical presentation. The overall attack rate in the training center was 3.83% and attack rate among males was 4.43%. The median age of the cases was 20years (IQR =1.25). All cases were males and case fatality rate zero.All cases had rash and fever and rash started from face in 22(66.67%) cases. Multivariate logistic regression analysis revealed that knowing modes of transmission forchickenpox diseasehad 0.14 time reduced risk of contracting

chickenpox disease than a person who doesn't know the modes of transmission at P-value of less than 0.05.

Conclusion: The source of the outbreak was from Mojana Wedera woreda, North Shewa Zone, Amhara region, Ethiopia, through the index case. Living condition within the camp creates good opportunity for the transmission. Females were not affected due to limited contact with male cases.

Recommendation: The training center need to strengthen surveillance within the camp and be alert for such cases. All level health departments should strengthen their linkage with such organizations to have timely notification of such an outbreak in the future. Ministry of Health need to consider building thee laboratory capacity to confirm chickenpox disease.

Key Words: Chickenpox, Outbreak Investigation, Aleltu training Center, Ethiopia, 2019.

2.2 Introduction

Chickenpox, also known as varicella, is a highly contagious disease caused by initial infection with varicella zoster virus (VZV) belonging to the family *Herpesviridae.* It is a double-stranded DNA virus and is most closely related to herpes simplex virus types 1 and 2. Human beings are the only known hosts of this virus. In tropical regions, the disease preferably occurs during the cooler seasons such as winter and spring, and affects mainly adolescents and young adults. Tropical countries may be at a higher risk of morbidity and mortality due to the disease. [5, 6] Seasonality of Chicken Pox outbreaks has also been noted. [1, 2, 3]

Chickenpox is not a bioterrorism agent but is part of the differential diagnosis when investigating a potential smallpox case. The average number of skin vesicles is usually 250–500 but more than 500 lesions may occur in severe cases. [1, 4]

Primary infection with VZV causes varicella or 'chickenpox', whereas reactivation of latent VZV causes herpes zoster (HZ) also known as zoster or 'shingles'. Shingles is an infection of a sensory nerve and the skin around it. [1, 5]

VZV is transmitted via the respiratory route (with viral particles present in respiratory droplets. It can also be transmitted by direct person to person contact or through contact with infected items such as clothing and bedding. Shingles is much less infectious than chickenpox although spread may occur from patients who have extensive lesions and susceptible contacts can develop chickenpox. [6, 5]

The infectious period is from 48 hours before onset of the rash and continues until all lesions are dry and have crusted, usually 5-6 days after onset. Immunosuppressed patients may be infective for longer. A person with shingles is infectious until their lesions have dried (usually 5-7 days after onset). The period of infectivity may be slightly reduced by acyclovir. [5]

Chickenpox is usually a self-limiting disease characterized by red, itchy spots that turn into fluid filled blisters. It usually appears initially on the face, ears, scalp and trunk, but can spread over the entire body. Other symptoms which may precede the rash by 48 hours include general malaise, fever and headache. The incubation period usually ranges between 7 and 23 days (mean-2 weeks).The condition usually resolves by itself within a couple of weeks. The rash may, however, last for up to one month. Laboratory confirmation of cases of varicella is not routinely recommended; laboratory confirmation is recommended for fatal cases and in other special circumstances. [1, 4, 5, 7]

Complications of chickenpox infection occur in approximately 1% of cases, with the most common being secondary bacterial infection of the skin lesions. Other complications include pneumonia, encephalitis and cerebellar ataxia, thrombocytopenia and hepatitis. Infection in adolescents and adults is usually more severe than infection in children. [1]

Patients should be considered immune if there is a good history of chicken pox or episode of zoster in the past **or** antibody test confirms specific antibodies **or** varicella immunization complete. A clinically apparent infection usually provides lifelong immunity.[5]

Antiviral therapy is moderately effective in treating varicella and herpes zoster infections: acyclovir, valacyclovir or famcyclovir are considered the agents of choice for treatment of varicella. In the case of resistance, foscarnet is considered the second line drug.Masksare not completely effective in preventing transmission, so susceptible persons (staff and visitors) should avoid contact with residents/clients with chickenpox. All staff caring for a client with suspected chickenpox should have a previous history of chickenpox or have evidence of immunity. [4, 8]

Statement of the problem

Chickenpox occurs in all parts of the world. In 2013 there were 140 million cases of chickenpox and herpes zoster worldwide. Globally, on average, 4.2 million cases of severe varicella result in hospitalization or death each year.Prior to widespread usage of vaccines against varicella in temperate high income countries, 13–16 cases of varicella per 1000 population occurred annually, mostly affecting children aged 1–9 years.[9, 10, 11]

Although the risk of severe disease and complications is greater in adolescents and adults, or people with a suppressed immune system, the majority of hospitalisations are in otherwise healthy children because disease incidence is far higher in childhood. [12]

Chickenpox has a worldwide distribution with increased prevalence noted in temperate climates. Most U.S. cases occur in children <12 years of age. Recent changes in the distribution of disease are due to an increasing proportion of children receiving vaccination. As vaccine coverage increased and the incidence of wild-type varicella decreased, a higher proportion of cases occurred in immunized people as breakthrough disease. CDC's active surveillance sites report breakthrough disease at an increased percentage of all cases, from 4% in 1995 versus approximately 25% in 2000. [4]

Prior to widespread usage of vaccine, >90% of the world population becomes infected with VZV before adolescence.In tropical regions, primary infection of varicella tends to occur at a later stage resulting in a larger population of susceptible adults and potentially a higher proportion of severe cases.[10, 13]

The incidence of herpes zoster increases with increasing age, especially after 50 years of life. For example, half of all 85-year-old individuals have experienced an episode of herpes zoster.Decreasing cell mediated immunity due to, for example, HIV infection, cancer, diabetes mellitus or immunosuppressive treatment, also increases the risk of zoster.2 Compared with HIV-negative individuals, persons with HIV have a 12–17-fold greater risk of developing zoster. In areas with a high HIV prevalence, zoster has an 85–95% positive predictive value for underlying HIV infection.[10, 14]

There are few data on zoster mortality, but studies from Europe and North America suggest that the prevalence is around 0.25 per 1 million population, mostly in the elderly.Timely vaccination against zoster may prevent such deaths. [15]

In 1998, the WHO recommended the introduction of routine childhood vaccination against VZV in settings where the disease has significant negative socioeconomic impact.But vaccines against

VZV are rarely used on the African continent. Introducing these vaccines would be in agreement with the Global Immunisation Vision and Strategy (GIVS) of the WHO and UNICEF. [16]
Before routine immunization the number of cases occurring, each year was similar to the number of people born. Since immunization the number of infections in the United States has decreased nearly 90%. In 2015 chickenpox resulted in 6,400 deaths globally – down from 8,900 in 1990. Death occurs in about 1 per 60,000 cases. [9, 17]

Rationale of the study

As indicated in the problem of statement rubella occurs worldwide. Many countries had reduced the burden of the disease due to high attention they give, integrated effort, strong surveillance, data availability and provision of vaccine. In Ethiopia published data on the epidemiology of chicken pox is scarce and it is not among the 22 prioritized notifiable disease and conditions included in the national surveillance system. Although chickenpox frequently occurs in the country a very less attention is given and there is no well-organized data on it. Chickenpox vaccine is also not included in the routine childhood vaccination program in our country. Due to these and other problems chickenpox persists being a problem in the country causing economy and life lose due to complications. This outbreak investigation aims to assess the situation of the outbreak, determine the cause and source, describe cases epidemiologically and apply intervention measures to overcome the current outbreak and prevent similar events in the future at Aleltu Soldier Training Center. Finally it helps to increase the government attention given to chickenpox and consider vaccination of at risk population by showing the magnitude and burden of the disease.

Significance of the study

As the challenges in preventing and eradicating the disease are identified the government concern is increased and recommendations are applied fully with regular monitoring and evaluation of data (case and activity data), the burden of the disease can be reduced even eliminated. This elimination enable the country to get economic advantage from the reduced cost for chickenpox intervention and healthy productive citizens. Attendants of cases will also spend their time in productive activities rather than staying with patients in psychologically depressed condition. This will contribute to increase the national life expectancy rate, pull attention of tourists and investors from foreign to visit and invest in the country. This intern contributes to develop the economy of the country.

2.3 Literature review

Chickenpox was not separated from smallpox until the late 19th century. In 1888 its connection to shingles was determined. The first documented use of the term chicken pox was in 1658. Various explanations have been suggested for the use of "chicken" in the name, one being the relative mildness of the disease. Humans are the only known species that the disease affects naturally. However, chickenpox has been caused in other animals, such as primates, including chimpanzees and gorillas. [9, 17]

In temperate countries, chickenpox is one of the classic diseases of childhood, with the highest prevalence in the 4–10-year-old age group. Like rubella, it is uncommon in preschool children. Varicella is highly communicable, with an infection rate of 90% in close contacts. The secondary attack rate from a person with primary varicella to susceptible children has been estimated to be between 61% and 100%, whereas secondary attack rates following contact with shingles are lower at about 15%. [9, 18, 19]

A study of household secondary attack rates found that contagiousness is related to the number of lesions. Vaccinated cases with more than 50 lesions were as contagious as unvaccinated cases, but when vaccinated cases presented with fewer than 50 lesions, they were only one-third as contagious. [18]

During pregnancy the dangers to the fetus associated with a primary VZV infection are greater in the first six months. In the third trimester, the mother is more likely to have severe symptoms. For pregnant women, antibodies produced as a result of immunization or previous infection are transferred via the placenta to the fetus. Varicella infection in pregnant women could lead to spread via the placenta and infection of the fetus. If infection occurs during the first 28 weeks of gestation, this can lead to fetal varicella syndrome (also known as congenital varicella syndrome) [4]. In later pregnancy, varicella can result in premature delivery. [3] Arterial ischemic stroke (AIS) associated with chickenpox in the previous year accounts for nearly one third of childhood AIS. [20]

The overall case-fatality rate in the United States is 2/100,000 but rises to 30/100,000 in adults. Neonates developing varicella between ages 5-10 days, and those whose mothers develop the disease between 5 days prior or within 2 days after delivery are at increased risk of developing severe generalized varicella with a fatality rate of up to 30%. Immunocompromised persons have a high risk of disseminated disease. [4]

CDC recommends two doses of chickenpox vaccine for susceptible children, adolescents, and adults. Two doses of the vaccine are about 98% effective at preventing chickenpox. A single dose of varicella vaccine is funded on the NIP at 18 months of age. As of July 2013, this is given in conjunction with the 2nd recommended dose of measles-mumps-rubella, using the four-in-one combination vaccine (measles-mumps-rubella-varicella; MMRV). [1, 4]

Vaccination against varicella is particularly recommended for non-immune persons at high risk of exposure to, or complications from, varicella, such as healthcare workers, childcare workers, non-immune women before pregnancy and parents. Vaccination of non-immune household contacts of people who are immunocompromised is also important to minimise opportunities for transmission of varicella to the immunocompromised person. [1]

Varicella vaccines are live attenuated viral vaccines and are contraindicated in pregnancy, and pregnancy should be avoided for 1 month following vaccination.42 Varicella vaccination is contraindicated for people who are immunocompromised, but their household contacts should be vaccinated, if non-immune, to protect the immunocompromised person against infection. Varicella-containing vaccines are also contraindicated in persons who have had anaphylaxis following a previous dose of any varicella-containing vaccine or anaphylaxis following any vaccine component. [21]

In the USA, a universal varicella vaccination program has been in place since 1995.12 This program has resulted in a decline in varicella disease by 85% and hospitalisations by 91% in children <10 years of age, the age group targeted by the vaccination program.13-15 Reductions in incidence rates and hospitalisation rates have also been detected in older children and adults, due to herd immunity.16 A reduction in deaths due to varicella was observed in all age groups, with the greatest declines (97%) in children and adolescents under 20 years of age. [22, 23, 24, 25]

In 2006, a 2nd dose of varicella vaccine was introduced in the USA resulting in a further 40% decline in hospitalisations.18 In Australia, where a single dose of varicella vaccine has been recommended since 2003, and funded under the National Immunisation Program since late 2005, significant declines in hospitalisation rates have been observed in all age groups under 40 years of age. The greatest declines (73%) have been in children 1–4 years of age, the group targeted by the funded immunisation program. [26, 27]

In clinical trials of the varicella vaccine in children, undertaken before vaccine licensure, the efficacy after 1 dose was reported to be approximately 96%.22-24 However, many post-licensure studies, mostly conducted in the USA, have determined that the vaccine effectiveness of 1 dose given early in childhood is less than this original estimate, and is actually about 80–85% for the prevention of any disease, with 95–98% effectiveness in preventing severe varicella. [18, 28, 29]
At the time of implementation of a universal varicella vaccination program in Australia, a single dose was considered adequate for protection of infants and children <14 years of age. However, data from the USA suggest that a 2nd dose of varicella-containing vaccine in children is optimal to provide an immune response more like natural infection, reducing the risk of vaccine failure and increasing population immunity. [22]
Combination MMRV vaccines have been shown in clinical trials to produce similar efficacy to the monovalent varicella vaccines. Similar to the monovalent vaccines, the effectiveness of 1 dose of MMRV (Priorix-Tetra®) against any disease is lower for a single dose (65%) than for 2 doses (95%). The response to a single dose of varicella vaccine decreases as age increases;

hence, healthy adolescents (14 years and older) and adults require 2 doses, 1–2 months apart. [30, 31]

In unvaccinated populations, varicella is primarily a childhood illness. In temperate countries, more than 90% of the population develop clinical or serological infection by early adulthood, with the highest attack rates in children aged 5–9 years. Australian data suggest a slightly later age of acquisition, with 83% of children infected by 10–14 years of age. [32, 33]

In areas with high vaccine coverage, the rate of disease has decreased by approximately 85% from 1995 to 2004 as a result of the varicella vaccine. The GIVS aims to widely introduce a range of newly available vaccines and immunize more people against as many vaccine-preventable diseases as possible.Achieving this aim would promote health, but would also improve equitable access to immunisation.[4, 34]

Breakthrough varicellais varicella that develops more than 42 days after vaccination. [2] The majority of cases of breakthrough varicella are mild and result in fewer skin lesions (usually <50), although up to 28% of breakthrough varicella cases may be severe (>500 lesions).2 In mild breakthrough cases, the skin lesions may not be vesicular and systemic symptoms, such as fever, occur less frequently.2 Because of this, breakthrough disease may not be recognised, or may be misdiagnosed. However, breakthrough varicella can still be contagious and exclusion from child care or school is recommended. [18]

Recent studies have suggested higher rates of breakthrough varicella in recipients of 1 dose than in recipients of 2 doses. 31,32 Long-term follow-up of 7,500 children aged 12–23 months found no difference in rates of breakthrough varicella between those vaccinated at 12–14 months of age and those vaccinated at 15–23 months of age.[35, 36]

In people who have been previously infected with VZV, the natural immunity may be boosted by exposure to others with varicella, and this may reduce the risk of developing shingles later in life. Based on this observation, mathematical modelling has suggested that rates of shingles in adults may temporarily increase over time following the introduction of universal varicella vaccination because of a reduced exposure to the virus in the community. However, studies from the USA have found an increased incidence of age-specific shingles prior to the varicella vaccine program and use of the vaccine has not affected this increase.43 Similar findings have been demonstrated in Australia. [37, 38]

The incidence of shingles is likely to be lower over time in varicella vaccine recipients than in those infected naturally with wild-type varicella. This is suggested from preliminary data from the USA in which lower rates of shingles have been reported in varicella vaccinated immunocompromised children and healthy adults. [39, 40]

2.4 Objective

General Objective

- The objective of this outbreak investigation was to confirm existence of the outbreak, describe cases epidemiologically and control the outbreak at Aleltu Soldier Training Center found in Aleltu woreda, North Shoa Zone of Oromia region 2019.

Specific objectives

The specific objectives of investigating this suspected chickenpox outbreak includes:

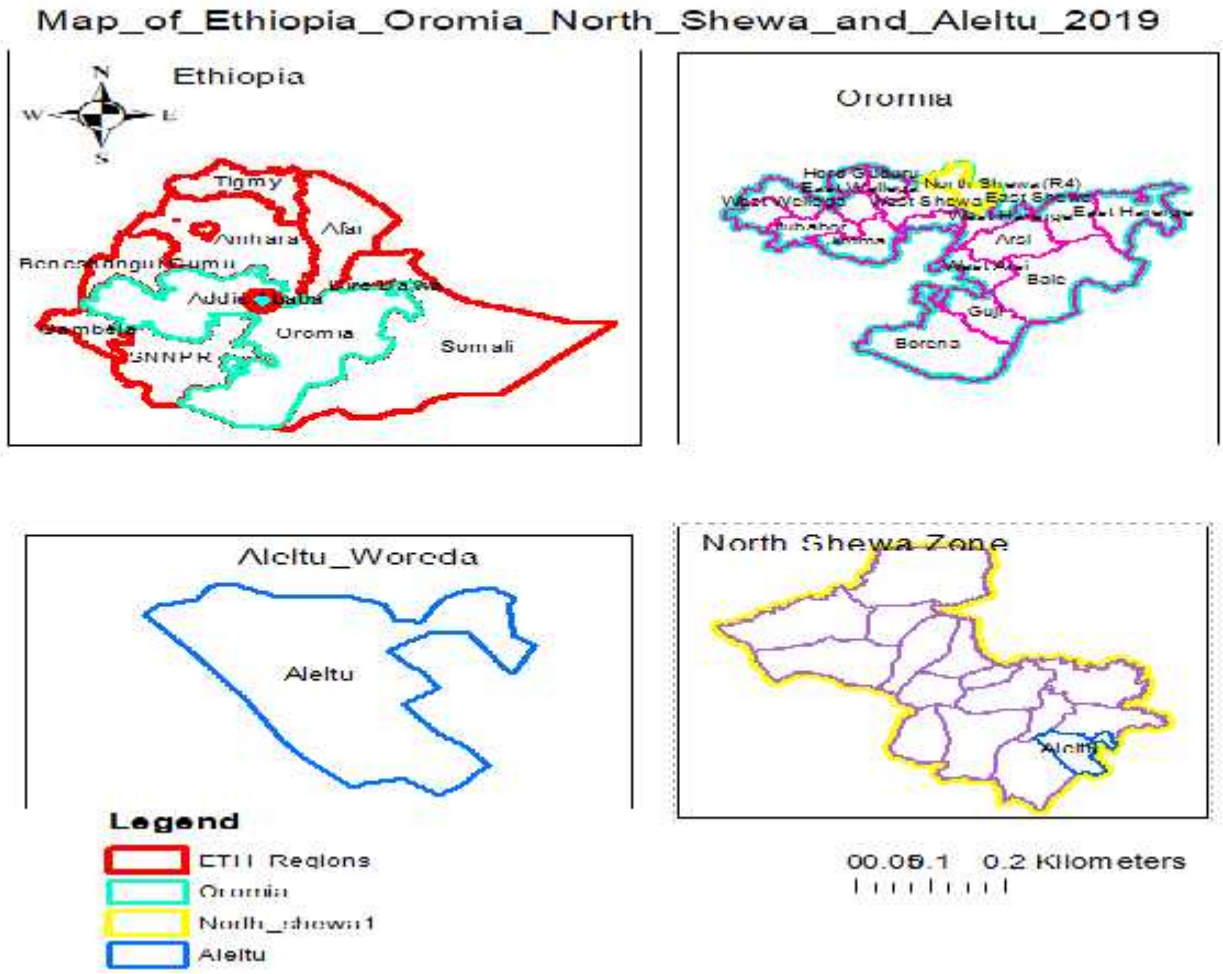
- ❖ To confirm the existence of the outbreak
- ❖ To describe cases epidemiologically by person and time
- ❖ To identify the source of the outbreak and other associated risk factors
- ❖ To control and prevent current and future outbreak trough appropriate intervention measures

2.5 Methods and Materials

Study area, period and population

Investigation area description

This suspected chickenpox outbreak investigation was conducted at Aleltu Soldier Training Center found in Aleltu woreda, North Shoa Zone of Oromia region 2019. The training center was persisted for many years under the control/leadership of Federal Maremia bet (Federal Jail). Currently the training center has been training a total of 1096 trainees in three divisions. Of those, 949 trainees are male and the rest (147) are females.



Map 2: Map of Ethiopia, Oromia Region, North Shewa Zone and Aleltu woreda 2019.

Investigation period

The outbreak investigation was conducted from 26th March to 1stApril/2019.

Investigation Design

Unmatched case-control study was conducted to investigate suspected chickenpox outbreak at Aleltu Soldier Training Center found in Aleltu woreda, North Shewa Zone of Oromia region 2019. The controls were selected conveniently.

Data Collection Tools and Procedures

A structured questioner from previous study was used to collect pertinent data regarding the outbreak with some modifications. The source of data for this study were health workers in the center's health center and trainees.

Dependent and independent variables

Dependent variables

Case

Awareness level participants about chickenpox

Independent variables

Age

Sex

Religion

Ethnicity

Patient educational status

Duration in the training center

Marital status

Occupation

Awareness on modes of transmission

Presence of similar suspected case in a room

Number of suspected case in a room

Data quality control

To maintain data quality, data collectors conducted a discussion on the questions and each question was asked clearly for cases and controls in similar manner. Data completeness and consistency was also checked before finishing each interview.

Data analysis

Data was entered and analyzed by using Epi-enfo software version 7.2.1.0 and scientific calculator was also used to perform simple calculations (addition, subtraction, multiplication and division). Bivariate and multivariate logistic regression analysis were also used to test association by controlling confounders.

Ethical Consideration

Permission to investigate the suspected chickenpox outbreak occurred at Aleltu Soldier Training Center was obtained from Ethiopian Public Health Institute (EPHI). Verbal informed consent was also received from the training center after describing the objective, methodology, confidentiality and other issues of the investigation.

Dissemination of investigation result

The final output of this outbreak investigation will be submitted to Addis Ababa University School of Public Health Department of Preventive Medicine and EPHI, FMOH and EFELTP.

Laboratory methods

Initially cases were being treated clinically for viral diseases. When the number of cases were increasing, the clinician has suspected measles and sent two serum samples to EPHI for laboratory test. The result was negative for both samples and an additional six serum samples were taken. But these six serum samples were not tested primarily due to lack of reagent and secondly the diagnosis shifted to chickenpox. Three swab samples were also collected to be tested for chickenpox. This was also not done due to unavailability of the test in Ethiopia secondary to lack of reagent.

Operational Definitions

Chickenpox contact: any patient who is non-immune to the VZV and who has had contact with a case of chickenpox at any time from 48 hours before the onset of the rash until all the lesions are crusted. [5]

Chickenpox outbreak: five or more cases in a specific setting that are epidemiologically linked. [4]

Confirmed chickenpox case: is an acute illness with diffuse (generalized) maculopapulovesicular rash and Epidemiologic linkage to another probable or confirmed case, or laboratory confirmation by VZV IgM & IgG ELISA from blood samples. [4]
ConfirmedChickenpox Death: A confirmed case of varicella which contributes directly or indirectly to acute medical complications which result in death. [4]

Incubation period: The time it takes for the symptoms to appear from initial exposure. [5]
Infectious period: The period during which an infected person can transmit a pathogen to a susceptible host. [5]

Probable Chicken Pox case: an acute illness with diffuse (generalized) maculopapulovesicular rash, lack of laboratory confirmation, and Lack of epidemiologic linkage to another probable or confirmed case. [4]
Shingles contact: any patient who is non-immune to the VZV and who has had contact with a case of disseminated, exposed shingles from the day of the rash until crusting of the exposed rash. [5]
Control: any trainee in the same center with almost similar exposure/characterstics with the case except complaining the sign and symptoms.
Suspected chickenpox case: An illness with acute onset of diffuse (generalized) maculo-papulovesicular rash without other apparent cause. **[4]**

2.6 Result

Background

A total of 44 suspected chickenpox cases were identified since the start of the outbreak at Aleltu Soldier Training Center found in Aleltu Woreda, North Shewa Zone of Oromia Region. The first 33 cases were included in the investigation. Primarily patients were reported as suspected measles case but a team from EPHI has gone to the area and observed the signs (rash) and putted a tentative diagnosis of chickenpox rather than measles. The team included a dermatologist during the second visit and the dermatologist said that the case was definitely a chickenpox (typical presentation of chickenpox) even no need of doing a laboratory test. The index case was a 29years old male trainee, who had contact and travel history to an area of active suspected chickenpox outbreak within 21 days prior to his symptom onset. The previous history of chickenpox infection and/or evidence of immunity were not considered in assigning health professionals who manage the cases.

Laboratory Investigation result

Initially 2 serum samples were sent to EPHI to do laboratory test for measles and both samples were resulted negative for measles and rubella. Following the recommendation from EPHI tea additional five serum samples were taken from active cases even-though the samples were not tested due to lack of reagent. After chickenpox diagnosis by a dermatologist three swab samples from the wound (wound following eruption of blistered rash) of active cases were taken to be tested for chickenpox. It is known that chickenpox laboratory test was not done in our country yet.

Descriptive Analysis

Out of the total 33 suspected chickenpox cases; majority (81.82%) of the cases were in the age group of 20-24 years followed by 25- 29 years (9.09%). The age of the cases range from 19 years (minimum) to 33 years (maximum) and the median age was 20 years (IQR =1.25). All of the suspected cases were males and 57.58% of suspected cases were Muslims by religion (all the rest cases were Orthodox religion follower). More than half (57.58%) of the suspected cases were Afar followed by Tigrea (21.21%) by ethnicity. Majority 27(81.82%) of the suspected cases were single and the rest were married. Nineteen (57.58%) of suspected cases had learnt until secondary school followed by Elementary school 7(21.21%). Fifteen (45.45%) suspected cases were a student before joining the camp followed by 10 (30.30%) unemployed. The overall attack rate in the training center was 3.83% and attack rate among male trainees was 4.43%. A relatively severe rash was seen in 2 (6.06%) suspected cases. No suspected case was developed any complication, except the 3 (9.09%) cases with diarrhea and the overall case fatality rate was zero. The minimum duration of suspected cases in the training center was 60 days and the

maximum was 193 days. The mean of their duration in the training center was 81 days and median was 74 days.

Table 2.1: Socio Demographic Characteristics of Suspected Cases, Aleltu Training Center, North Shewa Zone of Oromia, Ethiopia, 2019.

Variable	Category	N(%)
Marital status	Single	27(81.82%)
	Married	6(18.18%)
Occupation	Student	15(45.45%)
	unemployed	10(30.30%)
	Farmer	3(9.09%)
	Private	3(9.09%)
	Daily laborer	1(3.03%)
	Missed	1(3.03%)
Age group	15 - <20	2(6.06%)
	20 - <25	27(81.82%)
	25 - <30	3(9.09%)
	30 - <35	1(3.03%)
Religion	Muslim	19(57.58%)
	Orthodox	14(42.42%)
Ethnicity	Afar	19(57.58%)
	Tigrea	7(21.21%)
	Amhara	6(18.18%)
	Other	1(3.03%)
Patient educational status	Illiterate	3(9.38%)
	Elementary	7(21.88%)
	Secondary	19(59.38%)
	Above secondary	3(9.38%)
Duration in the training center	60 -74 days	18(54.55%)
	75-193 days	15(45.45%)

The first suspected case was seen on 9th January/2019 and last suspected case seen on 30th March/2019. The first notification was around 6th March/2019 (exact date of notification was not remembered) which is very late. The number of suspected cases were pick on 22 March/2019 (4 cases) followed by 23 and 27 March/2019 (3 suspected cases on each date). All of the suspected cases were complaining rash and fever, cough 18(54.55%), sense of coldness 12(36.36%), back pain 10(30.30%), head ache 9 (27.27%), fatigue 9 (27.27%), sore throat 8(24.24%), conjunctivitis 7(21.21%), arthritis 5(15.15%), loss of appetite 4(12.12%),itching 3(9.09%), diarrhea 3(9.09%), sweeting 2(6.06%) and vomiting 1(3.03%). In most of the suspected cases 22(66.67%) the rash were started from their face and it starts from their trunk in all the rest cases.

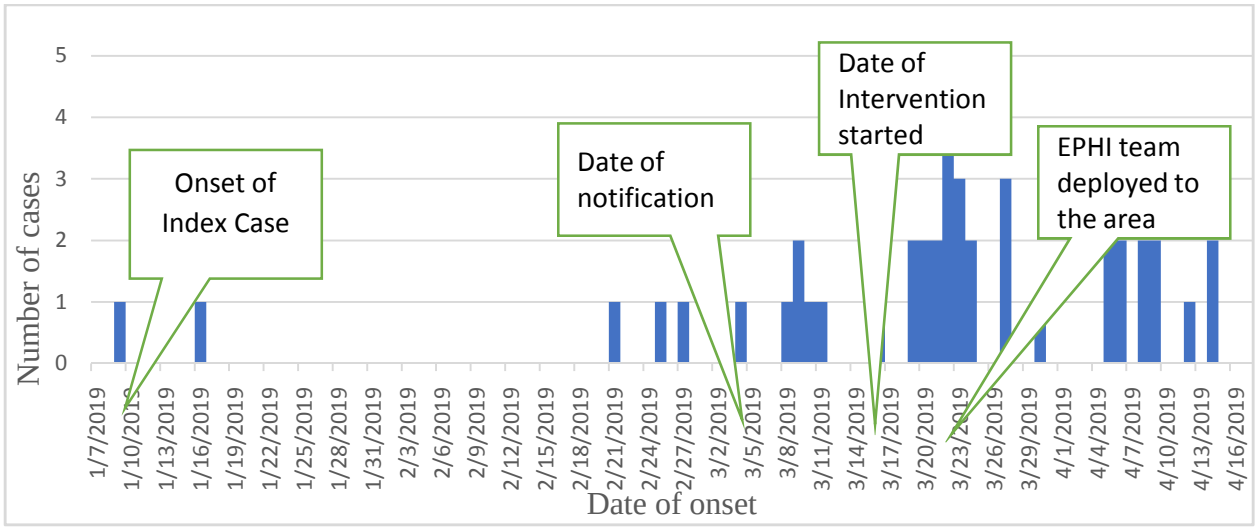


Figure 2.1: Epi-Curve by date of onset, Aleltu Training Center, North Shewa Zone of Oromia, Ethiopia, 2019

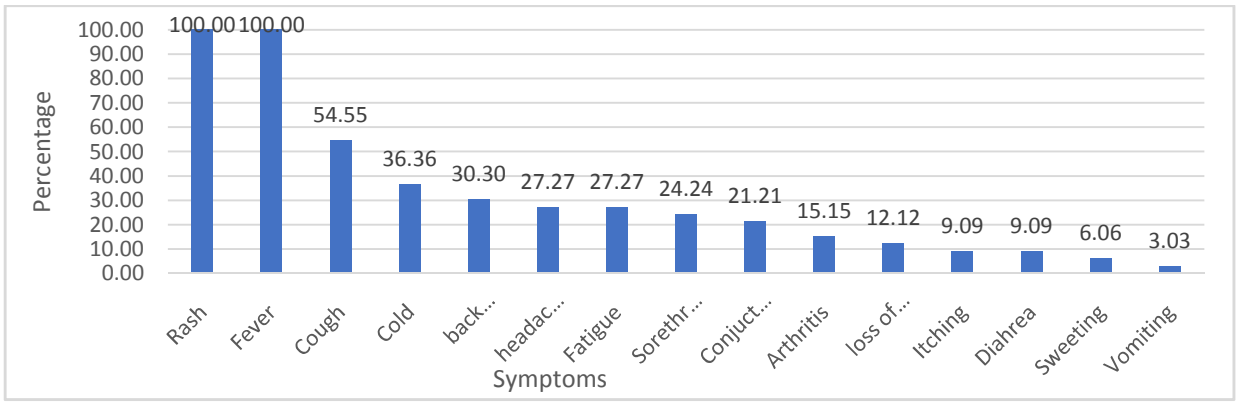


Figure 2.2: symptoms shown by the Suspected Cases, Aleltu Training Center, North Shewa Zone of Oromia, Ethiopia, 2019

Thirty two (96.97%) suspected cases had visited a health facility to seek medical treatment and 23 (71.88%) of suspected cases had visited a health facility on the same date of the disease onset. All the 32 (96.97%) suspected cases, who had visited a health facility had taken a medical treatment. Of those who had taken medical treatment, 24 (75%) of suspected cases taken antibiotics, 18(56.25%) antipyretics, 9(28.13%) anti-pain and anti-inflammatory drugs.

All the rooms, in which the suspected cases are living in, have at least one window and all suspected cases had access to free health service in the training center's health center located within the center's compound. The maximum number of persons living in a single room was 210 and the minimum was 44 as reported by the suspected cases. The maximum area of the room was estimated to be 300m^2 and the minimum area was 20m^2.

Twenty six (78.79%) of suspected cases replied that, there were another similar suspected cases within their common living room. The maximum number of suspected cases in a room was 15 and the minimum was 1.

Table 2.2: Number of suspected cases per room, Aleltu Training Center, North Shewa Zone of Oromia, Ethiopia, 2019

Number of sick persons in a room	Frequency	Percentage
1	9	34.62
2	4	15.38
3	4	15.38
4	2	7.69
6	1	3.85
8	1	3.85
9	3	11.54
15	1	3.85
Missed	1	3.85
Total	26	100.00

Thirty one (93.94%) of suspected cases prefer to visit a health facility in case of similar illness and all the rest 2(6.06%) suspected cases prefer to stay at home. Majority 14(42.42%) of the suspected cases perceived that chickenpox is cured by medical treatment followed by staying indoor 7 (21.21%). A single individual/suspected case (3.03%) perceived chickenpox can be cured both by modern and traditional medicine.

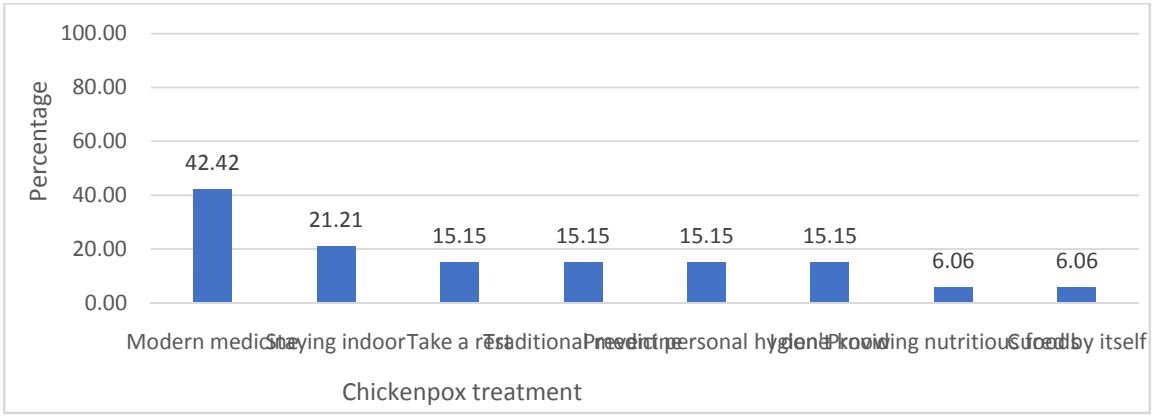


Figure 2.3: Perception of suspected cases on chickenpox treatment, Aleltu Training Center, North Shewa Zone of Oromia, Ethiopia, 2019

Almost half of the suspected cases 17(51.52%) know modes of transmission for chickenpox. Of those who know modes of transmission, 12 (70.59%) of suspected cases perceive that chickenpox is transmitted by direct physical contact followed by air droplets during coughing and sneezing 10 (58.82%). Almost half 17(51.52%) of the suspected cases believe that varicella zoster virus can infect any age group followed by 6(18.18%) believe it only infects adults between 15 and 30 years old. Twenty (60.61%) of suspected cases perceived varicella zoster virus can infect only males.

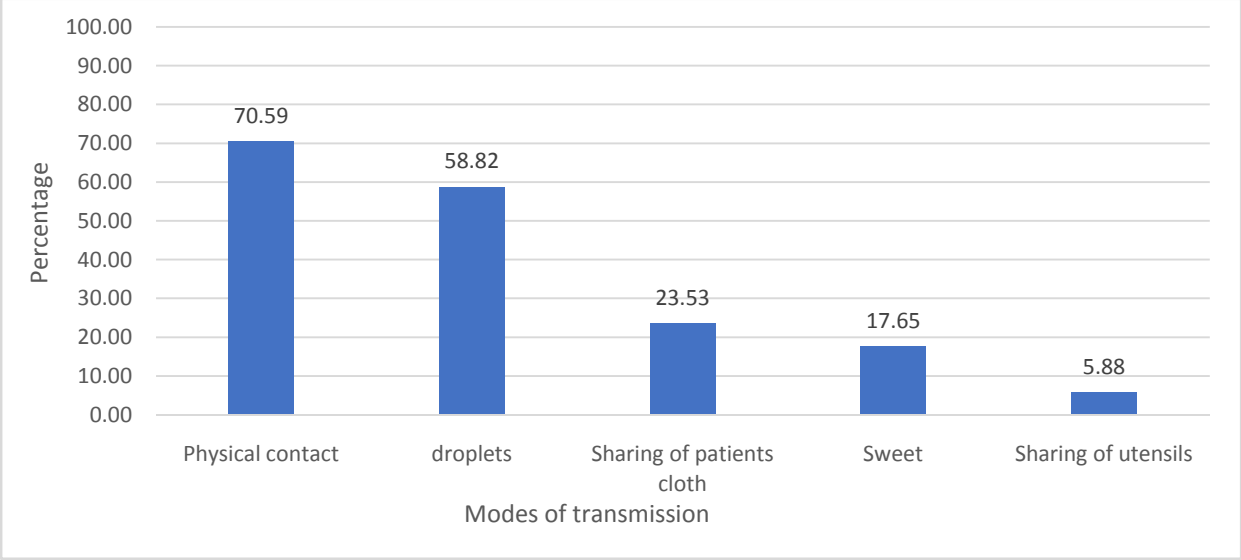


Figure 2.4: Suspected Cases response on modes of transmission of chickenpox disease, Aleltu Training Center, North Shewa Zone of Oromia, Ethiopia, 2019

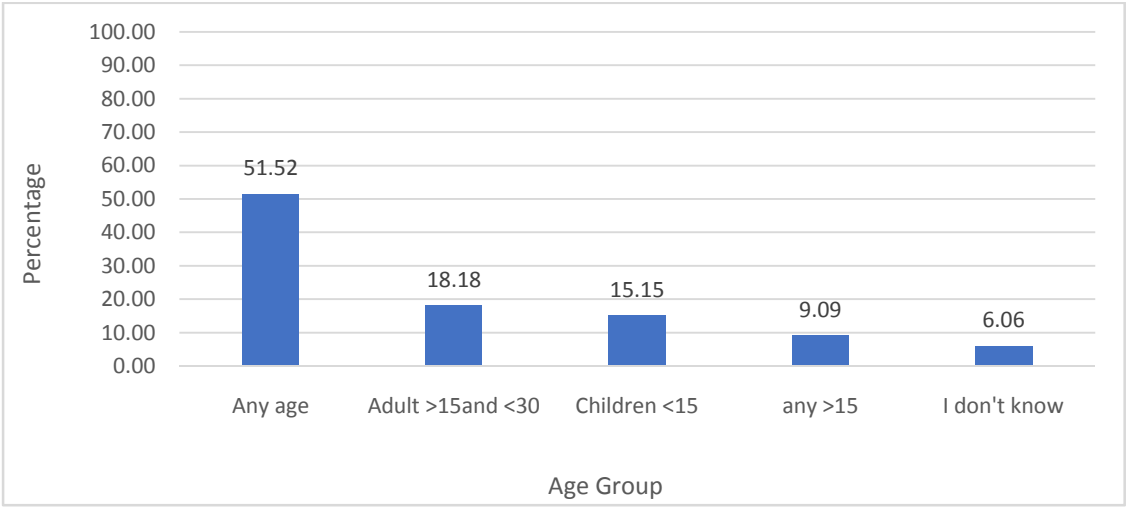


Figure2.5: Suspected Cases response on chickenpox risky age group, Aleltu Training Center, North Shewa Zone of Oromia, Ethiopia 2019.

Only the suspected index case had travel history to an area of active chickenpox case within 21 days prior to the onset of their symptom. All the suspected cases had contact history with active suspected chickenpox case within 21 days prior to the onset of their symptom within the center. All the suspected cases had no travel history after infection.

Hypothesis Generation

Based on the finding from the descriptive analysis, the investigation team had developed the following hypothesis.

The risk of contracting chickenpox disease is associated with:

- Age group
- Education status
- Marital status
- Presence and number of cases in a room
- Awareness status on the modes of transmission

Risk factor analysis

A total of 33 suspected cases and 66 controls from the same training center having almost similar exposure and characteristics with the suspected cases (from the same cohort) were selected conveniently. All the controls were males and majority 43(65.15%) of controls were in the age group of 20-24years followed by 15-19 years, 13(19.70%) of cases. The age of controls range from 17 years (minimum) to 39 years (maximum) and the median age was 20years (IQR=2). Nearly three-fourth 47(71.21%), of the controls were orthodox religion follower followed by protestant 13(19.70% and half of them were Amhara by Ethnicity 34(51.52%). Majority 61(92.42%) of the cases were single and the all rest were married. Forty-six (69.70%) of cases had learnt until secondary school followed by above secondary school 13(19.70%). Forty six (69.70%) of controls were a student followed by unemployed 7(10.61%) before joining the training center. The minimum duration of cases in the training center was 73 days and the maximum was 210 days. The mean of their duration in the training center was 88 days and median was 90 days.

Table 2.3: Distribution of socio demographic characteristics of Controls, Aleltu Training Center, North Shewa Zone of Oromia, Ethiopia 2019

Variable	Category	Control N(%)	Suspected Case N(%)
Marital status	Single	61(92.42%)	27(81.82%)
	Married	5(7.58%)	6(18.18%)
Occupation	Student	46(69.70%)	15(45.45%)
	unemployed	7(10.61%)	10(30.30%)
	Daily laborer	4(6.06%)	3(9.09%)
	Government Employee	3(4.55%)	0(0.00%)
	Private	3(4.55%)	3(9.09%)
	Farmer	2(3.03%)	1(3.03%)
	Missed	1(1.52%)	1(3.03%)
Age group	15 - <20	13(19.70%)	2(6.06%)
	20 - <25	43(65.15%)	27(81.82%)
	25 - <30	7(10.61%)	3(9.09%)
	30 - <35	1(1.52%)	1(3.03%)
	35 - <40	1(1.52%)	2(6.06%)
	Missed	1(1.52%)	0(0.00%)
Religion	Orthodox	47(71.21%)	14(42.42%)
	Muslim	13(19.70%)	19(57.58%)
	Protestant	5(7.58%)	0(0.00%)
	Missing	1(1.52%)	0(0.00%)
Ethnicity	Amhara	34(51.52%)	6(18.18%)
	Tigrea	15(22.73%)	7(21.21%)
	Other	9(13.64%)	1(3.03%)
	Afar	7(10.61%)	19(57.58%)
	Missing	1(1.52%)	0(0.00%)
Patient educational status	Illiterate	2(3.03%)	3(9.38%)
	Elementary	5(7.58%)	7(21.88%)
	Secondary	46(69.70%)	19(59.38%)
	Above secondary	13(19.70%)	3(9.38%)
Duration in the training center	73 -90 days	57(86.36%)	
	91-210 days	4(6.06%)	
	Missing	5(7.58%)	

All the rooms, in which controls are living, have at least one window and all the trainees had access to free health service in the training center's health center located within the center's compound. The maximum number of persons living in a single room was 210 and the minimum

was 44 as reported by the controls. The maximum area of the room was estimated to be 300m^2 and the minimum area was 20m^2.

Twenty six 64(96.97%) of controls replied that, there were chickenpox cases within their common living room. The maximum number of suspected cases in a room was 12 and the minimum was 1.

Table2.4: Distribution of suspected cases within controls room, Aleltu Training Center, North Shewa Zone of Oromia, Ethiopia 2019

Number of sick persons in controls room	Frequency	Percent
1	20	30.30%
2	7	10.61%
3	3	4.55%
4	13	19.70%
5	12	18.18%
6	4	6.06%
7	1	1.52%
8	1	1.52%
10	1	1.52%
12	1	1.52%
Missing	3	4.55%
TOTAL	**66**	**100.00%**

Fifty-six (84.85%) of controls prefer to visit a health facility in case of chickenpox illness, 9(13.64%) prefer to stay at home and 1(1.52%) prefer to use holly water. Majority 55(83.33%) of controls perceived that chickenpox is cured by medical treatment followed by staying indoor, 14 (21.21%). Three controls (4.55%) perceived chickenpox can be cured both by modern and traditional medicine.

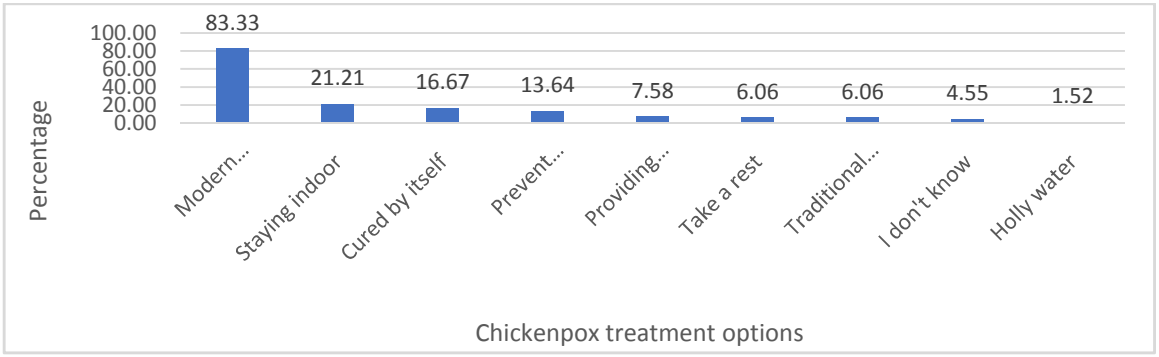


Figure 2.6: Perception of controls on chickenpox treatment, Aleltu Training Center, North Shewa Zone of Oromia, Ethiopia 2019

Fifty-six (84.85%) controls know modes of transmission for chickenpox. Of those who know modes of transmission; 40 (71.43%) of them perceive that chickenpox is transmitted by direct physical contact followed by air droplets during coughing and sneezing 32 (57.14%) and sharing of patients cloth 20(35.71%). Majority 45(68.18%) of controls believe that Varicella zoster virus can infect any age group. Nineteen (28.79%) of controls perceived varicella zoster virus can infect only males. All controls had contact history with active chickenpox cases during the current outbreak.

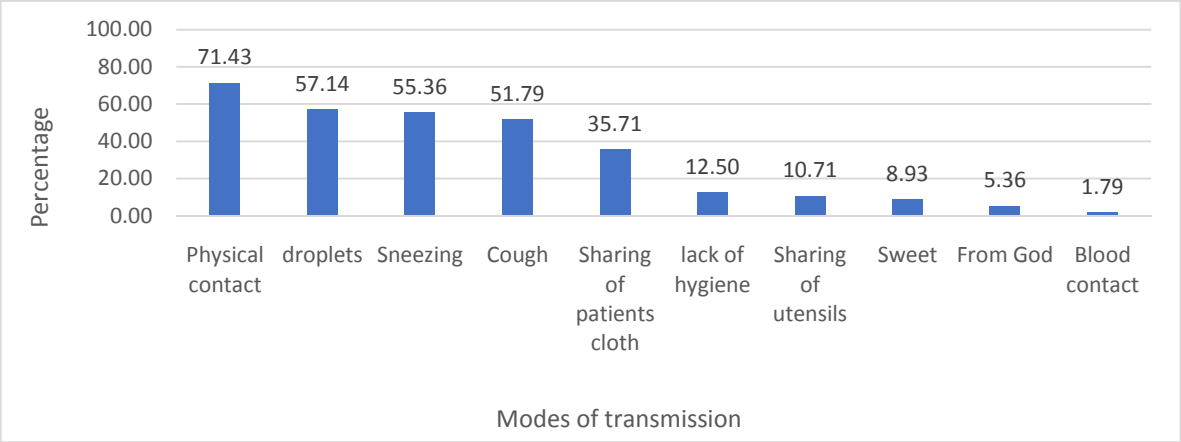


Figure 2.7: Controls response on modes of transmission of chickenpox disease, Aleltu Training Center, North Shewa Zone of Oromia, Ethiopia, 2019

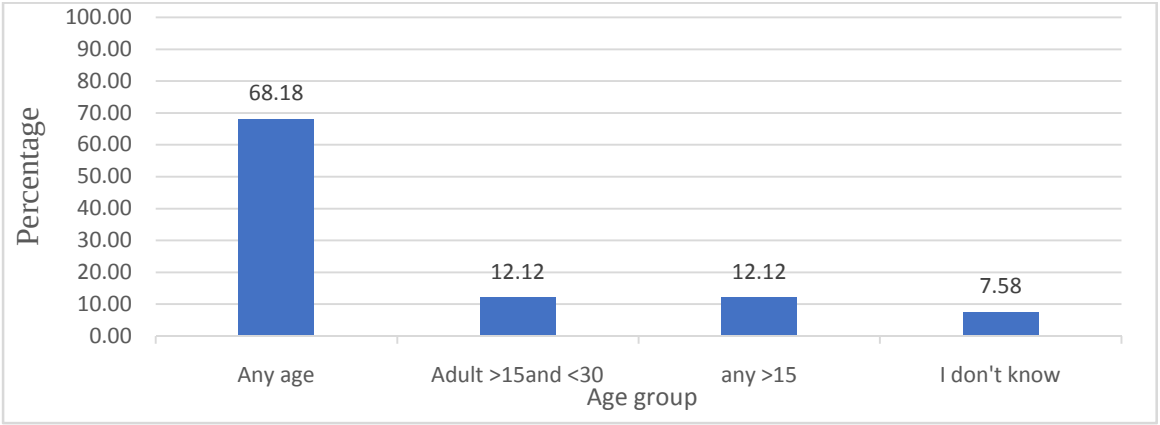


Figure 2.8: Controls response on chickenpox risky age group, Aleltu Training Center, North Shewa Zone of Oromia, Ethiopia, 2019

Hypothesis testing

Bivariate logistic regression model was used to test the association between all possible risk factors hypothesized above to have an association with contracting chickenpox disease. Age group, educational status, presence and number of cases in a room, awareness status on the modes of transmission and marital status were the variables tested by the bivariate logistic regression model. Those variables with P-value less than or equal to 0.25 were included in multiple logistic regression model. Depending on the bivariate logistic regression result educational status, marital status and awareness status on modes of transmission were the variables included in multivariate logistic regression model. Of those variables; awareness status on modes of transmission and educational status of elementary school had found to have a significant association with contracting chickenpox disease at CI of 0.05-0.42 and 1.34-58.66, respectively.

Table 2.5: Multivariate analysis result of association test, Aleltu Soldier Training Center, Aleltu woreda, North Shewa Zone of Oromia, Ethiopia 2019

Variables	Category	Case (%)	Controls (%)	COR (P-value)	AOR(95% CI)
Educational status	Illiterate	3(9.38%)	2(3.03%)	8.67(0.05)	6.97(0.62-78.22)
	Elementary	7(21.88%)	5(7.58%)	6.07(0.04)	8.85(1.34-58.66)
	Secondary	19(59.38%)	46(69.70%)	1.79)(0.40)	1.58(0.33-7.69)
	Above secondary	3(9.38%)	13(19.70%)	*1*	
Marital status	Single	27(81.82%)	61(92.42%)	0.37(0.12)	0.88(0.17-4.56)
	Married	6(18.18%)	5(7.58%)	*1*	*1*
Know modes of transmission	Yes	17(51.52%)	56(84.85%)	0.19(0.00)	0.14(0.05-0.42)
	No	16(48.48%)	10(15.15%)	*1*	*1*

- ***(1) * reference and P-value is significant at < 0.05.**

2.7 Discussion

A total of 44 suspected chickenpox cases were identified by tracing cases and revising health center case registration at Aleltu Soldier Training Center found in Aleltu Woreda, North Shewa Zone of Oromia Region. The first 33 cases were included in the investigation. The last 9 suspected cases were seen after the investigation team had finished the data collection and was following the situation by daily phone call. The first suspected case was seen on 9th, January/2019 and the notification was around 6th March/2019 (exact date of notification was not remembered). Due to late notification, the investigation was started lately and it causes recall bias. Due to this some variables like onset date, are missed and some are not exact number rather estimation/approximation.

Only the suspected index case had travel history to an area of active suspected chickenpox outbreak within 21 days prior to the onset of his sign and symptoms. The suspected case had travel to Mojana Wedera Woreda, North Shewa Zone of Amhara region to visit his family during his rest/break time, 12th December/2019. There was an active suspected chickenpox outbreak in that woreda and he had contact with active suspected cases during his stay. He had started to show the symptoms of chickenpox after a week of his return to the training center, 9th January/2019, and had contact with his friends. Following contacts within the center, the number of cases were increased and suspected chickenpox outbreak was declared. All the suspected cases had no travel history after infection due to presence of a rule that prohibit movement out of the training center.

It is known that chickenpox laboratory test was not done in our country yet. To do the test, the sample need to be sent to abroad or the reagent need to be available for EPHI laboratory. The virology laboratory department was trying their best to get the regent to do the test in our country. Although they were doing their best, they didn't get the reagent and the samples were not tested.

The age of the suspected cases range from 19 years (minimum) to 33 years (maximum) and majority (81.82%) of the suspected cases were in the age group of 20-24 years. This might be due to the reason that majority of the trainee is in the indicated age group and logistic regression analysis had confirmed that age group has no an association with contracting chickenpox disease. All the suspected cases were male and this might because of the index case was a male trainee and the centers rule prohibit close and prolonged contact between male and female trainees. It is known that close and prolonged contact is the main route of transmission for Varicella Zoster Virus from sick person to the healthy one. Nineteen (57.58%) of the suspected cases were Afar by ethnicity and Muslims by religion. This might be due to the intimate and prolonged contact between them compared to other ethnic groups as reported by the center's health professional. The religion might also be associated with this, more than 96% of Afar's are Muslim by religion. [41]

All the suspected cases and controls had contact history with active chickenpox case in this outbreak and the resistance among controls might be due to previous childhood infection and/or

strong immunity. Previous infection of chickenpox develops lifelong immunity. Two (6.06%) and 3 (9.09%) of suspected cases had developed a severe rash and diarrhea, respectively. This also might be related to their weak immunity.

All chickenpox suspected cases were isolated from the healthy trainee to reduce transmission and rest was also provided as a supportive treatment. The trainees need to get a rest from the training by getting sick. Due to this need isolation and controlling the outbreak was challenging. Lately, the center putted a rule to punish those individuals who get in contact with the cases deliberately.

All suspected cases had access to free health service in the training center's health center located within the center's compound. This free and nearby availability of the health service enable the cases to visit a health facility timely. Almost all 32(96.97%) suspected cases had visited a health facility to seek medical treatment and approximately three-fourth, (71.88%) suspected cases had visited a health facility on the same date of the disease onset. This contributes for immediate isolation to reduce transmission and get professional follow-up. Majority 14(42.42%) of the suspected cases perceived that chickenpox is cured by medical treatment. This perception also initiates the cases for timely health facility visit.

More than half 20(60.61%) of cases perceived varicella zoster virus can infect only males. This misperception might related to what happened in this outbreak (only males were affected).

Almost half (51.52%) of the suspected cases and more than three-fourth (84.85%) of controls know modes of transmission for chickenpox. It is clear that knowing the modes of transmission helps to avoid/reduce transmission. It is also evidenced by the multivariate logistic regression analysis, knowing modes of transmission for chickenpox have 0.14 times reduced risk of being infected by chickenpox than who don't know mode of transmission.

Two variables are said to have an association during logistic regression analysis at 95% CI, P-value should be less than 0.05%. Two variables with no association in bivariate logistic analysis might have an association in multivariate logistic analysis. This association is created by the synergetic effect of more than one variables. Therefore, P-value less than 0.25 in bivariate logistic analysis were incorporated in multivariate logistic analysis in order not to miss the confounding effect of one variable on the other variable.

The age of suspected cases range from 19-33 years with median age of 20 years in this outbreak and it ranges from 1.6months to 30years with median age of 5 years in an outbreak occurred in Pakseng district, Luang Prabang Province, the Lao PeopleÊs Democratic Republic. Most (81.82%) of the cases were in the age group of 20-24 years in this outbreak while the most (80%) of the cases were in the age group of 1-9 years in an outbreak occurred in Pakseng district, Luang Prabang Province, the Lao PeopleÊs Democratic Republic. A chickenpox outbreak Investigation in Muzaffarpur District, Bihar, India revealed that almost all age group were affected, but the incidence was more in the age group 1-14 years. Both results are different from

the finding in the current outbreak investigation. This might be due to presence of only adult (18-50 years old) trainees in the training center. [42, 43]

A total of 16 samples were tested in an Outbreak of Chicken Pox occurred in Muzaffarpur District, Bihar, India, in which all were tested positive while No sample was tested for chickenpox in the current outbreak. In the current outbreak two samples were tested for measles and rubellaand both resulted negative. This is comparable in an outbreak occurred in Pakseng district,Luang Prabang Province, the Lao PeopleÊs Democratic Republic in which all tested samples were resulted negative for measles and rubella. In both outbreaks the clinical manifestation was suggesting chickenpox disease. [42, 43]

A chickenpox outbreak investigation conducted in Muzaffarpur District, Bihar, India showed the most common clinical manifestations observed were rash (100%) and fever (88%). Which was almost comparable with the finding in the current outbreak investigation where all (100%) of the cases manifested rash and fever. The first site of the rash appearance was the trunk in the majority (60%) followed by face (20%) of the patients while it was the reverse in the current outbreak where the rash started from the patients face in majority 22 (66.67%) of patients followed by trunk 11(33.33%). [43]

The maximum number of suspected cases reported in a single day was 4 in this outbreak while it was 40 in an outbreak occurred in Pakseng district,Luang Prabang Province, the Lao PeopleÊs Democratic Republic. There were 85 (44.7%) female cases in the Pakseng's outbreak while no female case was seen in this outbreak. The overall AR in an outbreak occurred in Pakseng District was 0.9 which was too low than the attack rate in this outbreak (AR=3.83%) and age specific attack rate was not calculated due to lack of denominator data by age group. [42]
The majority of the cases were presented with vesicular rash(n = 189, 99.5%)in an outbreak occurred in Pakseng district,Luang Prabang Province, the Lao PeopleÊs Democratic Republicwhich is comparable with finding from the current outbreak; all 100% of cases had it which is characteristic of varicella and met the US CDC standard case definition for varicella. [42, 44]
The severity of the illness was uniformly mild with no complications and hospitalization or death which is almost similar with the finding in this outbreak; only 2(6.06%) of cases developed a relatively severe rash. A few studies conducted in EU/EEA countries have reported 2–6% of chickenpox cases attending a general practice are estimated to develop complications. It also revealed that the case fatality ratios vary from 0.01% to 5.4% among hospitalised cases of varicella. In the current outbreak no case had developed any complication and the case fatality ratio was zero. This might be due to cases immediate health facility visit, close follow-up and support by the health workers. [42, 45, 46]
History of contact with a case of chickenpox was available in all the patients while none of them gave a history of varicella vaccination which was the same result as this outbreak investigation. Majority of the affected population were illiterate (54%) in an outbreak occurred in Muzaffarpur

District, Bihar, India, while majority (59.38%) of cases had learned until secondary school with in the current outbreak (21.21%). [43]

2.8 Public Health Interventions during the investigation

Many activities to prevent further transmission and control the outbreak were performed by the investigation team together with the training center's staff. The investigation team had worked with the training center's administrative personnel to initiate and strengthen control and prevention activities, provided health education on chickenpox that includes basic information's such as sign and symptoms, modes of transmission, method of prevention and immediate notification to the center's health worker, isolation of cases in two rooms to avoid contact with the healthy trainees and follow-up of cases status and isolation compliance. Supportive treatments were also given for all cases and antiviral drugs given for severe cases. Although the laboratory test were not done; five blood and three swab samples were taken to be tested for measles, rubella and chickenpox. The investigation team had incorporated surveillance officers, social mobilization expert, dermatologist, laboratory expert and clinicians by profession.

2.9 Limitation

Due to late event notification and investigation some data were exposed to recall bias. The health center was not registered the initial cases, affecting data availability/accuracy for the initial cases. Following this some variables like date of onset were missed or not exact value rather estimation/approximation. Therefore, understanding of this outbreak investigation finding need to consider those limitations.

2.10 Conclusion and Recommendations

The source of the outbreak was from Mojana Wedera woreda, East Shewa Zone of Amhara region, through the index case. The disease was mainly transmitted through intimate and prolonged contact in which living together in a camp creates good condition for contact. The health education and isolation was effective in controlling the outbreak.

The training center need to notify the health department immediately in case of chickenpox and other similar disease with high transmission potential leading to an outbreak. The health center need to assure staffs caring for a client with suspected chickenpox disease should have a previous history of chickenpox or have evidence of immunity. The health center need to strength the surveillance in the center and be alert for such cases. FMOH need to consider building the laboratory capacity to confirm chickenpox disease.

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Chapter Three: Surveillance Data Analysis

3. Analysis of Last Five Years (2013-2017) Malnutrition Public Health Emergency Management Surveillance Data of Addis Ababa City Administration, Ethiopia, 2018

3.1 Abstract

Introduction: Malnutrition refers to all deviations from adequate and optimal nutritional status. From 2011 to 2013, one out of every eight people in the world (almost one billion people) was still not getting enough food for an active and healthy life. Most (98%) of these individuals lived in developing economic regions. Malnutrition is among the four leading causes of child mortality around the globe. The nationwide magnitude of wasting in Ethiopia is almost 10%.

Objective: The objective of analyzing last five years (2013-2017) malnutrition Public Health Emergency Management surveillance data of Addis Ababa City Administration was to provide malnutrition information for appropriate public health planning, enforce nutrition related polies and guide effective use of malnutrition treatment supplies in the city administration 2018.

Methodology: A retrospective secondary data review was conducted to analyze last five years (2013-2017) Public Health Emergency Management surveillance malnutrition data of Addis Ababa City Administration from March 15-30/2018. The study population for this malnutrition data analysis was all children less than five years age. Permission to access the data was obtained from the national Public Health Emergency Management. The data was reviewed, checked and cleaned prior to analysis.Data was analyzed by Microsoft office excel 2016.

Result: A total of 7,586 Severe Acute Malnutrition cases were reported from Addis Ababa City Administration during the time period of 2013 to 2017 (average incidence proportion=0.64%). The highest number of cases 1983 (26.14%) were reported in 2017 and 1220(16.1%) of the cases were treated as inpatient. Majority of the cases 2620 (34.5%) were reported from Arada sub-city followed by Kirkos sub-city977 (12.9%). Arada sub-city was the most affected sub-city by Severe Acute Malnutrition with an average incidence proportion of 0.19% followed byKirkos sub-city (0.07%). A total of 42 deaths due to Severe Acute Malnutritionwere reported during the time period of 2013-2017. This gives an average mortality rate of 0.036 per 1000 population and case fatality rate of 0.69%. More than half of the deaths 23(54.76%) were occurred in 2014 and all deaths were from Arada sub-city 31(73.8%), Kirkos sub-city 7(16.7%) and Akaki Kality sub-city 4(9.5%). Majority of the cases 753(9.93%) and deaths (57.14%) reported in May. The report excludes Moderate Acute Malnutritioncases and it lacks pertinent variables like age and sex.

Conclusion: Thousands of cases were threatening from malnutrition in the city administration. The number of malnutrition cases was underestimated due to exclusion of Moderate Acute

Malnutritioncases in the weekly Public Health Emergency Managementreport. The number of Severe Acute Malnutritioncases is increasing from year to year. Arada sub-city was most affected sub-city by Severe Acute Malnutrition.

Recommendation: All Moderate Acute Malnutrition and Severe Acute Malnutritioncase data need to be collected and reported. The necessary variables such as age and sex need to be included and reported. Further research needs to be done on malnutrition.

Key words: Malnutrition, Surveillance data analysis, Addis Ababa, Ethiopia, 2013-2017.

3.2 Introduction

Background

Malnutrition is a broad term that refers to all deviations from adequate and optimal nutritional Status resulting from specific nutrient deficiencies or diets based on inappropriate combinations or proportions of foods. There are two forms of malnutrition: over-nutrition and undernutrition and three forms of Sever Acute Malnutrition (SAM) namely kwashiorkor, marasmus and marasmic kwashiorkor. Based upon the type of nutritional deficit, an individual is said to be acutely or chronically malnourished. Acute malnutrition is caused by a sudden decrease in food consumption while chronic malnutrition is the result of inadequate nutrition over a long period of time. [1]

At the spring 2010 meetings of the World Bank and IMF, during the height of a global financial crisis, stakeholders from Ministries of Health, the UN system, development agencies, civil society organizations, academia, the private sector, intergovernmental organizations, and philanthropic bodies launched a collaborative initiative to end malnutrition called the Scale Up Nutrition (SUN) Movement. Building on the 2008 *Lancet* series with leadership from the UN, members of the SUN Movement developed a Framework for Action to Scale Up Nutrition that would place nutrition investments at the center of development work. [2]

The SUN Movement aimed to increase collaboration for nutrition and to foster a more coherent nutrition agenda at both global and national levels by developing global stakeholder networks. The SUN Movement established four multi-stakeholder platforms (MSPs) headed by national leaders: The Country Network, the Civil Society Network, the Donor Network, and the Business Network. SUN Movement participants set up MSPs in their respective countries as well. [3, 4]

Ethiopia has witnessed encouraging progress in reducing malnutrition over the past decade. However, baseline levels of malnutrition remain so high that the country must continue to make significant investments in nutrition. In 2009 the Ethiopian House of Representatives declared the Food, Medicine and Health Care Administration and Control Proclamation (No. 661/2009). The Ethiopian Food, Medicine and Health Care Administration and Control Authority (FMHACA) and regional health regulatory bodies are authorized to implement this proclamation. Both entities are mandated to promote and protect the public health by ensuring the safety and quality of products and health services through registration, licensing and inspection of food establishments, pharmaceuticals, health professionals and health institutions. According to their mandates, both organizations will ensure the quality and safety of nutritional supplies, including Fortified foods, Food fortificants/Premix, Micronutrient supplements (iron, zinc, folic acid, Vitamin A, etc.), Breast milk substitutes, infant and follow-up formulas, Complementary foods, Therapeutic and supplementary foods, Iodized salt and WASH. [5]

The government has already put in place programs and initiatives with set targets that directly and indirectly contribute to the reduction of under-nutrition. These programs include increasing

agricultural productivity; promoting girls' education; immunization; integrated management of neonatal and childhood illnesses (IMNCI); WASH; family planning, prevention of mother-to-child transmission of HIV (PMTCT), skilled delivery and delaying of pregnancy. [5]

Statement of the problem

To date, in most low- and middle-income countries (LMICs), the marketing of foods and non-alcoholic beverages is unregulated; where regulations are in place, they tend to be voluntary codes and are poorly monitored and enforced. WHO guidance on best practice for such marketing is rarely followed. [6]

In 1974, the World Food Conference declared, "Every man, woman and child have the inalienable right to be free from hunger and malnutrition." Yet, from 2011 to 2013, one out of every eight people in the world—almost one billion people—was still not getting enough food for an active and healthy life. Most (98%) of these individuals lived in developing economic regions. Socially vulnerable groups such as children and childbearing women shoulder the largest burden of malnutrition. [7, 8]

Malnutrition can lead to various secondary health conditions that impact morbidity and mortality and concurrent conditions may exhibit themselves differently in undernourished individuals. Malnutrition is a critical yet underestimated factor in susceptibility to infection, including susceptibility to the "big three" infectious diseases: HIV/AIDS, tuberculosis and malaria. [5]

Food insecurity and malnutrition in adolescents and pregnant women, compounded by gender discrimination, leads to an intergenerational cycle of nutrition problems which manifest as stillbirths, miscarriages, low birth weight, growth failure, increased risk of maternal and neonatal mortality, impaired cognitive development, sub-optimal productivity in adults and reduced economic growth for the nation. For girls in particular, the chances of escaping this nutrition-poverty trap diminish as the child grows older. Over time her options for better education attainment and delayed marriage decrease. She is likely, in turn, to give birth to a baby of low birth weight. Hence the cycle begins again. [9]

There is also a strong relationship between age and physical nutritional status. it is well recognized that the size and body composition of the mother at the start of pregnancy is one of the strongest influences on fetal growth. Ensuring that adolescent girls are themselves nutritionally fit to become mothers is essential. In the United States it has been shown that in adolescent mothers who were still growing during pregnancy, there is a maternal-fetal competition for nutrients, and that birth weight is smaller by some 200g. According to the 2011 Ethiopian Demographic and Health Survey (EDHS), the median age for a first marriage is around 16.5. Twelve percent of adolescent girls (aged 15–19) are either already mothers or pregnant with their first child. [10, 11, 12]

The Food and Agriculture Organization of the UN (FAO) estimated the annual global cost of malnutrition from loss of productivity and healthcare expenditures was USD 3.5 trillion. Preliminary data from the Cost of Hunger in Africa (COHA) study suggest malnutrition costs

Uganda, Ethiopia, Swaziland, and Egypt each 1.9 to 16.5% of their national Gross Domestic Product (GDP), [13, 14]

Worldwide, malnutrition is an underlying cause in the deaths of more than 3.5 million children under the age of 5 each year. Some 13 million infants are born each year with low birth weight (LBW). Fifty-five million children are wasted, and of these 19 million are severely wasted. About 178 million children around the world are stunted. Of the estimated 178 million, 90 percent live in 36 countries, one of which is Ethiopia. The prevalence of obesity in preschool children was 6.7% worldwide. Malnutrition is among the four leading causes of child mortality around the globe. In 2013, the World Health Organization (WHO) reported malnutrition was linked to 45% of all childhood deaths. Malnutrition is a contributing factor in the deaths of 60.7% of children diagnosed with diarrheal diseases, 57.3% of deaths associated with malaria, 52.3% deaths associated with pneumonia, and 44.8% of deaths from measles. [15, 16, 17]

The average prevalence of obesity in Africa was 8.5%. Africa shows rising numbers of stunted children due to population increase and an almost stagnant prevalence of stunting over the past two decades - of the 34 countries that account for 90% of the global burden of malnutrition, 22 are in Africa. In Africa, the estimated prevalence under-five overweight increased from 4% in 1990 to 7% in 2011. This trend is expected to continue. High rates of intrauterine growth retardation – about 20% of stunting by 24 months can be attributed to being Small for Gestational Age (SGA). [18, 19]

Ethiopia is the seventh wasting burden country from the ten most affected countries. The 2011 EDHS estimated the national prevalence of stunting among children at 44.4 percent, the prevalence of underweight at 28.7 percent and wasting at 9.7 percent. The survey also revealed that the level of chronic malnutrition among women in Ethiopia is relatively high, with 27 percent of women either thin or undernourished—that is, having a body mass index (BMI) of less than 18.5 kg/m2. Between 2000 and 2011 the prevalence of both underweight and stunting declined by 32 and 23 percent, respectively. [20]

Addis Ababa is an ideal setting to describe the coexisting rates of under and overnutrition. Addis Ababa is the capital and largest urban area of Ethiopia, a country that has been largely burdened by famine, food insecurity and underweight. The obesity and overweight rates in the city are comparable to those reported in other urban areas of the Sub Saharan Africa (SSA) region, where 25.7% of women were overweight and 10.2% were obese and 25% of adolescents in school were obese. The trends in the increase of obesity rates have not yet been documented for this capital, and there is scarce information about the determinants of overweight. However, this information can help to elucidate policy and program strategies to deal with the coexisting underweight and overweight problems. [21, 22]

A study conducted on changes in the prevalence of underweight and overweight/obesity in non-pregnant women of reproductive age (age 15-49), and their main socio-demographic correlates in Addis Ababa using data from 2000, 2005 and 2011 Ethiopian Demographic and Health Surveys, revealed the prevalence of overweight/obesity rose significantly from 16.1 to 20.6%; while underweight decreased from 17.9 to 14.1% between 2000 and 2011. [23]

Although several studies have been conducted on child malnutrition in Ethiopia there is a research gap on the coexistence of the double burden of malnutrition among adolescents which presumably is central to the success of many public health agendas, including the Millennium Development Goals aiming to reduce child and maternal mortality and non-communicable diseases. [24]

Rationale of the study

According to the National Public Health Emergency Management (PHEM) guide line, malnutrition is among the twenty-two prioritized events and diseases prioritized based on established criteria's and included in the national surveillance system. These prioritized events and diseases are categorized in to immediately and weekly reportable events and diseases. Of which SAM is a weekly reportable condition by using a standardized weekly reporting format at all levels of the government (community to national level). MOH has also been developed and implementing a nationwide nutrition program and initiatives by setting strategic objectives and targets that directly or/and indirectly contributes to the reduction of malnutrition.

Ethiopia is being challenged by repeated humanitarian crisis such as droughts, flooding, conflict affecting the agricultural production and provision of balanced diet for the population. Addis Ababa City Administration is the one being affected by the situation directly or/and indirectly causing an increment of malnutrition cases and deaths. These humanitarian crisis and presence of low socio-economic class communities and street children in the city administration contribute a lot for the increment of SAM cases and deaths. Due to these reasons high number of SAM cases and deaths were being reported every week through the surveillance system from the city administration.

Therefore, the aim of analyzing last five years SAM data of Addis Ababa City Administration was to determine the incidence of SAM cases, look for the trend of SAM cases and deaths in the city administration, describe cases epidemiologically, provide information for effective planning and targeted interventions and to provide an input/base for further research on it.

Significance of the study

The significance of this study was primarily to show the burden of malnutrition in the city administration, following this intervention measures will be implemented. If the implementation measures are implemented with regular monitoring and evaluation, the burden of malnutrition will be minimized to an acceptable level. This in turn will reduce the cost of treating malnutrition and the time waste for attending cases will also be reduced. This time will be used to do another productive activity. These implemented measures enable to achieve the objectives setted in the national nutrition program and nutrition surveillance. Generally, this contributes to develop the country's economy and change the countries appearance which attract tourists and investors to invest in the country.

3.3 Objective

General objective

- To provide malnutrition information for appropriate public health planning, enforce nutrition related polies and guide effective use of malnutrition treatment supplies in Addis Ababa City Administration 2018.

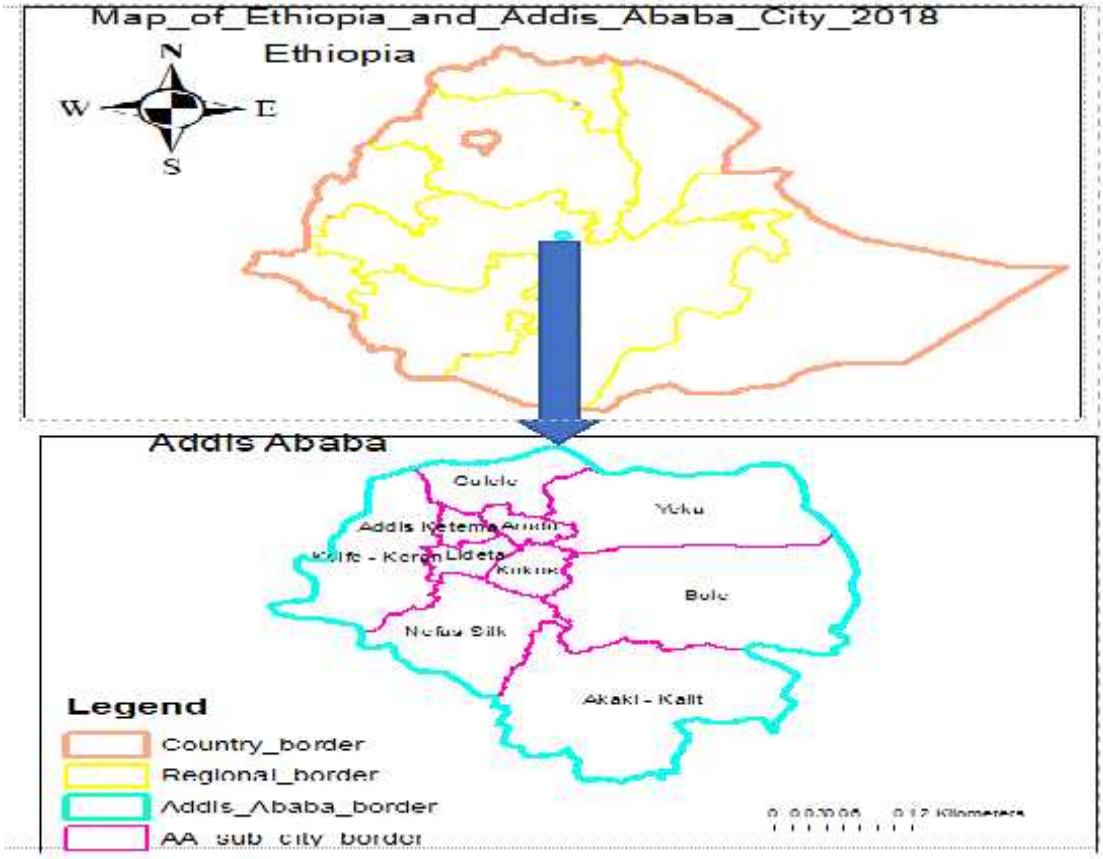
Specific objectives

- To determine the incidence of Severe Acute Malnutrition (SAM)
- To determine the mortality due to Severe Acute Malnutrition (SAM)
- To describe Severe Acute Malnutrition (SAM) cases epidemiologically
- To determine proportion of Severe Acute Malnutrition (SAM) cases treated as inpatient

3.4 Methodology

Study area and population

The study area for this last five years malnutrition data analysis was the city administration of Addis Ababa. The city administration is divided in to ten sub-cities and 118 woredas administratively. The average total population of the city administration for the study period was projected to be 3,273,001 with yearly growth rate of 3.8% and population density of 5,165/km^2. The population of the city administration is increasing due to increased migration of peoples from rural areas to the city. The total area of the city administration is 530.14km2. The study population for this malnutrition data analysis was all children less than five year age found in the city administration projected based on 2007 population enumeration. [24, 25]



Map 3: Map of Ethiopia and Addis Ababa 2018.

Study period and design

A retrospective secondary data reviewwas conducted to analyze last five years (2013-2017) PHEM surveillance malnutrition data of Addis Ababa City Administration from March 15-30/2018.

Data collection tools and procedures

Malnutrition surveillance data was requested from the national public health emergency management (PHEM) and permission to access the data from PHEM data management case team was gained. PHEM weekly reportingformat for malnutrition was used to collect the data.

Data quality assurance

The PHEM surveillance malnutrition data of Addis Ababa City Administration was reviewed, checked and cleaned for assuring completeness, validity and consistency of the data prior to analysis.

Data analysis

Microsoft excel 2016 was used to analyze last five years (2013-2017) PHEM surveillance malnutrition data of Addis Ababa City Administration. Simple mathematical operations (addition, subtraction, division, multiplication) were applied to analyze and describe malnutrition cases in Addis Ababa City Administration reported during 2013-2017.

Data dissemination

The final result of the analysis will be submitted to Addis Ababa University School of Public Health Department of Preventive Medicine, FMOH, EFELTP,Addis Ababa City Administration Regional Health Bureau/PHEM unit and EPHI.

Ethical clearance/ethical consideration

Verbal informed consent to accesses and analyze last five years (2013-2017) PHEM surveillance malnutrition data of Addis Ababa City Administration was obtained from the national PHEM Head after detail explanation of the objective, methodology and data dissemination.

Operational definition

Edema (Eodema): the enlargement of organs, skin, and other body parts in response to a buildup of water and sodium in the tissues. [1]
Kwashiorkor: caused by insufficient protein intake and characterized by skin and hair changes. [1]
Marasmic- kwashiorkor: a combination of marasmus and kwashiorkor. [1]

Marasmus: caused by rapid deterioration in nutritional status and characterized by extreme wasting of fat and muscle. [1]

Overnutrition: is the hyper-consumption of calories and nutrients beyond levels necessary for growth, development, and metabolic functioning. [1]

Overweight: weight for height is above two standard deviations from the median of the WHO Child Growth Standards. [1]

Severe Acute Malnutrition case (SAM): Children age from 6 months to 5 years with MUAC less than 11cm and/or children with bilateral edema regardless of their MUAC. [26]

Stunting: height for age is more than 2 standard deviations below the WHO Growth Standards median; a result of long-term nutritional deprivation. [1]

SUN Business Network: unites companies that have pledged to reach over 120 million undernourished women and children together each year with direct and indirect nutrition interventions by 2020. [27]

SUN Civil Society Network: encourages the alignment of civil society organizations' strategies, programs, and resources with nation specific plans for scaling up nutrition programs. [23]

SUN Donor Network: focuses on aligning, mobilizing, and tracking resources to support countries' nutrition initiatives. [27]

SUN United Nations Network: supports nations in scaling up their nutrition programs through a UN nutritional team, facilitated by REACH. [23]

Undernutrition: results primarily from inadequate intake of dietary energy but may also be caused by infections that limit absorption of key nutrients. [1]

Underweight: weight-for-age < −2 standard deviations (SD) from the median weight-for-age of the reference population. [28]

Wasting: weight for height is more than 2 standard deviations below the WHO Child Growth Standard median; a symptom of acute under nutrition. [1]

3.5 Result

A total of 7,586 Severe Acute Malnutrition (SAM) cases were reported from Addis Ababa City Administration during the time period of 2013 to 2017 through the standard weekly Public Health Emergency Management surveillance system. This gives an average incidence proportion of 0.64% for the time period of 2013 to 2017. The highest number of cases 1983(26.14%) were reported in 2017 while the least number of cases reported in 2014, 968(12.76%) (Figure 2.1). Of which 1220(16.1%) of the cases were treated as inpatient (Figure 2.2). The weekly data collection and reporting tool used by PHEM exclude MAM cases (only for SAM cases) and lacks pertinent variables such as age and sex.

Majority of the cases 2620 (34.5%) were reported from Arada sub-city followed by Kirkos sub-city 977(12.9%) and Gulele sub-city 835(11%). About 875(71.7%) of inpatient cases were from Arada sub-city followed by Kirkos sub-city 180(14.8%) and Kolfe Keraniyo sub-city100 (8.2%) (Table 2.1). Arada sub-city was the most affected sub-city by SAM with an average incidence proportion of 0.19% followed by Kirkos sub-city (0.07%) (Map 4).

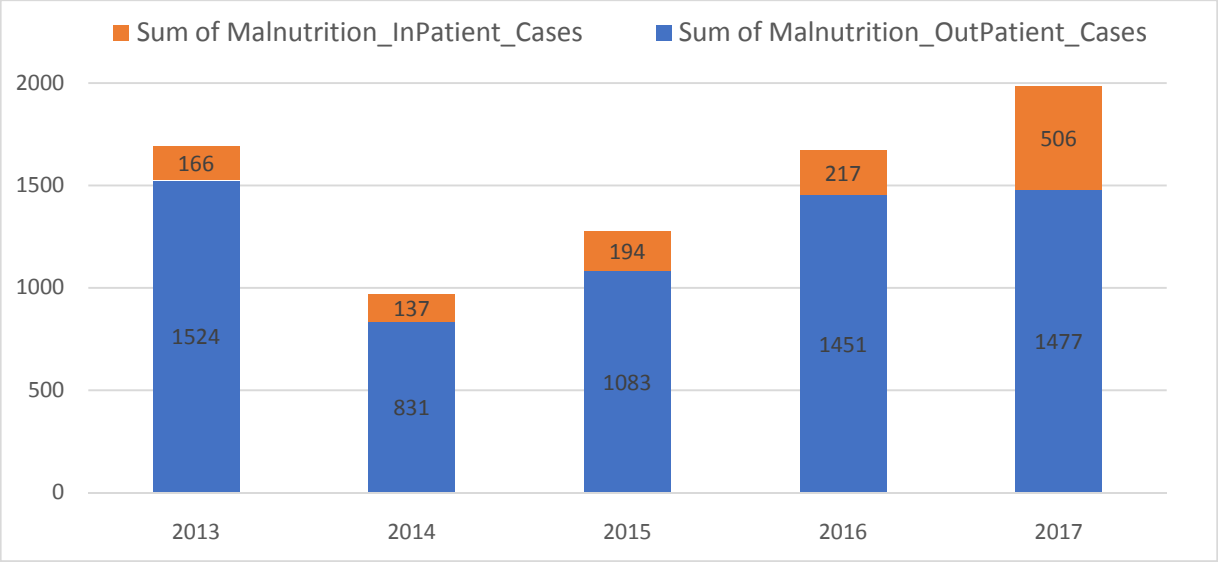


Figure 3.1: Distribution of SAM cases by year (2013-2017), Addis Ababa, Ethiopia, 2018.

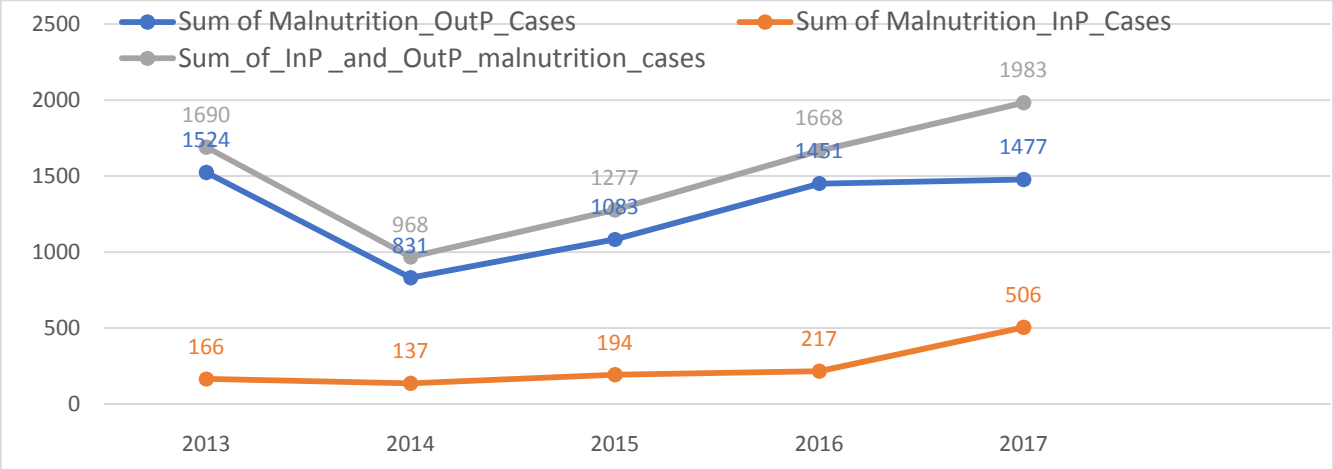
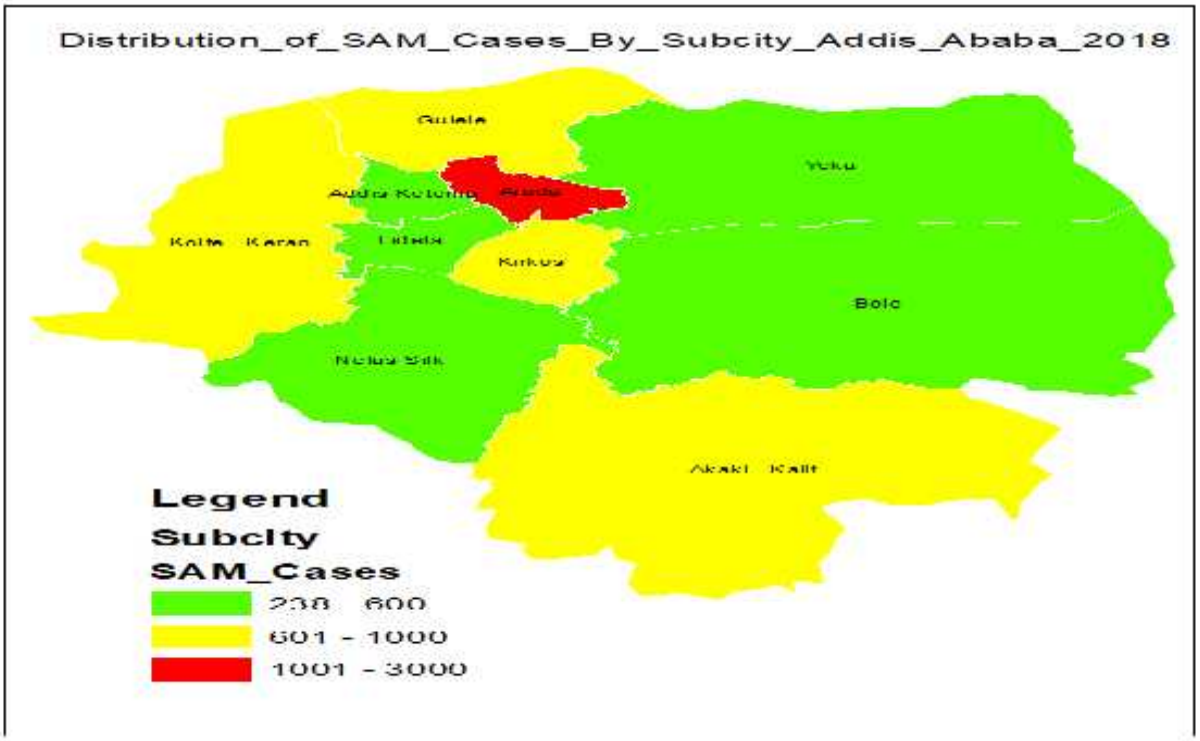


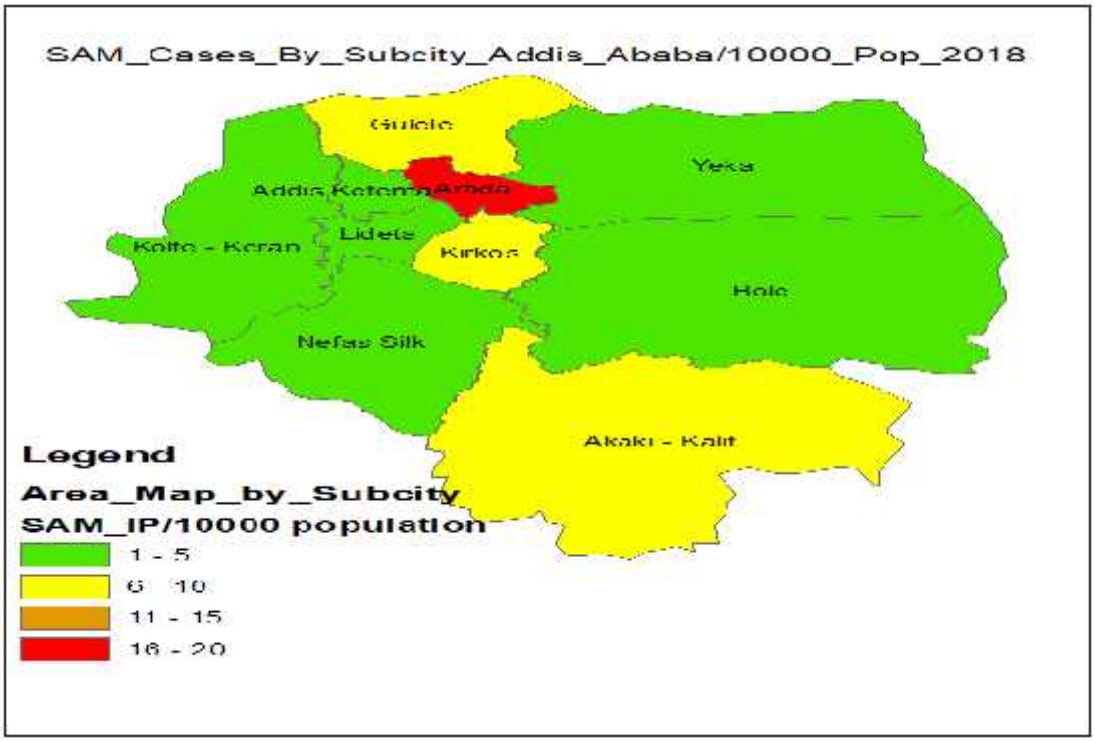
Figure 3.2: Trend of SAM cases, Addis Ababa, Ethiopia, 2013-2017.

Table 3.1: Distribution of Inpatient and Outpatient SAM cases by sub-city (2013-2017), Addis Ababa, Ethiopia 2018

Sub city	SAM outpatient cases	SAM inpatient cases	Total SAM cases
Addis Ketema	509(8.00)	1(0.08)	510(6.72)
Akaki Kaliti	640(10.05)	9(0.74)	649(8.56)
Arada	1745(27.41)	875(71.72)	2620(34.54)
Bole	236(3.71)	2(0.16)	238(3.14)
Chirkos	797(12.52)	180(14.75)	977(12.88)
Gulele	818(12.85)	17(1.39)	835(11.01)
Kolfe Keraniyo	631(9.91)	100(8.2)	731(9.64)
Lideta	304(4.78)	1(0.08)	305(4.02)
Nefas Silk Lafto	373(5.86)	19(1.56)	392(5.17)
Yeka	313(4.92)	16(1.31)	329(4.34)
Total	6366(100)	1220(100)	7586(100)



Map 4: Distribution of SAM cases by sub-city, Addis Ababa, 2013-2017**.**



Map 5: Distribution of SAM cases by sub-city per 10,000 population, Addis Ababa, 2013-2017.

A total of 42 deaths due to SAM were reported during 2013-2017. This gives an average mortality rate of 0.036 per 1000 population and case fatality rate of 0.69% for the time period of 2013 to 2017. More than half of the deaths 23(54.76%) were occurred in 2014, and the least number of deaths occurred in 2015 and 2016 (2.38% of total deaths for each) (Figure 2.3). All deaths were reported from three sub cities, Arada sub-city 31(73.8%), Kirkos sub-city 7(16.7%) and Kolfe Keraniyo sub-city 4(9.5%) (Table 2.2). The highest case fatality rate was seen in Arada sub-city (1.18%) and in 2014 (2.38%).

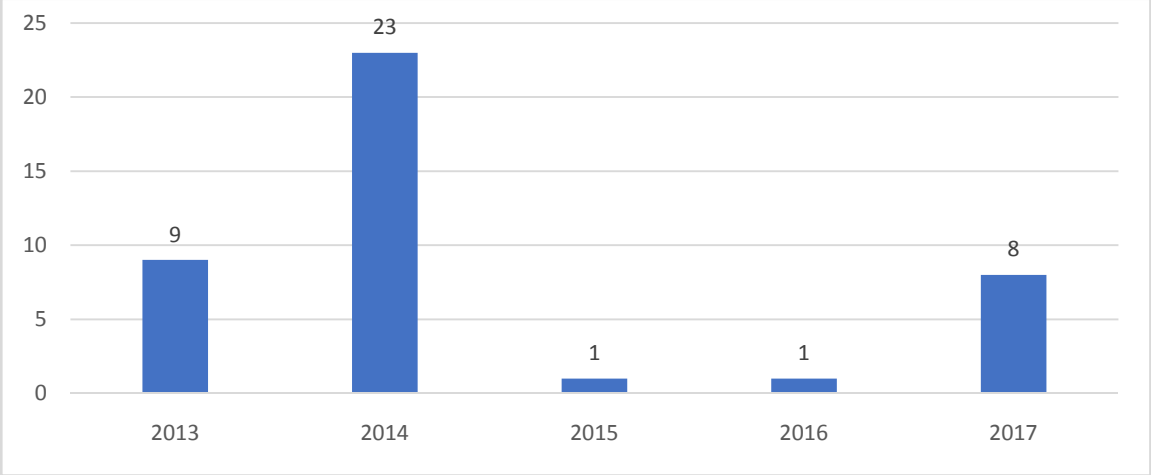


Figure 3.3: Distribution of SAM deaths by year (2013-2017), Addis Ababa, Ethiopia 2018.

Table 3.2: Distribution of SAM deaths by sub-city (2013-2017), Addis Ababa, Ethiopia 2018.

Sub city	Sum of Malnutrition inpatient Deaths	Percent
Addis Ketema	0	0.0
Akaki Kaliti	0	0.0
Arada	31	73.8
Bole	0	0.0
Chirkos	7	16.7
Gulele	0	0.0
Kolfe Keraniyo	4	9.5
Lideta	0	0.0
Nefas Silk Lafto	0	0.0
Yeka	0	0.0
Total	42	100.0

In analyzing SAM cases by WHO epidemiological week (WHO-Epi week), the highest number of cases were reported in WHO-Epi week 48, 31, 20 and 21 with case number of 200(2.64%),

199(2.62%), 196(2.58%) and 196(2.58%), respectively (Figure 2.4). More than three-fourth of deaths 32(76.2%) were reported in WHO-Epi week 19, 23(54.76%) and 32, 9(21.43%).

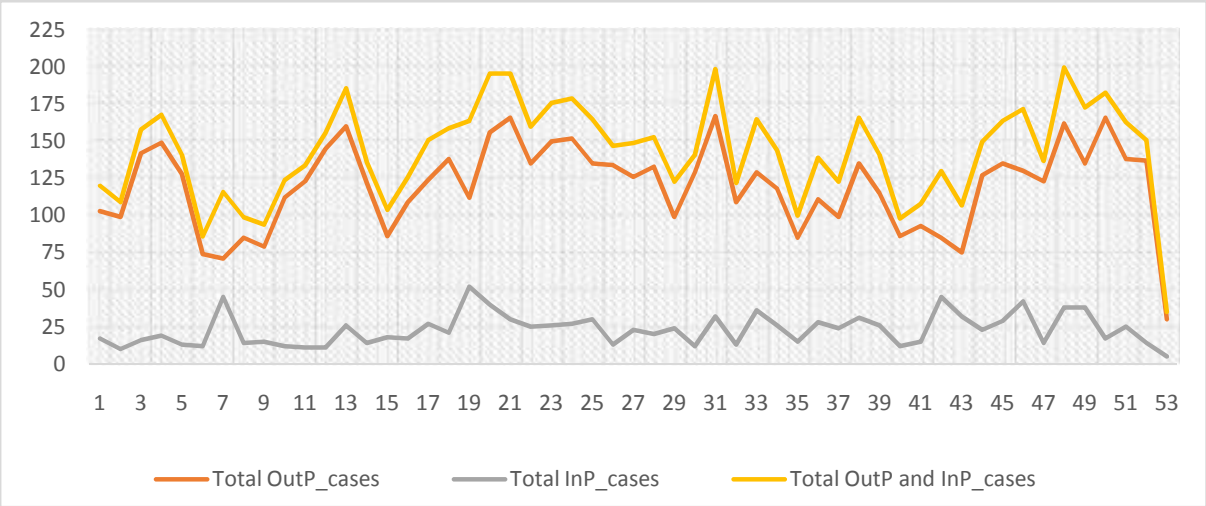


Figure 3.4: Trend of SAM cases by WHO-Epi week (2013-2017), Addis Ababa, Ethiopia 2018

In analyzing the data by month, the highest number of cases were reported in May 753(9.93%) followed by December 752(9.91%) and June 750(9.89%). Twenty-four (57.14%) of deaths were also reported in May and 9(21.43%) of deaths in August (Table 2.3).

Table3.3: Distribution of SAM cases and deaths by month (2013-2017), Addis Ababa, Ethiopia 2018

Month	SAM outpatient Cases n(%)	SAM inpatient Cases n(%)	Total SAM cases n(%)	Total SAM deaths n(%)
January	554(8.70)	64(5.25)	618(8.15)	1(2.38)
February	339(5.33)	84(6.89)	423(5.58)	2(4.76)
March	577(9.06)	73(5.98)	650(8.57)	0(0)
April	479(7.52)	77(6.31)	556(7.33)	0(0)
May	605(9.50)	148(12.13)	753(9.93)	24(57.14)
June	635(9.97)	115(9.43)	750(9.89)	1(2.38)
July	542(8.51)	90(7.38)	632(8.33)	2(4.76)
August	532(8.36)	104(8.52)	636(8.38)	9(21.43)
September	481(7.56)	116(9.51)	597(7.87)	1(2.38)
October	407(6.39)	110(9.02)	517(6.82)	0(0)
November	571(8.97)	131(10.74)	702(9.25)	2(4.76)
December	644(10.12)	108(8.85)	752(9.91)	0(0)
Total	6366(100)	1220(100)	7586(100)	42(100)

3.6 Discussion

A total of 7,586 Severe Acute Malnutrition (SAM) cases and 42 deaths were reported from Addis Ababa City Administration during the time period of 2013 to 2017. This gives an average incidence rate of 0.64%, mortality rate of 0.036 per 1000 population and case fatality rate of 0.69% for the time period of 2013 to 2017. The denominator used includes under 6 month children, due to lack of appropriate figure on these age groups to minimize from all under 5 age children. The number of cases were increasing from year to year in the last three consecutive years (2015-2017), with highest number of cases (1983) being reported in 2017. This increment may be due to the increment of street children, who didn't get their nutrition sufficiently. The increment of costs of food items, lack of strong nutrition related policies and irregular inspection of packed foods might also contribute for this increment of SAM cases. The increment might also be linked to the increased completeness rate of reporting and involvement of private health facilities in the surveillance and reporting which was not practical before 2015. Lack of strong coordination and weak participation of nutrition acting agencies might also contribute for the increment.

Although MOH had developed strategic objectives to decrease the prevalence of malnutrition in the country, the tangible improvement was not much satisfactory. Since the strategic objectives based on multisectoral collaborative development to address malnutrition, the work done only by MOH may not be sufficient to achieve these strategic objectives unless all acting sectors are working in coordinated manner. [6]

Majority of the cases were reported from Arada sub-city 2620(34.5%) and Kirkos sub-city 977(12.9%). Highest proportion of the inpatient cases were also reported from these two sub cities (Arada=71.7% and Kirkos=14.8%). This might be related to the presence of free medical care service at missionary of charity clinic found in Arada sub city. The highest number of cases in Kirkos sub-city might also related to the presence of high number of street children in the sub city.

A total of 42 deaths due to SAM were reported during 2013-2017 and more than half of the deaths 23(54.76%) were occurred in 2014, a year with smallest number of total SAM cases 968(12.76%). Although all sub cities had reported a number of SAM cases, all deaths were reported only from three sub cities (Arada sub-city (31 deaths, 73.8%), Kirkos sub-city (7 deaths, 16.7%) and Akaki kality sub-city (4 deaths, 9.5%)). Almost three-fourth of the deaths 31(73.8%) were from Arada sub-city (sub-city with highest number of cases). The highest case fatality rate was also seen in Arada sub-city (1.18%). This might be related to the highest number of cases or/and poor case management due to high case load. The highest number of cases were reported in May 753(9.93%). Twenty-four (57.14%) deaths were also reported in this month (May) which might be related to high number of cases in the month (May).

Since malnutrition decreases the immunity of an individual, malnutrition cases are also exposed to many communicable diseases. These communicable diseases have a potential for outbreak occurrence. Due to this each family and as a whole the country is obligated to cost for purchasing medical supply. The health facilities also overburdened compromising the normal health service provision. Family members of cases also waste their time to attend the cases rather than investing it for other productive activities. Therefore, this increasing and high prevalence of malnutrition and other outbreaks in the country creates bad picture for tourists and investors which will affect the country development creating high burden in the country.

The weekly PHEM surveillance system for malnutrition has only inpatient, outpatient and death variables. The data collected through the weekly PHEM surveillance system is not much informative due to collection of limited features/variables which lacks variables like age and sex. Although collection of data by woreda was started since 2018, data by woreda was not available till 2018. Lack of these pertinent variables restrict analysis and interpretation of cases by woreda, age group and sex, which is important for targeted planning, intervention and for effective use of limited resources. Besides this the report didn't include MAM cases, which is difficult to determine the incidence of MAM cases and total malnutrition cases (MAM and SAM). The proportion of MAM cases which progress to SAM cases were also not known. Having information on these variables had great value in minimizing SAM cases and deaths.

3.7 Limitations

The denominator used includes under 6 month children, due to lack of appropriate figure on these age groups. Incidence proportion by sub-city excludes cases seen in 2013, due to lack of population data by sub-city in the year. The analysis didn't reveal case distribution by age, sex and woreda/kebele, due to lack of these variables in the weekly PHEM surveillance reporting format. The PHEM report also didn't include MAM cases. These limitations also limit the scope of discussion.

3.8 Conclusion and Recommendations

As the analysis revealed, thousands of cases were threatened from malnutrition. This number is also underestimated due to exclusion of MAM cases in the weekly PHEM report. The number of SAM cases was increasing from year to year.

All MAM and SAM case data need to be collected and reported by all level of reporting units to have the right figure of malnutrition. MOH need to include the necessary variables such as age and sex in the weekly surveillance data reporting format to have full information of the cases. The federal government and Addis Ababa city administration need to strengthen the attention given to street children. Further research needs to be done by research institutes or any other interested to determine the predisposing factors. MOH should strengthen enforcing nutrition related policies and maintain regular inspection on packed foods. MOH also needto coordinate and strengthen multisectoral approach for malnutrition. MOH need to provide capacity building training for all health workers including HEWs and HDAs to transmit appropriate nutrition related massages. MOH need to use social medias to transmit nutrition related messages by local languages. MOH also need to maintain regular monitoring and evaluation of nutrition related interventions. Finally, MOH need to specify a cutoff point (threshod) to declare malnutrition outbreak.

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Chapter Four: Surveillance System Evaluation

4. Maternal Death Surveillance System Evaluation at Addis Ababa City Administration, Ethiopia, 2018

4.1 Abstract

Background: Public health surveillance is an ongoing, systematic collection, analysis, interpretation, and dissemination of data regarding a health-related event for use in public health. Public health surveillance systems should be evaluated periodically to improve quality, efficiency, and usefulness. Maternal Death Surveillance and Response is form of continuous surveillance linking the health information system to quality improvement processes from local to national levels. Ethiopia has been implementing Maternal Death Surveillance and Responsefor the last four years.

Objective: The objective of evaluating Maternal Death Surveillance and Response system at Addis Ababa City Administration was to evaluate the performance of existing system and provide information for better improvement of the system in city administration 2018.

Methods: A descriptive cross-sectional study design was used to evaluate Maternal Death Surveillance and Responsesystem at Addis Ababa City Administration, which was conducted from March 12-23/2018. Purposive sampling technique was used to select study units (best and least performing). The region, two sub-cities, four woreda, four health centers and two hospitals were selected. Primary data was collected using structured questionnaire and collected data was crosschecked with any available hard copy and soft copy documents. The data was analyzed using Microsoft Office Excel, 2016. An official letter was submitted to each study units to get permission for the evaluation.

Result: Sixty-seven percent (67%) of study units had appropriate denominator for Maternal Death Surveillance and Responseimplementation. The appropriate denominator at the regional level was 1168157 (34.6 % of total population). The action threshold used by all study units was one maternal death. All study units had maternal death review committee. A total 52maternal death notifications received by the region in 2009 EC, giving case detection rate 13% of national plan for the city. All notifications were true maternal deaths. Cause of death identified for 50(96.15%) of deaths and only findings from 7 (14%) deaths used for action. No separate budget was allocated for Maternal Death Surveillance and Responseat all levels. System implementation at private health facilities was almost neglected and overall average attribute measurement for the system was 63%.

Conclusion: Maternal Death Surveillance and Responsesystem establishment objectives will not succeed by current level of implementation and detection. Data utilization and attributes value was very low. Lack of separate budget affect system implementation negatively.

Recommendation: Federal Ministry of Health should allocate separate budget for Maternal Death Surveillance and Responseactivities. Capacity building trainings, regular supervision and feedbacks should be provided at all levels to increase attribute measurement value and data utilization. Private health facilities need special attention.

Key words: Maternal Death Surveillance and Response, Evaluation, Addis Ababa 2018.

4.2 Introduction

Public health surveillance is an ongoing, systematic collection, analysis, interpretation, and dissemination of data regarding a health-related event for use in public health action to reduce morbidity and mortality and to improve health (1-3). Data disseminated by a public health surveillance system can be used for immediate public health action, program planning, implementation and evaluation, measure the burden of a disease, monitor trends, early detection of epidemics, identification of emerging and reemerging health concerns, evaluate public health policy, detect changes in health practices and the effects of these changes, prioritize the allocation of health resources and provide a basis for epidemiologic research by formulating research hypotheses. Ultimately, the purpose for conducting public health surveillance is to learn the ongoing pattern of disease occurrence and the potential for disease in a population so that we can be effective in investigating, controlling, and preventing disease in that population and to link with public health action (4-6).

Public health surveillance activities are generally authorized by legislators and carried out by public health officials. Public health surveillance systems have been developed to address a range of public health needs. In addition, public health information systems have been defined to include a variety of data sources essential to public health action and are often used for surveillance (7). These systems vary from a simple system collecting data from a single source, to electronic systems that receive data from many sources in multiple formats, to complex surveys. The number and variety of systems will likely increase with advances in electronic data interchange and integration of data, which will also heighten the importance of patient privacy, data confidentiality, and system security. Appropriate institutions/agencies/scientific officials should be consulted with any projects regarding public health surveillance. Variety might also increase with the range of health-related events under surveillance (4).

Ethiopia had introduced Integrated Disease Surveillance and Response (IDSR) in 1996, focusing on 17 priority communicable diseases. Two years later, in 1998, the 48th WHO Regional committee for Africa adopted a resolution on integrated disease surveillance of communicable diseases. It is aimed to assist health workers to detect and respond to diseases of epidemic potential, diseases of public health importance, and diseases targeted for eradication and/or elimination through the available and effective control and prevention methods (8).

In integrated disease surveillance, the various surveillance activities become integrated into one system within the broader national health system. Recently federal ministry of health (FMoH) underwent the process reengineering, identifying the IDSR to be the core process to be evaluated. The IDSR was evaluated and identifying its strength and weakness, was recommended to establish Public Health Emergency Management (PHEM) as of 2009. One of the major activities of PHEM is to take over the diseases surveillance parallel to preparedness, response and rehabilitation in any health related emergencies and outbreaks (9).

The public health system is continually challenged by recurrent and unexpected disease outbreaks and is facing the challenge of managing health consequences of natural and man-made disasters, emergencies, crises, and conflicts. These problems continue to disrupt the health care system, while successful detection and response to these challenges is becoming increasingly complicated (10).

Since conducting surveillance for all health problem consumes time and other resources, the National Public Health Emergency Management Center (NPHEMC) identified 22 priority diseases and events based on their Public health importance, potential to cause outbreaks, disease of international concern, diseases on eradication or elimination, availability of control and prevention measures, and capacity of the health system to implement available control and prevention measures for the health problem. Additional to the 22 prioritized diseases and events, PHEM is also monitoring any cluster of cases and any unusual presentations. Out of these 22 prioritized diseases and events 14 are weekly reportable while 8 are immediately reportable (9, 11). According to the national PHEM guideline of the country, maternal death is one of immediately reportable health related event (9).

Maternal Death Surveillance and Response (MDSR) is relatively new surveillance system linking the health information system and quality improvement processes from local to national levels. It includes the routine identification, notification, quantification, and determination of causes with the aim of providing information that effectively shows the true magnitude of maternal mortality and guides actions to eliminate preventable maternal mortality at a health facilities and community level (12).

According to WHO technical guide line for MDSR, there are four basic processes/activities in the implementation of MDSR system. These basic activities are Identification and notification of a suspected maternal death (community or facility death), Review of maternal death by local maternal death review committee, analysis and interpretation of aggregated findings from the review and finally implement and monitor recommendations made by the review committee (13).

During the last two decades, maternal mortality level in Ethiopia reduced by 71% from its level in 1990 (1250/100,000 live births to 353/100,000 live births in 2015). However, this achievement still short of the country's target to reach 267/100,000 live births by 2015 (14, 15). According to the 2016 Ethiopian DHS, maternal mortality ratio (MMR) is around 412/100,000 live births (16). The government of Ethiopia has developed the five-year (2016 to 2020) health sector transformation plan (HSTP) and RH strategy for 2016-2020, putting reduction of maternal and perinatal deaths as a top priority (17). WHO and other partners are on the process of implementing this new approach towards maternal death specifically on 75 high-burden countries that account for 95% of maternal deaths (18).

Ethiopia is one of the countries with a higher number of maternal deaths. There has been effort in the country to improve access of essential health service to the population with specific focus on mothers and children. Following this, Ethiopia has been implementing MDSR for the last four years to address preventable maternal deaths following the 2013 WHO technical guidance. The national MDSR database receives reports and case summaries from all regions in the country (19, 20).

The main aim of establishing MDSR system is to provide accurate information on the magnitude of maternal deaths and about preventable factors that contribute to a maternal death which attracts attention of policy and decision makers, and guides actions that need to be taken at the each level and assess the effectiveness of these actions to prevent maternal deaths. To achieve its aim, MDSR system uses community and facility based surveillance system (21).

For a maternal death happening at a community the HEWs will collect and compile detail information about the event by interviewing key informants such as local Health Development Army (HAD), religious leaders, administrative leaders, community members and family members. Any of these individuals report a death of a woman of reproductive age (15-49 years) to HEWs. The HEWs intern notify to her supervisor, and the supervisor report to a health facility. MDSR review committee at that health facility will arrange verbal autopsy (VA) to be conducted. The MDSR review committee of the health facility will complete the VA by interviewing individuals who attended the women during illness, in labour and delivery (for home delivery), a Person who were present at the time of death and any person who is likely to have additional details on the woman's experiences during pregnancy such as husband and children (21)

For a maternal death happening at a health facility, MDSR review committee use referral sheets, medical records, attending health workers (OPD, maternity ward, operation room) and Log books to complete VA (21).

To do all maternal reviews, a consent after informed decision of the participants need to be obtained and confidentiality should be maintained. The national guideline for MDSR recommends to use different information dissemination methods, starting from presentation on meetings to scientific publications and audio visual reports, ensuring that the information gets to reach the right audience (who can act on the recommendations) (21).

WHO estimates show that the leading causes of maternal deaths in the world are hemorrhage and hypertension, which together account for more than half of all maternal deaths. Indirect causes, which include deaths due to conditions such as Malaria, HIV/AIDS and cardiac diseases, account for about one fifth of maternal deaths (10).

In developing countries hemorrhage and hypertension are among the top three causes of deaths in both South Asia and Sub-Saharan Africa. The majority of maternal deaths in developing

countries are due to five major direct obstetric complications: hemorrhage, infection, unsafe abortion, hypertensive disorders of pregnancy, and obstructed labour (22, 23).

Like any other developing countries, Ethiopia is also affected by the above causes of maternal mortality. A systemic review conducted by Yifru Berhan and Asres Berhan on eight facility based maternal death studies conducted from 1980 to 2012 indicates that the top four causes of maternal mortality in the year 1980-1999 were abortion related complications (31%), obstructed labor/uterine rupture (29%), sepsis/infection (21%) and hemorrhage (12%). In the last decade, however, the top four causes of maternal mortality were obstructed labor/uterine rupture (36%), hemorrhage (22%), hypertensive disorders of pregnancy (19%) and sepsis/infection (13%) (24).

Maternal death is a very complex event to understand the contribution and association among risk factors of it. These complex risk factors can be categorized in to biological factors (age, parity, birth spacing), socio economic factors, health system and health facility associated factors (25).

Public health surveillance systems should be evaluated periodically, and the evaluation should include recommendations for improving quality, efficiency, and usefulness. Evaluation of a public health surveillance system focuses on how well the system operates to meet its purpose and objectives. The evaluation of public health surveillance systems should involve an assessment of system attributes, including simplicity, flexibility, data quality, acceptability, sensitivity, predictive value positive, representativeness, timeliness, and stability. Because public health surveillance systems vary in methods, scope, purpose, and objectives, attributes that are important to one system might be less important to another. A public health surveillance system evaluation should emphasize those attributes that are most important for the objectives of the system (4).

It is important to monitor data quality and thus ensure that the collected data are meaningful so they meet the objectives of local, national and international surveillance systems. The quality of the initial data may determine the data quality at all stages of the reporting process. Monitoring data quality also helps to improve data analysis and interpretation in public health reports at all levels. The purpose of evaluating maternal death surveillance system at Addis Ababa City Administration was to ensure that maternal death is being monitored effectively and efficiently with quality data provision and utilization to achieve its establishment objectives.

4.3 Objective

General objective

The general objective of evaluating maternal death surveillance system at Addis Ababa City Administration was:

- To evaluate the performance of existing maternal death surveillance system and provide information for better improvement of the system at Addis Ababa City Administration 2018.

Specific objectives

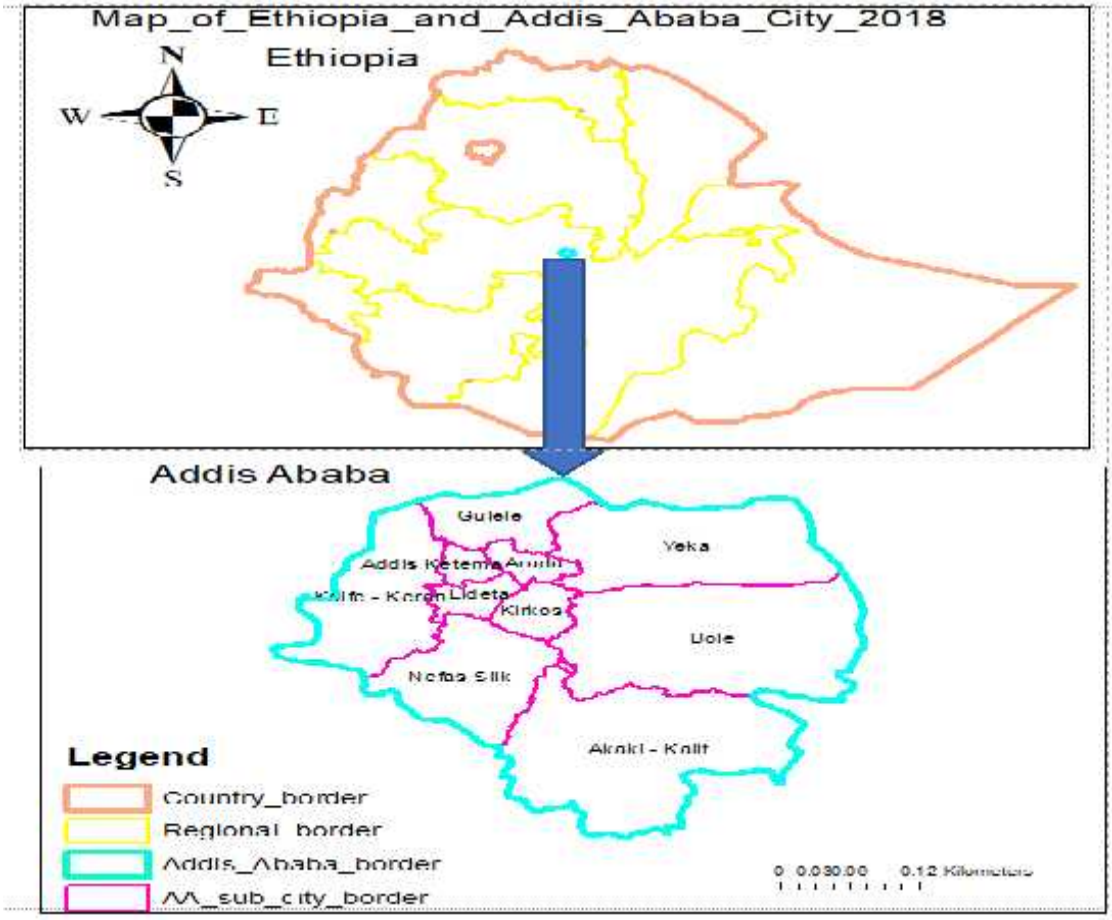
The specific objectives of evaluating maternal death surveillance system at Addis Ababa City Administration, March 2018 were:

- To assess the performance of MDSR system in relation to death detection, reporting
- To identify gaps and challenges in implementing the system (logistic, training, supervision and feedback)
- To determine whether information generated from the system are used for action
- To evaluate the maternal death surveillance system attributes

4.4 Methods

Study area and population

This MDSR system evaluation was carried out at Addis Ababa City Administration (capital city of Ethiopia). The city has been divided in to ten sub-cities and 116 woredas. The population of Addis Ababa was projected to be 3,433,999 based on 2007 population enumeration with yearly growth rate of 3.8% and population density of 5,165/km2. The population of the city administration is increasing due to increased migration of peoples from rural areas to the city. The total area of the city administration is 530.14km2. The study populations were all females in the age group of 15 to 49 years. The city had an international airport which enables peoples in the world to contact within hours of travel. (26, 27)



Map 6:Map of Ethiopia and Addis Ababa 2018.

Study design

A descriptive cross-sectional study was conducted at Addis Ababa City Administration.

Study period

This maternal death surveillance and Response system evaluation project was carried out from March 12-23/2018.

Sampling technique

Purposive sampling technique was used to select two sub-cities (Kolfe Keraniyo and Nefas silk sub-cities) out of ten (10) sub-cities found in the city administration of Addis Ababa. In communication with the City Administration PHEM (MDSR focal person), one best performing sub-city and one least performing Sub-city was selected. Similarly, two woredas and two hospitals from each sub-city was selected. Lastly one health center from each woreda was selected. Since there was no government hospital in Nefas silk sub-city, S.t Paul Hospital (with high maternal death report) from Gulele sub-city was included. Finally, data was collected from 13 study units (the regional PHEM, two sub-city PHEM, four woreda PHEM, four health centers and two hospitals)

Study units

The study subjects were Addis Ababa City Administration Health Bureau Public Health Emergency Management (PHEM) unit, Kolfe Keraniyo and Nefas silk sub-cities PHEM unit, selected four woredas PHEM unit and selected two hospitals and four health facilities.

Data collection tool

A structured questioner used for evaluating maternal death surveillance and response system in another previous study was used with some amendment.

Data collection method

Pertinent primary data to evaluate MDSR system was collected from each study participants by using pre-prepared questioner. Secondary data from available documents related to maternal death surveillance was also reviewed and used to cross check with the primary data. MDSR related reports and guidelines were also observed.

Data quality control and analysis

Data collected at each level was crosschecked with each other and data available at national level. It was also cross checked with any available document (hard copy and soft copy) related to maternal death at each level. The completeness of the data variables was checked for most of the respondents. Observation was also conducted to confirm some responses like availability of reports. The collected raw data was entered and analyzed using Microsoft Office Excel, 2016.

Dissemination of finding

The final result of the project will be submitted to Addis Ababa University College of Health Sciences Department of Field Epidemiology, FMOH, EFELTP, Addis Ababa City Administration Health Bureau PHEM unit and Ethiopian Public Health Institute.

Ethical clearance

An official letter was submitted to Addis Ababa City Administration Health Bureau PHEM unit which was cascaded to selected Sub-cities, woredas and health facilities to get permission for the evaluation.

Operational definition

Acceptability: Acceptability reflects the willingness of persons and organizations to participate in the surveillance system (28).

Active surveillance system: is a system that is 'based on the public health officials' initiative to contact the physicians, laboratory or hospital staff or other relevant sources to report data (29).

Completeness: proportion of all expected data reports that were actually submitted to the public health surveillance system (29).

Comprehensive surveillance systems: include reports of cases of infectious diseases that occur within the whole population of the geographical area covered by the surveillance system (29).

Data Quality: the completeness and validity of the data recorded in the public health surveillance system (29).

Direct Obstetric Deaths: Deaths resulting from obstetric complications of the pregnant state (pregnancy, labour and puerperium), from interventions, omissions, incorrect treatment, or from a chain of events resulting from any of the above (21, 13).

Flexibility: A flexible public health surveillance system can adapt to changing information needs or operating conditions with little additional time, personnel, or allocated funds (28).

Indirect Obstetric Deaths: Deaths 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 (21, 13).

Maternal Mortality Rate: The number of registered deaths among women, from any cause related to or aggravated by pregnancy or its management (excluding accidental or incidental causes) during pregnancy, childbirth or within 42 days of termination of pregnancy, irrespective of the duration or site of the pregnancy, for every 100 000 live births in a given year or period of time (30).

Passive surveillance: relies on the physicians, laboratory or hospital staff or other relevant sources to take the initiative to report data to the health department (29).

Population under surveillance: defined as targeted groups (risk groups) which is determined according to objectives of the surveillance system and should take into account feasibility (29).

Representativeness: describes the occurrence of a health-related event over time and its distribution in the population by place and person (28).

Sensitivity: The sensitivity of the surveillance system is the number of cases reported by the surveillance system or 'true cases' (a), divided by the number of cases (a+c) in the community (31).

Simplicity: The simplicity of a public health surveillance system refers to both its structure and ease of operation, while still meeting their objectives (28).

Stability: refers to the reliability and availability of the public health surveillance system (29).

Timeliness: reflects the speed between steps in a public health surveillance system (28).

Usefulness: implies that surveillance results are used for public health action. (28).

4.5 **Result**

The respondents were in the position of Regional MDSR focal person, disease prevention case team coordinator, sub-city PHEM officers, woreda PHEM officers and health facility surveillance focal persons. MDSR system implementation was launched in May 2013 by FMOH as stand-alone parallel data collection and analysis system by MCH department with overall goal of improving quality of care and elimination of preventable maternal deaths. MDSR was integrated into the existing Public Health Emergency Management (PHEM) system and has been added as the 21st national notifiable diseases and conditions in 2014.

General Information

Sixty- seven percent (67%) of study units had appropriate denominator for MDSR system implementation. The population included in Maternal Death Surveillance and Response (denominator) in the city administration of Addis Ababa were all women in the age group of 15 to 49 years. The appropriate denominator for the system at the regional level was 1188164 (34.6 % of the total population). The common type of surveillance used for MDSR in the city administration was comprehensive passive surveillance. The national PHEM guideline and MDSR guideline were available at 91.67% and 92.31% of study units, respectively. All other recommended formats for MDSR were available at all reporting levels. Although the region didn't lack any of the recommended formats for MDSR in the last year (2009 EC), 33.33% of health facilities lacked clinical register for maternal death. The action threshold used for MDSR at all study units was one maternal death and 69.23% of study units had the capacity to respond for a maternal death within 48 hours. Lack of timely notification, poor coordination and communication and shortage of supply were raised as an obstacle for providing timely response, within 48 hours. Generally MDSR system implementation at private health facilities was almost neglected.

Framework of MDSR implementation

Although everybody is expected to report maternal death, there was a responsible person for collecting, analyzing, documenting and reporting PHEM data including MDSR data at all level of reporting units. These responsible persons are PHEM Officers, health facility surveillance focal persons, HEWs, HDA), MDSR focal, HMIS focal and RRT committee. Although there was irregular MDSR data analysis at woreda level, regular and detail analysis was performed at sub-city and regional level by PHEM officers, MDSR focal persons and RRT committee. MDSR data was collected, analyzed and reported in daily, weekly and as needed. The data was described epidemiologically by place, person and time that was summarized by table, graph and maps especially at sub-city and region level.

Maternal death review committee

All study units had a maternal death review committee from region to health facility level. The members of the review committees were medical directors, health facility surveillance focal, laboratory expert, pharmacy, senior midwife, MCH case team, disease prevention and health promotion owner, gynecologist, anesthetist, HEWs focal and HEWs supervisor. They were using maternal death review guide annexed in the MDSR national guideline.

There were 10 community based and 42 facility based maternal death notifications to the region in 2009 EC. This gives case detection rate 13% of national plan and 130% of the regional plan for the region. Death review was conducted for all 52 deaths (100%) and all notifications were true maternal deaths after verified by regional maternal death review committee. The review committee was able to identify risk factors for 50 (96.15%) deaths, of which only findings from 7 (14%) deaths were used for action or action plan developed. This was due to lack of resource, poor coordination, low attention and follow-up at each level.

Ninety-one percent (91%) of study units had a separate maternal death preparedness and response plan which was evaluated for last year performance (2009EC).

Reports

Fifty-four percent (54%) of study units didn't posted the reporting flow chart on the wall of their office. The analysis result of MDSR data was shared to staffs and other stakeholders by presenting it on Technical Working Group (TWG) meeting, printed report, morning session, email and phone call. A total of 44 (84.6%) reports were complete with no blank or/and unknown responses at the regional level. The reporting completeness and timeliness of MDSR data at regional level in 2009EC was 98.61% and 74% respectively. Sixty-nine percent (69%) study units believe that the reporting completeness and timeliness can be improved by providing continuous monitoring, feedback, supervision and utilizing electronic based reporting systems like DHIS 2.

Training

Seven (87.5%) regional PHEM Officers, 18(90%) sub-city PHEM officers and 88(75.2%) woreda PHEM Officers were trained on PHEM prioritized diseases surveillance system for 13 days and 6(75%) regional PHEM Officers, 18(90%) sub-city PHEM officers and 116(99.2%) woreda PHEM Officers were trained on MDSR for 3 days by EPHI. The regional and sub-city health bureaus had also given PHEM disease surveillance training for their staffs. The change after training were not monitored by all levels.

Supervision and feedback

Irregular supervisions and feedbacks were provided to all sub-cities, woredas and health facilities by the higher level of the government structure. Seventy-seven percent (77%) and 61.54% of study units were supervised and received feedback at least one time by the next higher level of governmental structure in 2009EC, respectively. All sub-cities (10) in the city administration was supervised at least one time in the last year (2009 EC) by the region, but no supervision was done from the national. Fifty-four percent (54%) of study units had conducted at least one-time meeting with the community related to MDSR in the last year (2009EC).

Logistics

All necessary emergency drugs were available and no medical supply shortage was faced at all level of reporting units. Although, there was no separately allocated budget for MDSR system implementation at all level and it is included in general PHEM budget. The system also had got fund from partners such as WHO at regional level. There was also high supply shortage to effectively implement MDSR activities such as printer, vehicle, stationery, fax, email, projector etc.

The following points were suggested by the study units to improve MDSR system implementation:

- Maintain regular supportive supervision and follow-up by all level government structures
- Attract and motivate senior health professionals and partners working on MDSR
- Create community awareness on MDSR and change bad community attitudes towards it
- Use MDSR data for promotion to attract the attention of leaders and community
- Allocate separate MDSR budget and other supplies such as vehicle for MDSR related activities
- Provide capacity building trainings for maternal death review committee and untrained staffs including private health facility workers
- Use opportunities like trainings and meetings to integrate and strength MDSR activities with other PHEM activities
- Strengthen communication and coordination between all level stakeholders on MDSR

Attribute measurement

Simplicity

Seventy-seven percent (77%) study units perceive MDSR system was easy and manageable to collect and analyze maternal death data and 92.31 % of study units perceived the case definition of MDSR was easy to be used by all level health workers. Half of the study units believe MDSR system doesn't take much time and have no influence on other activities and 92.31 % believe the system was integrated with other PHEM surveillance systems. Sixty-nine percent (69%) of perceived that data collection formats used by the system were clear and easy to be filled by all level data collectors. It was also believed MDSR system doesn't need high level training (can be done just by simple orientation) by 15.38 % of study units and 53.85 % of study units believe it was easy to report to the higher level by using available means of reporting systems. Generally, 63.46% of study units agreed that MDSR system was simple for implementation.

Table 4.1: Distribution of study units by simplicity measurement for MDSR, Addis Ababa, 2018.

Simplicity Measurements	Agree (%)	Neutral %)	Disagree (%)
The data sources of MDSR is easy and manageable	76.92	15.38	7.69
The case definition for maternal death is easy to be used by all level health workers	92.31	0.00	7.69
MDSR system doesn't take much time and have no influence on other activities	50.00	33.33	16.67
MDSR data analysis is easy and manageable	75.00	8.33	16.67
The type of data collected are clear and easy	46.15	38.46	15.38
The system (MDSR) is integrated with other surveillance systems	92.31	7.69	0.00
Data collection formats are clear and easy to be filled by all level data collectors	69.23	7.69	23.08
To work in the system, it doesn't need a high-level training (can be done just by orientations)	15.38	23.08	61.54
Methods of disseminating MDSR data to whom concerned are easy and manageable	53.85	7.69	38.46

Flexibility

Fifty-eight percent (58%) of study units perceived that MDSR system was flexible enough to adopt to the user's improvement demands (new case definitions, new data, new technology, new reporting sources etc).

Acceptability

Thirty-nine percent (39%) of study units noticed staffs working on MDSR were satisfied and well accepted the current system. Thirty-one percent of study units identified that health professionals working on MDSR were comfortable when assigned to participate in verbal autopsy activities. The overall acceptability of MDSR system by the health workers working on it was 34.62%.

Sensitivity

Eighty-five percent (85%) of study units agreed that the system picks most maternal deaths occurring in the city administration.

Predictive value positive

Sixty-four percent (64%) of study units had appreciated that most of the deaths (all of the deaths at regional level) reported in the system were actual maternal deaths.

Representativeness

Sixty-seven percent of study units believed that the report of maternal death represents the situation in the city administration.

Timeliness

Fifty-eight percent (58%) of study units believed MDSR data was submitted on expected time limit.

Cost

Sixty-nine percent (69%) of study units agreed on MDSR system was cost effective compared to the benefit it provides.

Usefulness

Seventy-five percent (75%) of study units agreed the system have an ability to estimate the incidence of maternal deaths and is able to show the trend of maternal deaths in the city administration. Ninety-two percent (92%) of study units believed that MDSR system had ability

to show the progress and effect of preventive and control methods applied to decrease the death of mothers and help the health facilities to improve clinical and ethical practices. It was believed that the system had ability to indicate major causes of maternal deaths in the city administration by 83.33% of study units and 75 % of study units also believed that MDSR data can stimulate research on maternal death. Sixty-seven percent (67%) of study units agreed the data from MDSR can be used for decision making. Generally, 79.85% of study units agreed that MDSR system was useful if it is implemented as intended.

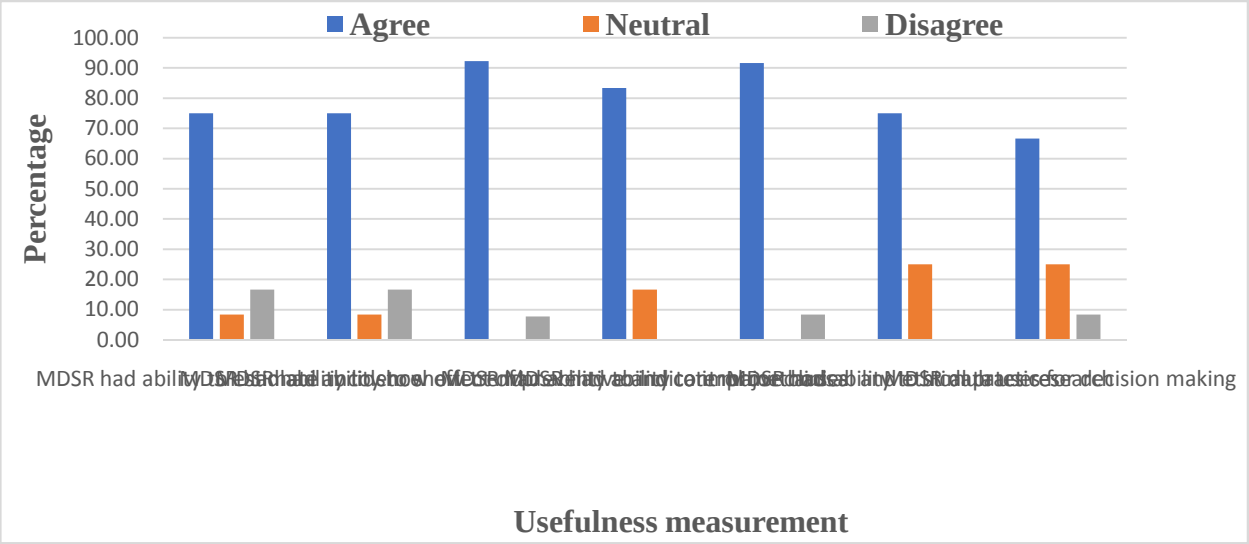


Figure 4.1: Distribution of study units by usefulness measurement for MDSR, Addis Ababa, 2018.

Stability

Seventy-five percent (75%) of study units agreed that MDSR data was ready for use when needed for planning and other purposes and 16.67 % of study units believe the system was interrupted due to lack of resources within last year (2009EC). The new BPR restructuring had affected the procedures and activities of MDSR as 36.36 % of study units agreed.

Data quality

Seventy-five percent (75%) of study units agreed MDSR data collection forms were clear and 76.92 % study units agreed most (not specified) MDSR data collectors were trained on MDSR system. Fifty-five percent (55%) of study units agreed that most of the records were complete. Seventy-three percent (73%) of study units agreed that collected data were consistent with the event (maternal death) and 63.64 % of study units agreed the quality of MDSR data was as expected. The overall MDSR data quality in the city administration was 68.57% and 62.73% of study units agreed on the overall average attribute measurements of the system.

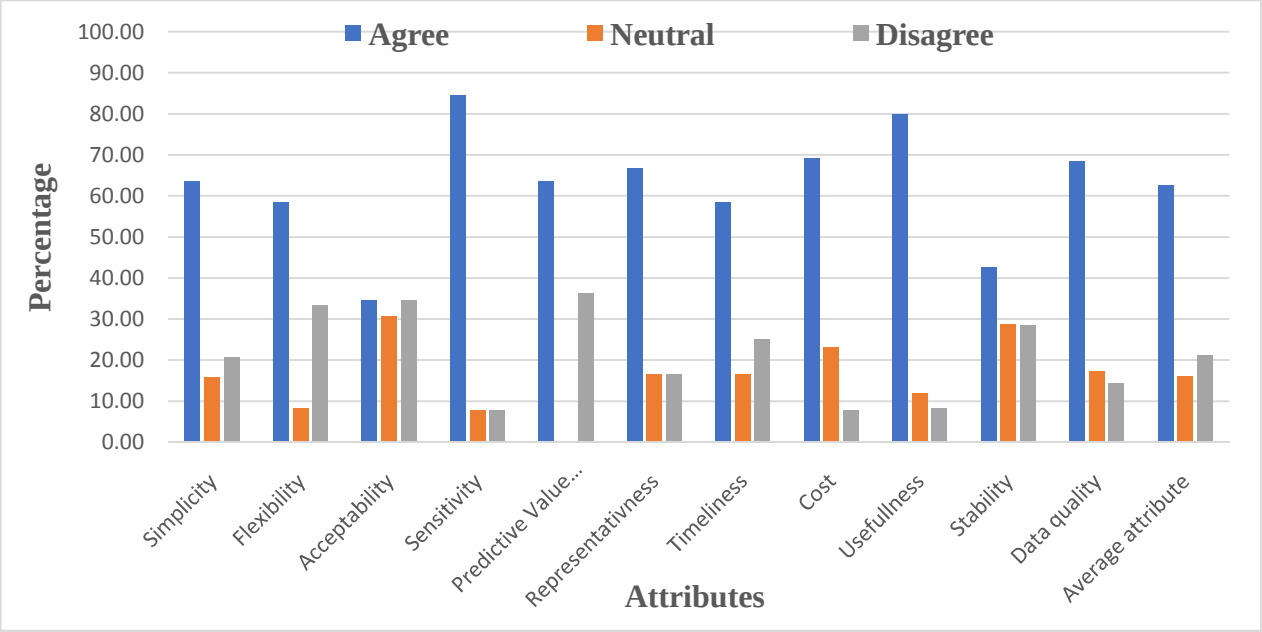


Figure 4.2: Distribution of study units by attributes measurement for MDSR, Addis Ababa,2018.

4.6 Discussion

Sixty-seven percent (67%) of study units replied that they had appropriate denominator for MDSR system implementation, but 55.56% of them didn't put the exact number of the denominator. This might indicate the data quality problem and 33% of the study units didn't know the denominator used for MDSR. The common type of surveillance used for MDSR in the city administration was comprehensive passive surveillance. The system is relatively young (launched in 2013) and it is not fully strengthened, therefore active surveillance was also used frequently. [30]

Most of the regional, sub-city and woreda PHEM Officers were trained on PHEM disease surveillance and MDSR by EPHI. The regional and sub-city health bureaus had also given PHEM disease surveillance training for their staffs including staffs from health facilities. The presence of at least one concerned health professionals almost from all reporting levels were indicated as strength of the training while short period of training, exclusion of private health facilities and MDSR committee from the training were seen as weakness of the training. Additionally, the presence of technical advisors from partners at regional level was seen as an opportunity to share their experience in the training. Although, most of the data collectors at each level were trained on MDSR, some of the current data collectors at community and woreda level were not trained due to high trained staff turnover. Therefore, it might be important to put a minimum duration of time to serve after a training.

Maternal deaths at a health facility were not registered appropriately. This was due to lack of clinical register for maternal deaths and clinical register were available only in 66.67% of health facilities.

The action threshold used for MDSR in the city administration was one maternal death and 69.23% of study units replied that they had the capacity to respond for a maternal death within 48 hours. However, this capacity depends on the factors contributing to the death of the mother and timely availability of the information. From the time in which a death of a woman happens to notification, identification of risk factors and development and implementation of action plan takes a minimum of three weeks. Therefore, response to a maternal death will be started after minimum of 21 days if the risk factor for the death of the mother was not identified. Lack of timely notification, poor coordination and communication and shortage of supply were raised as an obstacle for providing timely response.

All of the study units had maternal death review committee from the region to health facility level. Eight percent (8%) of study units had no separate maternal death review committee but the rapid response team (RRT) is doing all expected activities to be done by the maternal death review committee. The members of the review committees were medical directors, health facility

surveillance focal, laboratory expert, pharmacy, senior midwife, MCH case team, disease prevention and health promotion owner, gynecologist, anesthetist, HEWs focal and HEWs supervisor. These members of the committee may not be similar in profession composition and number of members at each reporting level and site.

There were 10 community based maternal death notifications to the region in 2009 EC, of which 4 (40%) of deaths were notified immediately while all deaths were included in the weekly report. There were also 42 facility based maternal death notifications, of which 10 (23.81%) of the deaths were notified immediately, while all deaths were included in the weekly report. This gives maternal death incidence rate of 4.45 per 100,000 mothers and case detection rate of 13% of national plan and 130% of regional plan. Although most of the study units respond that the system picks most maternal deaths, representative and was able to show the trend of maternal deaths in the city administration, it is far from the national plan, case detection rate was too law, not representative and can't show the real maternal death trend of the city administration. However, the original residence for some (not specified) of the died mothers were not Addis Ababa City administration. They came from other regions to seek better treatment and died at a health facility found in Addis Ababa. These deaths were notified to Addis Ababa Regional Health Bureau (AARHB) and communicated to the region they came from to be investigated by the regional health bureau.

Fifty-four percent (54%) of study units said that the reporting flow chart were not posted on the wall of their office. Lack of space on the wall of the office and exclusion as performance indicator were raised as a reason for not posting the reporting flow chart. The analysis result of MDSR data was shared to staffs and other stakeholders by presenting it on Technical Working Group (TWG) meeting, printed report, morning session, email and phone call. The regional plan to share the update to stakeholders was every two months but it was not done regularly. Notification to the next higher level was maintained on daily and weekly basis by all level of reporting units. A total of 44 (84.6%) reports were complete with no blank or/and unknown responses at the regional level. In reports which were not complete (15.4%), educational status, ethnicity, appropriate code, date of death, age and preventability were commonly missed variables in the report.

Only 63.46% of study units were agreed MDSR system was simple for implementation and the acceptability of MDSR system by the health workers working on it was 34.62%. These rates are too low to achieve the MDSR establishment goal. The maternal death review committee has a feeling of blaming culture to do maternal death review and this has decreased the system acceptability by the health professionals working on it. Besides this, lack of separate budget and other supplies such as vehicle for MDSR activities decreases staff satisfaction and system acceptability and make system implementation difficult.

Fifty-eight percent (58%) of study units believed that MDSR data was submitted on expected time limit. The study units had also suggested availing cell phone and air time fee and email

access help to improve the reporting timeliness. Sixty-nine percent (69%) of study units replied that the MDSR system was cost effective compared to the benefit it provides. They also believe this effectiveness will increase if it is implemented as expected with its own budget. Eighty percent (80%) of study units agreed that MDSR system was useful if it is implemented as intended. They had also suggested use of MDSR data for planning, budget allocation and attracting official's attention, continuous follow-up, feedback and supervision will help to further improve the usefulness of the system. Almost 17% of study units said the system was interrupted due to lack of resources within last year (2009EC and 36.36 % of study units agreed the new BPR restructuring had affected the procedures and activities of MDSR. This effect might be due to structure change or/and trained staff shift. This indicates the problem of the system in relation to consistency/stability. Since right data enables for appropriate planning and resource mobilization, wrong data causes inappropriate planning and wastage of limited resources. Therefore, the quality of the data collected through MDSR system need to be given high attention. As 68.57% study units agreed, MDSR data quality in the city administration was as maintained.

The evaluation team had noticed very low motivation and awareness on MDSR among the respondents. This was justified as inconsistent and inappropriate response were given for some of the questions, even they didn't understand after explanation of questions. Respondents had also appointed the evaluation team repeatedly to fill the questioners but without any progress.

Since MDSR system was relatively young (implementation started in 2008EC) it was being implemented in governmental health facilities and almost neglected implementation in private health facilities. Due to this reason the evaluation was done only on governmental health facilities. If private health facilities were included in the evaluation, the result might be totally different from this finding.

4.7 Limitation

Some the respondents had knowledge gap on MDSR and some of the results were not presented numerically. The evaluation excluded private health facilities, which might have a different finding and understanding of this evaluation finding need to consider these limitations.

4.8 Conclusion and Recommendation

The case detection rate of the system was very low and not representative of all maternal deaths occurred in the city administration. The value of system attributes was also very low and it might be impossible to achieve the system objectives unless the value it is improved. MDSR system establishment objectives cannot be fulfilled by the current level of implementation.

A separate budget need to be allocated at all levels of reporting units for MDSR related actvities. Capacity building trainings for staffs working on MDSR, regular supervision and feedbacks should be provided continuously by all level of the government structures. It is also critical to monitor the availability of trained staffs and the change after trainings. An agreement might need to be considered before trainings to serve at least for a fixed period of time. Attention should be given to private health facilities in order to achieve the system establishment objective by working coordinately with all stakeholders. The regional MDSR plan need to be align with the national plan.

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Chapter Five: Narrative summary of disaster situation visited

5. Summary Report on Internally Displaced Populations at Kochere and Yirgachefe Woredas Found in Gedeo Zone of SNNP Region, Ethiopia, 2018

5.1 Abstract

Introduction: Internally Displaced Persons are persons or groups of persons who have been forced to leave their places of habitual residence, who have not crossed an internationally recognized state border.At the end of 2017, 68.5 million people worldwide were in need of protection and assistance as a consequence of forced displacement. Recent (2018) United Nations High Commissioner for RefugeesEthiopia report indicates over 2.8 million people in Ethiopia were internally displaced due to internal conflicts and climate induced factors.

Objective: The objective of the study was to describe the burden of the displacement and gaps seen during humanitarian response in Yirga chefe and Kochere woredas found in Gedeo zone of South Nation Nationalities and Peoplesregion, Ethiopia 2018.

Methodology: The study was conducted at Yirga chefe and Kochere woredas of Gedeo zone, South Nation Nationalities and Peoplesregion, Ethiopia from August 21 to October 15/2018. A descriptive cross-sectional study was conducted to study the situation of Internally Displaced Persons. Data was collected by using nationally developed data collection tools for Internally Displaced Persons. Additional data was also collected by in-person observation of situations and by attend meetings. Data was analyzed by using Microsoft excel 2016. Permission to study the Internally Displaced Personssituation in these two woredas was obtained from the national Public Health Emergency Management, Yirga chefe and Kochere woredas health offices.

Result: There were repeated (four times) inter-border conflicts betweenSouth Nation Nationalities and Peoplesand Oromia region at the border of Gedeo zone of South Nation Nationalities and Peoplesregion and Guji zone of Oromia region**.** These repeated conflicts were happened due to the issue of land use. Zonal level Emergency Operation Center was established and activated on 7 July, 2018 to coordinate humanitarian responses. A total of 103,415 and 163,560 population was displaced from Kochere and Yirga chefe woredas, respectively. Of these total Internally Displaced Persons35,285 were under 5 and 11,172 Pregnant and Lactating Women. A total of 28 deaths and 68 injuries were reported from Kochere woreda during the conflict and 631 injuries from Yirga chefe woreda. Initially 8230 unaccompanied children were identified from Kochere woreda. A total of one health centers and three health posts were damaged totally and three health posts damaged partially by the conflict. Twelve schools were also damaged, 11 schools in Kochere woreda and one school in Yirgachefe woreda. Following a series of peace and reconciliation efforts by Aba Gedas (traditional leaders) the government led

return process commenced in mid-August. According to the woreda administrations report, as of 25th September/2018, a total of 156,574 (94,736 from Yirga chefe and 61,838 from Kochere) Internally Displaced Peoples had returned to their original place of residence. Generally IDPs were living in a harsh condition and in need of basic needs. There was no outbreak occurred following the displacement. Response clusters were being challenged by lack of appropriate and timely information regarding Internally Displaced Peoples.

Conclusion: The conflict had displaced hundred thousand of people and cause a lot of infrastructure and civil document damage. Many heads of a household, children and PLW were killed, normal community connections and livelihood were disrupted. Lack of appropriate and timely information regarding location and number of Internally Displaced Peopleswere a challenge during response activities.

Recommendation: The coordination cluster need to provide timely and clear information..Ministry of Health and Ministry of Education need to reconstruct and replace damaged health facilities, schools and necessary materials in collaboration with other stakeholders. The protection cluster together with the woreda administration need to do an assessment on lost civil documents and should be replaced. The national and regional governments should work to resolve the root cause of the conflict.

Key Words: Internally Displaced Persons, Kochere and Yirga Chefe woredas, Gedeo zone, South Nation Nationalities and Peoples region, Ethiopia 2018.

5.2 Introduction

Statement of the problem

The definition of internally displaced persons (IDPs) most commonly used comes from the United Nation's (UN) Guiding Principles on Internal Displacement. The Guiding Principles define IDPs as "persons or groups of persons who have been forced or obliged to flee or to leave their homes or places of habitual residence, in particular as a result of or in order to avoid the effects of armed conflict, situations of generalized violence, violations of human rights or natural or human made disasters, and who have not crossed an internationally recognized State border. [1]

The UN Refugee Agency, the UNHCR, distinguishes between refugees and internally displaced persons as follows: “Both groups often leave their homes for similar reasons. Civilians are recognized as ‘refugees’ when they cross an international frontier to seek sanctuary in another country. The internally displaced, for whatever reason, remain in their own states. [2]

The effect of internal displacement on IDPs themselves, as well as on the local authorities and communities that host them, can be devastating. While the act of displacement itself often may violate the human rights of those affected, the subsequent loss of access to homes, lands, livelihoods, personal documentation, family members, and social networks can negatively affect the ability of IDPs to assert and enjoy an entire range of fundamental rights. [3]

Traumatic life events due to war, disasters, torture and mass violence are known to lead to serious psychological consequences and mental disorders. Such traumatic events include lack of food, water, shelter and medical care, imprisonment, combat and injury, abuse and isolation, torture, and murder and death of the subject or family. Dose-effect relationships have also been reported between the cumulative trauma and the psychiatric consequences. [4, 5, 6, 7, 8, 9]

Globally in 2017, 40 million people were internally displaced as a result of conflict and persecution, while 25.4 million were refugees and 3.1 million were asylum-seekers. Most refugees nowadays live in urban areas (58%), not in camps or rural areas. Of the global refugee population, 52% are children under 18 - the highest proportion in a decade – including many who are unaccompanied or separated from their families. At the end of 2017, 68.5 million people worldwide were in need of protection and assistance as a consequence of forced displacement, as per UNHCR, the UN Refugee Agency. This is the equivalent of a person becoming displaced every two seconds. [10]

The EU is a leading international donor in forced displacement situations. In 2017, it gave more than €2 billion for humanitarian assistance dedicated to refugees, IDPs and their host communities. The number of forcibly displaced people has continued to rise throughout 2017, calling for increased humanitarian assistance worldwide. Up to 85%of the forcibly displaced find refuge among people who already struggle with poverty in low- and middle-income countries. Their survival depends on the availability of assistance provided by local communities and

international organizations. Largest sources of displaced people are Palestine, Syria, Afghanistan, South Sudan, Myanmar, Somalia. [10]

There are estimated to be about 23.7 million internally displaced persons worldwide in 52 different countries today, half of them in Africa, living amidst war and persecution. They have little legal or physical protection and a very uncertain future, since they are not covered by international laws regarding refugees. [11]

The Ethiopian government does not officially recognize conflict-induced displacement, but has included in the 2007 Humanitarian appeal "populations affected by localized conflicts". According to some estimates, 60,000 people remain displaced by the 2004 border referendum along the Somali-Oromia regional border. Recent (2018) UNHCR Ethiopia report indicates over 2.8 million people in Ethiopia were internally displaced due to internal conflicts and climate induced factors. [2, 3, 12, 13]

In the Southern Nations, Nationalities and Peoples region (SNNPR) along the south-western border with Kenya and Sudan, armed cattle raids are becoming more frequent causing displacement. Currently the region is being challenged by interregional border conflicts with Oromia region. As reported by UN-OCHA in Ethiopia, the DPPA dispatched 512 tonnes of various food commodities in February 2007 to 27,580 conflict-induced IDPs in Amaro and Burji *woredas*. [14, 15]

Rationale of the study

As mentioned under the statement of problem many millions of people were being affected by repeated internal displacements around the world. Many of these displacements happen in low- and middle-income countries found in Africa including Ethiopia. The effect of these displacements was serious when they happen in resource poor countries like Ethiopia. Although there were many causes of displacements, the attention given to these displacements is still low especially for those displacements due to conflict. The response for these displacements were also not coordinated sufficiently. The aim of the investigation was to show the burden of the displacement and gaps on response to be corrected for similar future occurrences in the country.

Significance of the study

Showing the burden and cause of the displacement and increasing the government attention towards Internally Displaced Populations (IDPs) is vital to prevent future displacements and respond effectively for the displaced ones. Identifying the gaps in responding to the IDPs and put action points to resolve these identified gaps together with all stakeholders enables to use limited resources effectively. Avoiding of these conflicts enable people to invest their time on productive activities. These all contribute for the development of the country and pull tourists and investors to invest in the country.

5.3 Literature Review

A proportion of the refugees and internally displaced persons worldwide receive help from the UNHCR. At the start of the year 2006, the number of persons of concern to UNHCR was about 21 million, of which internally displaced persons comprised 6.6 million (31%). However, at the close of 2006, the number of persons of concern to UNHCR increased to 32.9 million. The largest increase had occurred among the internally displaced persons, to 12.8 million (38.9%). The increase in the number of persons from East and Horn of Africa of concern to UNHCR, from the beginning to the end of 2006, was 10.4%. One of the hot spots in Africa is the Horn of Africa where the place has been repeatedly hit by natural and man-made disasters where by millions had to flee their homes to spare their lives. [16]
In Africa definitive numbers on those displaced by disasters and development projects are difficult to find; the best estimates from the Internal Displacement Monitoring Centre on those displaced by disasters is that 1.1 million were displaced in 2009 and 1.7 million in 2010. But this estimate refers only to sudden-onset disasters but in Africa one of the biggest environmental threats is drought. [17]

Africa is the region with the largest number of IDPs in the world. Out of an estimated 26.4 million IDPs in the world at the end of 2011, there were some 9.7 million IDPs in sub-Saharan Africa – a figure which is down 13 percent from 2010 when there were just over 11 million. This refers only to those displaced by conflict and human rights violations. Africa has many more internally displaced persons (IDPs) than refugees – in fact, there are nearly five times as many IDPs. But while there is a 60-year old convention on refugees and a dedicated UN agency to protect and assist refugees, the corresponding system for responding to internal displacement is much weaker. [18]

In the absence of a national definition of IDPs and policy for their protection, the Ethiopian government does not officially recognize all conflict-induced situations of internal displacement. There has never been a country-wide IDP assessment. However, the 2007 Humanitarian Appeal for Ethiopia, written in collaboration with the government, includes as vulnerable groups “populations affected by natural disasters such as prolonged drought, flooding and other shocks, as well as by localized conflicts, women, children under five, youth, adolescents, the elderly and emergency induced displacements. [12]
According to some estimates, 60,000 people remain displaced by the 2004 border referendum along the Somali-Oromia regional border. This number includes Somali and Oromo IDPs. There are no numbers available with regard to the displacement in Somali region due to the 2007 clashes between the military and the ONLF. As at September 2007, an estimated 20,000 people in Borena and Guji zones (Oromia region), 60,000 in Gambella region and 62,000 in Tigray remained displaced. No estimates are available on displacement in Afar, or in SNNPR, although informal information suggests that there are between 25,000 and 30,000 IDPs in SNNPR. [13]

In the Southern Nations, Nationalities and Peoples region (SNNPR) along the south-western border with Kenya and Sudan, armed cattle raids are becoming more frequent. The patterns of raiding and population displacement are complex, with population groups from all three countries crossing borders and displacing each other in turn, even though both the Kenyan and Ethiopian armies appear to have stationed troops along their borders. Entire *woreda* populations have been displaced, specifically from Surma and Dizi *woredas* in Bench Maji zone. As many as 50,000 Kenyan pastoralists are reported to have arrived at the end of 2006, displacing between 25,000 and 32,000 people. [13, 14, 13]

Recent UNHCR Ethiopia report indicates over 2.8 million people in Ethiopia were internally displaced due to internal conflicts and climate induced factors. The Protection Cluster prioritized drought- and conflict-induced IDPs in 64 woredas for the protection response to make efficient use of resources through a holistic approach. Due to several internal conflicts, the number of IDPs has increased on an unprecedented scale. The conflict along the regional Somali-Oromia borders, which had intensified in September 2017, led to the displacement of around 1 million individuals from both regions. The April/June 2018 Gedeo-West Guji conflict displaced 958,200persons in both SNNP and Oromia regions. The August 2018 inter-communal conflict in the Somali region caused additional 141,400 persons leave their homes. [3]

IDP camps and settlements often lack access to sufficient food, clean water and sanitation, and their inhabitants are at particular risk of water-borne diseases and other communicable diseases such as acute watery diarrhea and respiratory infections. Only an estimated 38 per cent of Ethiopians, and as few as 13 per cent in some rural areas, have access to clean water, while community health education is rare. [19]

Although women and men (as well as children) are affected by severe consequences of armed conflicts and war leading to displacement, women and men are likely to be vulnerable in somewhat different ways. Women are more likely to be exposed to abuse and rape and also carry a heavier family burden, whereas men are more exposed to direct combat activities and war conflicts. [20, 21]

In general, women are more than twice as likely to develop post-traumatic disorder as men as a result of trauma. The two genders are likely to differ in the type of coping strategies employed and the degree of social support perceived. [22, 23, 24, 25, 26]

Many children do not attend school or only follow primary education. Child Laboure is widespread, with 40 per cent of children working before the age of six to support the family, and school drop-out rates are accordingly high. This pattern has also been encountered in the IDP sites visited, particularly in Somali region, where child labour is culturally acceptable among the Somali population. [27, 28]

The protection of women and girls and of children in general, is included as a cross-cutting issue in the 2007 Humanitarian Appeal for Ethiopia, which recognizes that such social inequalities can be reinforced in humanitarian situations. [29]

Since the end of the cold war, the UN has facilitated domestic responses to internal displacement through the humanitarian assistance provided by its specialized agencies but also through the

identification of the rules of international law that govern all states' responses to displacement. [30]

The first RSG, Dr. Francis Deng, was appointed in 1992 with a mandate to compile international standards composing the normative framework for addressing internal displacement. The result was the Guiding Principles on Internal Displacement, which were presented to the UN Commission on Human Rights in 1998. [31]

At the regional level, the 2006 Pact on Security, Stability and Development in the Great Lakes Region of Africa includes a protocol obliging signatory states to enact national legislation to incorporate the Guiding Principles in their legal frameworks. Other regional organizations including the African Union, the Organization of American States and the Council of Europe have called upon their member states to use the Guiding Principles and incorporate them into their domestic laws and policies. [30, 32]

As the Guiding Principles for IDP underline, it is not the international community but national authorities that "have the primary duty and responsibility to provide protection and humanitarian assistance to internally displaced persons within their jurisdiction. [30]

The DPPA is the main government institution responsible for humanitarian response to the emergency needs of people displaced by conflict and natural disasters, in collaboration with relevant ministries. Its early warning system, designed to respond to disaster-induced displacement, does not include conflict-induced displacement. IDPs are thus only included in the government response if they fall within a specific emergency response. In those cases, the DPPA works in close cooperation with regional governments, local NGOs and IDP committees, international and UN agencies such as UNICEF, UNHCR, IOM, ICRC and the World Food Programme, and international NGOs. It is reported that the government is developing a policy to deal with inter-ethnic tension in the country, which may have some effect on the pattern of response to conflict-induced displacement. [33]

National civil society groups and NGOs are important actors in community work. Most civil society groups are organized in membership associations, typically for women or youth work. They do not, however, have a structural role in relief work, and apparently none work specifically with IDPs. [34]

The UN response to conflict-induced internal displacement in Ethiopia is not provided by a single lead agency. The Ethiopia UN Country Team is led by a Resident Coordinator/Humanitarian Coordinator (RC/HC) supported by UN-OCHA, which ensures coordination between UN agencies and NGOs, and which is also responsible for implementing the humanitarian cluster approach.

Formal recognition of conflict-induced internal displacement is a necessary step towards an effective response to the affected populations, both for providing humanitarian assistance and protection, and for finding political solutions. [35]

In signing the 2003 Khartoum Declaration on internal displacement in the Intergovernmental Authority on Development (IGAD) sub-region, the government has already made an important first step in recognizing the problem of internal displacement and its primary responsibility for

protecting and assisting IDPs. It thereby also committed to developing and adopting a national IDP policy. [36]

Globally to date, twenty-two countries, including six in Africa, have adopted a wide variety of national policies or legislation—many of which are based on the *Guiding Principles*—specifically addressing internal displacement, and others are in the process of doing so, including Côte d'Ivoire, Nigeria, Chad and Kenya. In fact, African States were among the first in the world to adopt national laws and policies based on the Guiding Principles. The Kampala Convention has been signed, as of April 2012, by 36-member states and ratified by 17, although instruments for ratification have been deposited only by 11. The Kampala Convention comprehensively affirms the importance of addressing the protection and assistance of IDPs in all stages of displacement – from prevention of displacement to protection and assistance during displacement to durable solutions. Significantly, the Convention incorporates the 1998 UN Guiding Principles on Internal Displacement. [37]

Social support is believed to be protective by acting as a buffer against the deleterious effects of stress and trauma, as well as by providing emotional and material nourishment and helping to remove potentially stressful factors from the environment, although the underlying physiological mechanisms are not yet fully elucidated. [38, 39,40,41]

Every year on 20 June, World Refugee Day is an opportunity to bring renewed focus to the plight of all people who are forced to flee their homes. The UN General Assembly established the World Refugee Day in 2001, on the 50th anniversary of the United Nations (UN) Convention relating to the Status of Refugees.

5.4 Objective

General Objective

- The general objective of the study was to describe the burden of the displacement and gaps seen during humanitarian response at Yirga chefe and Kochere woredas found in Gedeo zone of SNNP region, Ethiopia 2018.

Specific Objective

The specific objectives of the study includes:

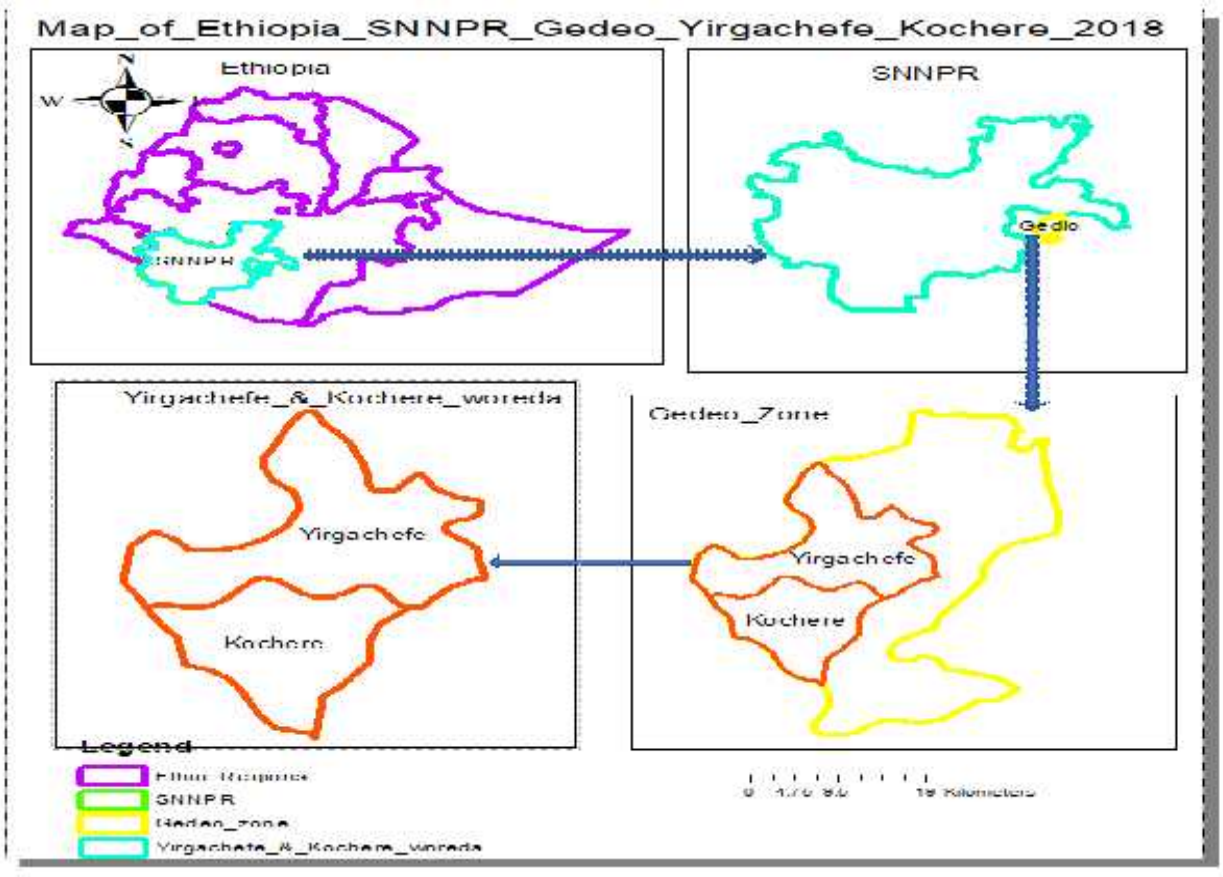
- To determine causes of the conflict
- To describe the situation of internally displaced peoples
- To describe internally displaced peoples and lost life by place, person and time
- To describe infrastructure damage happened due to the displacement
- To determine any disease outbreak occurrence and describe it epidemiologically
- To identify humanitarian activities performed and gaps during the response process
- To identify partners participating in IDP response activities

5.5 Methods and Materials

Study area, period and population

Investigation area description

The investigation was conducted at Yirga chefe and Kochere woredas of Gedeo zone, SNNP region, Ethiopia 2018. The total population of the two woredas were 435847 (261189 in Yirga chefe woreda and 174658 in Kochere woreda). Kochere woreda is bordered on the east by Gedeb woreda, on the southwest by the Oromia Region, and on the north by Yirgachefe woreda. Yirgachefe woreda is bordered on the south by Kochere woreda, on the west by the Oromia region, on the north by Wenago woreda, on the east by Bule woreda, and on the southeast by Gedeb woreda. Towns in Kochere include Fisehagenet and Chelelektu. Coffee is an important cash crop for these woredas. More than 85% of the population is gedeo by ethinicity and speaks gedeo language dominantly.



Map 7: Map of Ethiopia, SNNPR, Gedeo zone, Yirgachefe and Kochere woreda, 2018.

Investigation period

The investigation was conducted from August 21 to October 15/2018.

Investigation population

The investigation population was all peoples found in the Yirga chefe woreda, Yrga chefe town, Kochere woreda and Dilla zuria woreda of Gedeo zone, SNNP region, Ethiopia 2018.

Investigation Design

A descriptive cross-sectional study was conducted to investigate the situation of Internally Displaced Populations (IDPs) at Yirga chefe and Kochere woredas found in Gedeo zone of SNNP region, Ethiopia 2018.

Data Collection

Data was collected by using nationally developed data collection tools for IDPs. Additional data was also collected by in-person observation of situations and by attending meetings.

Data quality control

Data quality was controlled by cross-checking collected data with other key in formatives at woreda and zonal label. In-person observation was also taken place to confirm reported situations.

Data analysis

Data was analyzed by using Microsoft excel 2016. Simple mathematical operations such as addition, subtraction, multiplication and division were performed.

Ethical Clearance/Ethical Consideration

Permission to study the IDP situation in these two woredas was obtained from the national PHEM, Yirga chefe and Kochere woredas health offices.

Dissemination of investigation result

The result of the investigation will be submitted to Addis Ababa University School of public Health Department of Preventive medicine, Yirga chefe and Kochere Woreda Health Offices, Gedeo zone health office, SNNP regional health bureau, EPHI, FMOH and EFELTP.

Operational Definition

Asylum-seekers: are those who have made a claim that they are refugees and are in the process of waiting for it to be accepted or rejected. [10]

Coping: is conceptualized as the individual's response to stressful or negative events, and different individuals may be inclined to employ different coping strategies. [25, 26]

Durable Solutions: can be said to have been found when people do not experience discrimination because of their displacement and can enjoy their human rights to the same extent as other citizens. [42]

Global Acute Malnutrition (GAM): is a measure of acute malnutrition in refugee children aged between 6 and 59 months, obtained by combining the number of children in this age range who have moderate acute malnutrition and severe acute malnutrition. [43]

Refugee: is someone who has been forced to flee his or her home country and is unable or unwilling to return due to fear of persecution. [10]

5.6 Result

Cause of the conflict and Emergency Operation Center operation

There were repeated (four times) inter-border conflicts betweenSNNP and Oromia region at the border of Gedeo zone of SNNP region and Guji zone of Oromia region**.** These repeated conflicts were happened due to the issue of land use and cleavage between two individuals from Oromo and Gedeo ethnic group. Finally, these individual conflicts were changed to ethnic based conflictcausing a devastating material damage, death of humans and animals and psychological sequel.

The current conflict was started in June and Zonal level Emergency Operating Center (EOC) was established and activated on 7 July/2018 to coordinate humanitarian responses for IDP in Gedeo zone. The EOC is structured with key sectors under the leadership of Federal and Zonal governments, including Management, Operations, Planning, and Logistics sections/cluster. Initially humanitarian response was performed by seven Clusters namely Food, WASH, Health and Nutrition, Protection (and Child Protection and GBV Sub- Clusters), Emergency Shelter & NFI, Education, and Logistics. Site Management cluster was also set up since mid-August. The overall activities of these clusters were monitored and coordinated by coordination cluster.

Stakeholders participated in the humanitarian response activities

Many governmental organizations and NGO partners were participating in the humanitarian response activities by providing technical, financial and logistic support. The organizations participating in the response includes IOM, CARE, CRS, DORCAS, ERCS, GOAL, HI, ICRC, IOM, IRC, MSF – Spain, NDRMC, NRC, PI, PSI, SCI, UNDDSS, UNFPA, UNICEF, UNHCR, UNOCHA, WHO, WFP, WVI, NDRMC, SNNPR, DM&FSO, GZDM&FSCO, MOH, EPHI, Belaya, WDM&FSC.

Epidemiological description of internally displaced peoples and life lost

Registration of Internally Displaced Peoples were conducted by Woreda Disaster and Risk Management Office, Woreda Health office and International Organization for Migration (IOM). A total of 103,415 and 163,560 population was displaced from Kochere and Yirgachefe woreda, respectively. Of these total IDPs 35,285 were under 5 and 11,172 Pregnant and Lactating Women (PLW). Although there was some difference between different counting of IDPs by different sectors, this estimation was approved by local authorities. All IDPs were displaced from bordering kebeles in Gedeo zone of SNNP and Guji zone of Oromia regions. These IDPs were settled in 30 (19 in Kochere woreda and 11 in Yirgachefe woreda) collective sites. Besides collective sites, IDPs were settled in the host community together with their relatives and the host community was willing to assist the IDPs except some resistance especially in Kochere woreda. IDPs were settled in governmental buildings such as schools and farmer training centers and in shelters constructed for the emergency (IDPs). Regarding the quality of the shelter, its

ability to protect from cold, heat, wind, rain, snow, people's privacy, personal security, protection from fire and covered space for essential household activities was evaluated by Rapid Joint Assessment team and found to be poor in both woredas. The average number of peoples living per shelter were 6 in Kochere woreda and 140 in Yirga chefe woreda.

A total of 28 deaths and 68 injuries were reported from Kochere woreda during the conflict and 631 injuries were reported from Yirga chefe woreda. Initially 8230 unaccompanied children were identified from Kochere woreda while no data was available on number of death and unaccompanied children from Yirga chefe woreda.

Description of infrastructure damage

A total of one health centers and three health posts were damaged totally and additional three health posts damaged partially by the conflict, including materials stolen from Buno kebele health post in Kochere woreda, which was being used as IDP site. The health center and 2 health posts damaged were in Kochere woreda and the rest 3 health posts in Yirga chefe woreda. Twelve schools were also damaged, 11 schools in Kochere woreda and one school in Chirku kebele of Yirgachefe woreda.

General situation of Internally Displaced Peoples

Regarding availability of clothes such as blankets, bedding, cooking utensils and plastic sheets, it was estimated that one-fourth of IDPs had these materials in Yirga chefe woreda while half of the IDPs had the materials in Kochere woreda. All IDPs were using firewood for cooking and heating, but it was also in scarce. IDPs were in critical need of shelter and other Non-Food Items (NFIs).

Majority of the population (70% of adults and 90% of children) were defecating in open, undefined and unmanageable area. Average number of users per toilet were 75 in Kochere woreda and 100 in Yirga chefe woreda. Toilets were separated for males and females and all toilets opening was small enough to prevent children falling in. There was also substantial presence of faeces on the ground close to shelter and water sources (within 20meter radius). Spring, open well, pipe, surface water such as river and rain water were the common sources of water for the IDPs as well host community. Average daily water consumption of individuals for all uses (drinking, cooking and hygiene) was 25 liters. The average time it takes to fetch water was 15 minutes for Kochere woreda and 30 minutes for Yirga chefe woreda including the time it takes to travel, waiting and filling the containers. IDPs were complaining shortage of water and water treatment chemicals, shortage of water storage, shortage of waste disposal pit and overcrowdings.

Zonal and Woreda Water Office, health office, WASH department and UNICIF were working to improve water supply, sanitation and hygiene of the IDPs as well host community. Activities being performed to improve these issues includes Water supply installation, Roto and tanker installation, latrine (trench and pit latrine) and waste disposal pit construction, soap distribution,

chlorination of water sources, health education and Health promotion.A total of 34 latrines with 103 sits were existed in these woreda before the displacement and more than 122 additional latrines with 276 sits were constructed for the IDP sites. A total of 59 rotos (ranging from 3000 to 10,000 liters) for water storage were available in the two woredas. Of which 50 rotos were newly distributed after the displacement. Total of 4 water trucks were providing water for IDPs in all four woredas.

A total of 13 health centers (7 in Yirga chefe and 5 in Kochere), 5 Mobile Health and Nutrition Teams (MHNT) (3 in Yirga chefe and 2 in Kochere) and no hospital were providing health services during the IDP response in these two woredas. Additional 10 temporary clinics (8 in Yirga chefe and 2 in Kochere) were established to provide primary health care service for IDPs in these two woredas. At least one health post was also available in each kebele. Seven of the health facilities (4 in Yirga chefe and 3 in Kochere) had SC service and 54 health facilities (31 in Yirga chefe and 23 in Kochere) had OTP service. A total of 2 doctors, 47 health officers, 193 nurses, 40 laboratory technicians, 27 pharmacists, 120 Health Extension Workers (HEWs), 6 surveillance/PHEM officers, 5 WASH officers, 2 EPI officers and 2 nutrition officers were assigned to work in the woreda. Besides these health workers other professionals from the national, regional, zonal and partners were supporting woredas.

Monthly malnutrition screening of children aged under 5 was conducted three times since the start of the displacement and the fourth screening was started during the assessment. Inpatient and outpatient therapeutic feeding, selective supplementary feeding, blanket supplementary feeding and Infant and Young Children Feeding (IYCF) programs were implemented by the government as well partners such as GOAL-Ethiopia, UNICEF, MSF and Belaya (local NGO) for malnutrition cases. Micronutrient supplementation e.g. vitamin A and iron were also conducted during vaccination campaign and routine health facility visit for children and pregnant women.

General food distribution for IDPS was conducted by WFP and NDRMC on monthly basis. The total need of food that people are consuming is increasing since the beginning of the crisis. Currently only some of the IDPs (not quantified) have food stocks in their households in Kochere woreda while none of the IDPs had it in Yirga chefe woreda. IDPs said that food stocks were available only for two weeks since they receive it and were being exposed to famine.

Less than 10 % of infants (IDPs) were dependent on formula milk feeding and this was provided by the government as well partners such as UNICEF and GOAL. Shortage of supply was raised as a challenge in feeding children below two years old. The major livelihood of IDPs was agriculture and the crisis had affected this causing increment on food prices. The most affected population groups by the crisis were children, women and elderly people.

A total of 98 total births (8 in Kochere woreda and 90 in Yirga chefe woreda) were reported from the IDPS and all births were attended by skilled health professional. There was also a total of 378 pregnant woman (15 in Kochere and 363 in Yirga chefe) seen in these IDP sites. A total of 12

individuals (10 in Kochere and 2 in Yirga chefe woreda) were in need of treatment for chronic diseases but no one were able to afford it by themselves. Of those 12 individuals, 6 were hypertension cases (Kochere), 4 insulin dependent diabetes (Kochere) and 2 were epileptic cases (Yirga chefe woreda). No sexual violence and hazardous substance usage were reported among IDPs but many (not specified in number) of them were exposed to psychosocial trauma following the conflict. There was functional surveillance and early warning system. The data collected through the surveillance system was reported to the zone at least every week. Measles vaccination campaign was conducted in both woredas and the coverage was 97% in Yirga chefe woreda and 86% in Kochere woreda.

The Return, Rehabilitation and Recovery (RRR) Plan was developed at zonal level and has been finalized on 18th September to mobilize collective support for the return process. Humanitarian partners advocate with the authorities for humanitarian responses for both returnees and IDPs. The importance of the principle of voluntary return with dignity, safety, informed decision, and sustainability was considered.

Following a series of peace and reconciliation efforts by Aba Gedas (traditional leaders) of Gedeo and West Guji with the IDPs, a government led return process commenced in mid-August. According to the woreda administrations report, as of 25th September, 2018, a total of 156,574 (94,736 from Yirga chefe and 61,838 from Kochere) IDPs had returned to their original place of residence, while the verification of the figure of returned IDP remains a challenge. Most returns were spontaneous (self-organized) for returns within Gedeo Zone, while the government had organized returns using buses for distant travels to Guji.
An average of 3120 individuals were returning daily from each woreda. Following return, the number of IDPs were decreased and IDP sites were merged to decrease number of IDP sites. Material support was being provided by the government as well partners to construct their shelters in the return site. Generally, no disease outbreak was happened following the displacement.

A joint inter-cluster rapid assessment in the areas of return was conducted by humanitarian partners under the leadership of government on 7th September, 2018. The assessment was conducted in selected kebeles of the two woredas. The objectives of the assessment were to establish the situation of returnees and identify immediate needs and vulnerabilities of the returnees in the assessed woredas.

General observations in the return area

A total of 14,589 household returnees were found at Kochere woreda (Buno kebele = 6604HH, Hanchebe kebele = 894HH and Baya kebele 7091HH). There was also additional unverified report of 1,276 household returnees in Jeldo Kebele of the woreda. A total of 35,834 household returnees were also found in Yirga chefe woreda.

The situation of the returnees remains dire, immediate life-saving and lifelong responses were critically needed across all clusters. For both Woredas, return took place in the last 10-14 days, and more returnees are expected in the coming days. In general, returnees feel safe and have some confidence and hope in the ongoing peace and reconciliation process facilitated by Aba Gadas (traditional leaders). However, certain returnees implied some fears for recurrence of conflict if the root causes of the conflict are not addressed.

Some of the returns were spontaneous (own return on foot): male IDPs tend to go back to their places of origin to check the situation while the remaining family members (mostly females and children) stay in IDP sites. Government organized return were through provision of transportation buses for mostly returnees from distant Guji Zone. Return within border of Gedeo zone was mostly spontaneous. Road access remains a challenge in some areas of return due to poor road condition owing to heavy rains.

In Kochere, a significant number of returnees were in new collective centers within their Woredas, which could be considered as a trend of secondary displacement. Returnees were not returned to their own homes due to lack of construction materials for shelter and ES/NFI support. The needs for loss and damage assessment and compensation was raised by returnees as an issue that should be investigated by the government. Generally, there was a huge lack of basic service (food, NFIs, WASH facilities, etc.) in the return areas.

General recommendations given after the assessment finding

- Ensure better coordination of responses for returnees
- Ensure better information sharing on numbers and locations of returnees arrived in each kebele
- Strengthen reconciliation and peacebuilding initiatives at Woreda and kebele levels through Aba Gedas (traditional leaders)

Summary of major activities performed by response clusters

Coordination

- All humanitarian response activities provided by clusters were monitored and coordinated through establishment of Emergency Operation Center (EOC). EOC was functional from 7:00am to 6:30pm on daily basis)
- Interborder communication between EOCs established at Gedeo zone of SNNP region and Guji zone of Oromia region were maintained
- Return of IDPs to their original place of residence were coordinated
- Usage of referral slip for returnees on treatment were coordinated between Gedeo and Guji zone
- Six-month Return, Rehabilitation and Recovery joint Plan for IDP's was developed
- Partners were presenting their performance report
- Daily and weekly cluster update was maintained at EOC and Inter Cluster Coordination (ICC) meeting conducted at Woreda and Zonal level

Health

- Capacity building training on surveillance, RRT, WaSH, social mob, outbreak investigation, laboratory, case management and IPC, coordination and reporting and AWD was given for Six health workers from each health facilities and 10 health workers from each woreda by experts from national, regional, zonal and partner staffs
- Training on surveillance, nutrition, AWD, meningitis, MDSR and malaria was given for selected health workers from all woredas and health facilities
- Mass measles vaccination campaign for IDPs and host communities targeting from 6 month to 15 years old children was completed in August
- Vitamin-A supplementation and deworming was conducted during the mass measles vaccination campaign
- Twenty-one CTCs were prepositioned at zonal level for AWD preparedness and CTC locations were identified
- Mobile clinics were provided to serve IDPs and returnees in areas where health facilities were damaged
- Provision of essential primary health care services were maintained
- Ongoing water quality monitoring by health teams at distribution points were maintained
- Supportive supervision was conducted to health facilities to improve malnutrition and other case management, surveillance, data management and reporting

- Direction was given to make free PHEM focal persons from additional activities
- AWD EPRP was developed at zonal level to be cascaded to woredas
- Surveillance and case management data were collected and reported to the zone on daily and biweekly basis

Nutrition

- Supportive supervision of stabilization centers (SC) was conducted to assess functionality and identify needs of SCs
- Monthly nutrition screening was conducted 3 times and the 4th round screening was ongoing and children were also screened during their routine health facility visit
- Mam and SAM cases identified during screening were managed accordingly
- Therapeutic Supplementary Feeding (TSF) distribution was conducted deepening on the need from the screening finding
- Sufficient SAM-SC kits with essential 2nd and 3rd line antibiotics were provided for referral SCs
- Capacity building training was conducted to improve SAM case management
- Key Infant and Young Children Feeding (IYCF) messages including institutional delivery, early initiation of breastfeeding, exclusive breastfeeding, risks of breastmilk substitutes and introduction of complementary foods were delivered for IDPs

WASH

- Chlorination of water sources, distribution of soaps and water treatment chemicals were performed
- Clean-up, desludging and decommissioning of latrines in schools previously occupied by IDPs were performed
- Water trucking to IDPs, health centers and nutrition facilities (SCs)
- Capacity building training was given on water quality management and other WaSH related activities for Woreda staffs (6 Health workers from each woreda)
- Pumps and generators were provided to the Water Bureau for installation

NFI

- Plastic sheets, clothes, cooking utensils and other NFI kits were distributed by NDRMC and other partners
- Universities were also supporting IDPs by providing NFIs like blanket and matts

Food

- Food was distributed in three rounds by NDRMC and Joint Emergency Operation Program (JEOP) which includes WFP, CRS, CARE, SCI, WVI and FH. They were planning for fourth round distribution
- The distribution was targeting IDPs in collective sites and host communities and the 3rd round distributed as well for returnees
- Due to factors like inclusion error of non- IDPs and absence of individuals some IDPs might not receive the food
- IDPs settled in officially unrecognized sites were not allowed to get the food and they sold the NFI to buy food for their children

Protection

- Dignity Kits for women were distributed
- Orientation was given on Sexual and Gender Based Violence (SGBV), returnee protection monitoring, community mapping and protection for all IDPs and returnees
- Community workers and social workers were assigned for all woredas
- Psychologists and psychiatrists were providing psychological support for IDPs

Education

- A total of 26 Schools (13 schools in each woreda) were occupied by IDPs and all schools had been evacuated except 2 schools in Kochere woreda
- Schools were supported with scholastic materials such as exercise books, sharpener and eraser
- Construction of temporal learning classrooms by partners through the site management and ES/NFI cluster were ongoing

Site Management

- Site decongestion and relocation of IDPs especially for the most congested sites by constructing communal shelters and kitchens
- Capacity building training on SMS were given to the clusters, IOM staff and government officials

Logistics

- Facilitate, compile and share logistics related information such as available storage, transport companies and Final Distribution Points (FDPs)
- Provide logistic expertise to improve the efficiency of the response
- Avail office spaces with internet connections and other facilities

- Training offered on logistic management to all humanitarian partners for a better emergency logistic handling

Table 5.1: Third round malnutrition screening coverage and incidence in under 5 children and PLW, Yirga chefe and Kochere woreda of Gedeo zone, August 2018.

Third round malnutrition screening coverage						
Woreda	Children (%)			PLW (%)		
	IDP	Host		IDP	Host	
Yirga chefe	102.8	109		222	124	
Kochere	68.9	88.4		97.9	119.2	
# of malnourished under 5 children						
Woreda	IDP			Host		
	MAM	SAM		MAM	SAM	
Yirga chefe	7340	521		9591	524	
Kochere	844	78		1434	139	
Incidence of malnutrition cases in under 5 children and PLW						
Woreda	IDP			Host		
	Proxy GAM	Proxy SAM	Malnourished PLW	Proxy GAM	Proxy SAM	Malnourished PLW
Yirga chefe	41.8	2.8	47.9	25.4	1.3	39.4
Kochere	8.8	0.7	10.7	7.3	0.6	29.6

Table 5.2: IDPs return status of Kochere and Yirga chefe woreda, Gedeo zone, SNNP region, Ethiopia, September 2018

Woreda	Total IDPs in each woreda	IDPs returned			IDPs expected to return	Returnees in %
		Within Gedeo	To East and Guji	Total		
Yirga chefe	149560	28,845	65891	94,736	54,824	63.3
Kochere	86078	27386	34452	61838	24240	71.8

5.7 Discussion

Hundred thousand of people were affected by the border conflict between Gedeo zone of SNNP region and Guji zone of Oromia region. More than 699 injuries and a number of human deaths were happened due to the conflict. Besides this a huge infrastructure damage, disruption of normal livelihoods and displacement was happened because of the conflict. There were also more than 8230 unaccompanied children from these two woredas and these children were in a serious psychological stress.

Although IDP sites were established the quality of shelter were poor exposing IDPs to health risk conditions like cold and rain water flow in. Some of these temporary shelters had no sleeping matts or other materials to sleep on which creates a difficult situation especially for children and pregnant. Canvas used for constructing IDPs shelter were also not distributed fairly (duplication and missing problem) due to this part of the population were obligated to live in a very crowded shelter. Some of the host communities were also receiving these shelter constructing materials as the IDP said and this was done for relatives of the distributing agent. Besides these distribution problems, canvas and other NFIs including cooking utensils were sold to the host community with cheap price to get money for other material and food purchasing. There was no adequate monitoring of NFIs distribution and after distribution.

Food were being distributed by NDRMC and WFP since the beginning of the crisis and the total amount of food consumption was increasing due to the fear and continuous displacement of peoples from the border (conflict area).

The food distributed to the IDPs on monthly basis was not sufficient to reach the next monthly distribution. Due to this malnutrition was the main concern in children and PLWs. Although the commitment of HEWs was law, monthly malnutrition screening and screening during routine health facility visit was maintained. HEWs were assuming this screening as additional activity and need perdium payment. Due to this low commitment, knowledge gap and insufficient supervision from the woredas, there was limitation on implementing the screening and counting leading false screening data especially in Yirga chefe woreda. In Third round monthly screening, there was high incidence of Global Acute Malnutrition (GAM = 25.3%) which was very high compared to UNHCR GAM standard (<10%). [46] Following this the Zonal Health Department (ZHD), with UNICEF, GOAL and IRC, conducted a verification exercise for 6 kebeles in Yirga chefe (GAM =41.8%) where very high figures were recorded and correction was done at least on counting.

Malnutrition supplies were mobilized by the government as well partners such as UNICEF and distributed to the woreda and health facilities. Health facilities identify malnutrition cases during routine health facility visit and monthly nutrition screening. Those identified malnutrition cases, whether they are SAM or MAM were being treated according to malnutrition treatment protocol. The major challenge in treating malnutrition cases were that treatment supplies like plumpy nut

were shared by normal family members even sold to shops with cheap price to buy another food for family members. There was also no sufficient space, safe water and electric city to treat malnutrition and other cases in temporary treatment facilities established at IDP sites as well in some permanent health facilities. There was also shortage of supply and sufficient skilled man Power like IYCF expert.

IDP sites were made dirty by animal excreta, urine and other household wests which is risk for the health of the IDPs causing respiratory and diarrheal diseases.

A total of 7 health facilities (4 totally and 3 partially) were damaged due to the conflict. Following this the routine EPI service was interrupted in these damaged health facilities. Due to this interruption and risky IDP living conditions, IDPs were at high risk for public health problems/diseases such as measles and scabies and high potential of outbreak occurrence. To monitor the health conditions of IDPs as well host community case management and surveillance data was collected and reported to the zone on daily (immediately reportable diseases/conditions), biweekly and weekly basis. Initially all PHEM prioritized disease (22) were included in the report. Later diseases with no/little risk in the zone was omitted and only diseases with potential risk were included in the report. Zero report was also maintained on daily basis for potentially risk immediately reportable diseases. Case management data on diarrheal diseases, pneumonia, malnutrition, Meningitis, AFI, malaria, scabies and intestinal parasites were received biweekly on Tuesday and Friday.

Although the data were registered and counted at health facilities there were high gap on reporting to the woreda and zone due to lack of internet and transportation access and meeting of health facility PHEM focal person and the health facility medical director. These surveillance and case management data were not analyzed and interpreted at health facility and woreda level (partially done) and this was being changed in the support of partners and high-level government staffs.

AWD outbreak persists for the last 3 years in the country and Gedeo zone of SNNP region was one of affected zone by the outbreak. During the displacement time there was also active AWD outbreak in some woredas of Tigray, Afar, Oromia and Amhara regions of the country. It is also known that the living condition in IDP site is compromised which is risk factor for AWD outbreak occurrence. Due to this reason development of AWD contingency plan was perceived as critical by all response clusters. Following this, a three-month AWD contingency plan was developed by staffs from Gedeo Zone Health Office, WHO, INICEF, and EPHI.
Although referral slips were prepared to link IDPs under treatment (chronic diseases), during the return time, to the health facility found in the return area, no practical utilization was seen.

Even though there was some figure discrepancy between different counting organizations and times, the local authority approved that a total of 26 schools were occupied by IDPs in the two woredas and all (13) schools in Yirga chefe and 11 schools in Kochere woreda was totally evacuated and registration of students were started for 2018/19 fiscal year. Despite most of the

schools being evacuated, hygiene, sanitation, latrine issues and water availability in these schools remain a concern.

Provision and distribution of dignity kits especially for females were not sufficient and assessment on lost civil documentation was not done.

Although, some IDPs were not volunteer (fear) to return to the original place of residence, the government decided to stop humanitarian support in these IDP sites. This was one reason for selling NFIs and other nutrition treatment supplies to get food. Spontaneous and continuous field insecurity had cause fear and stress on the returnee. There was limited participation of IDPs through committees, feedback in response and returnee process. The four principles of return such as voluntariness were also not maintained well. Priorities for returnees in the return area includes emergency shelter kits for home construction (plastic sheet, wooden pole, nails, ropes), emergency NFIs (particularly of kitchen equipment) and transition shelter assistance for the people who lost their homes completely.

Returnees also reported that they walk long distances to access water (up to 4 kilometers), and sometimes from unsafe sources.

Most of the activities and supplies including human power were deployed from the zone to the woreda and health facility. There was duplication of efforts and wastage of limited resources. Due to this woreda level, inter-sectoral and inter-organization meetings and coordination was strengthened and these duplication and wastage was avoided.

One of the main and persistent challenge in implementing the humanitarian activities in effective and timely manner was lack of timely and accurate information related to exact number of IDPs and exact number and site of these IDP settlements. This information varies by time continuously even by assessing organization. This lack and discrepancy of exact figure also seen in number of IDP occupied schools, evacuated (partially and totally) and not evacuated one.

Lack of convenient road access remains a big challenge to provide satisfactory and timely humanitarian support for the IDPs. This road challenge was aggravated by the rain fall which creates a sliding mud to travel and there was also information gap on available and better road options. Besides the road access challenge, shortage and dalliance of financial and other supplies fund from both the government and partner's side was the main challenge to implement humanitarian activities in effective and timely manner.

5.8 Limitation

There was some discrepancy in number between assessments done by different sectors and at different times, somewhat conflicting numbers from different sector sources might also be found in this document. Some data were also not specified in number which limit interpretation and discussion. Therefore, understanding of this document need to consider these limitations.

5.9 Conclusion and Recommendations

Such kind of ethnic based conflict was occurred repeatedly in the area. The conflict had displaced hundred thousand of peoples and cause many life lose, infrastructure and civil document damage. Many heads of a household, children and PLW were killed, normal community connections and livelihood were disrupted. Although many efforts were invested to provide humanitarian support for the IDPs many gaps were existed in effectively coordinating activities and responding timely. One of the main challenges in the humanitarian response were lack of appropriate and timely information regarding location and number of IDPs. There was high gap in analyzing and reporting surveillance and case management data at health facility as well woreda level.

The coordination cluster need to provide timely and clear information to provide effective and efficient humanitarian support for the IDPs. The coordination cluster need to maintain the four principles of return (voluntary, safety, informed decision, and sustainability)during the return process. The Zonal Health Department need to provide training on analyzing, documenting and reporting of surveillance and case management data on timely manner for all health facilities and woredas. MOH and MOE need to reconstruct the damaged health facilities and schools and replace the necessary materials in collaboration with other stakeholders as soon as possible. The protection cluster together with the woreda administration need to do assessment on lost civil documents and should be replaced. All the humanitarian support need to continue for IDPs coordinately. The national and regional governments need to work to resolve the root cause of the conflict.

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Chapter Six: Health Profile Description Project

6. Health Profile Description of Woreda 05 of NefasSilk Sub-city, Addis Ababa, Ethiopia, 2018

6.1 Abstract

Introduction: The major health problems of the country remain largely preventable communicable diseases and nutritional disorders. Describing the health and health related profiles at each level enables us to identify problems and gaps by continuous monitoring and evaluation of health programs.

Objective: The objective of this health profile assessment was to describe and provide information on health and health related issues to be used for systematic public health planning in Woreda 05 of Nefas silk Sub city, Addis Ababa, Ethiopia, 2018.

Methodology: A descriptive cross-sectional study was conducted to assess health and health related issues at Woreda 05 of Nefas silk sub city from February 26 to March 14/2018. Pertinent data was collected and compiled from each concerned sectors. Other available hard copy and soft copy documents were also reviewed. The available data completeness and consistency was checked. Data analysis was done by using Microsoft Office Excel, 2016. Permission to do the health profile description was obtained from each sector through an official letter.

Result: Woreda 05 of Nefas silk sub city contains 7594 households and total population of 31135, (sex ratio = 86:100). There was no well-organized population data by age group, ethnicity and ketena. The Woreda had Rapid Response Team, 40 teams of volunteer community workers and 14 HEWs. Acute Upper Respiratory Tract Infections was leading cause of outpatient department visit in both under 5 and adult outpatient departments. Linkage of toilets with waste tubes and rivers, flowing of cattle's urine to waste tube and river and impaired water quality were prioritized problems of the woreda.

Conclusion: There were many problems found in the Woreda such as absence of pertinent governmental organizations like Water office, shortage ofambulance, lack of supporting Nongovernmental Organizations, data management and organization gap. The leading causes of morbidity, acute upper respiratory tract infections and diarrheamight be related to poor sanitation and high intermittency of water supply.

Recommendations: Pertinent governmental organizations need to be available at Woreda level. Ambulance should be available every time and training should be given for data managers. Health interventions need to be focused on prioritized problems and health profile of the Woreda should be assessed regularly.

Keywords: Health profile description Health and health related issues, Addis Ababa, Ethiopia, 2018.

6.2 Introduction

Ethiopia has introduced a federal government structure in 1994 composed of nine Regional States: Afar, Amhara, Oromia, Somali, Benishangul Gumuz, Southern Nations Nationalities and Peoples Region, Gambela, Tigray, Harrari and two city Administrations (Addis Ababa and Dire Dawa). The Regional States are administratively divided into 78 Zones and 710 800 Woredas [1].

Ethiopia experiences a triple burden of disease mainly attributed to communicable infectious diseases and nutritional deficiencies, NCD and traffic accident. Shortage and high turnover of human resource and inadequacy of essential drugs and supplies have also contributed to this burden. Despite major progresses have been made to improve the health status of the population in the last one and half decades, Ethiopia's population still face a high rate of morbidity and mortality and the health status remains relatively poor [2].

To improve the health status of Ethiopia, the Ministry of Health (MOH) has been formulated consecutive phases of comprehensive Health Sector Development Programs (HSDP), starting from 1997/8. There has been also encouraging improvements in the coverage and utilization of the health service over the periods of implementation of HSDP [3, 4].

Describing the health and health related profiles at each level enables to identify problems and gaps by continuous monitoring and evaluation of health programs on these preventable communicable diseases and nutritional disorders.

Health profile description is a system of collecting, auditing, discussing and summarizing of health and health related events and important health indicators to describe the health and health related demographic, environmental, social, economic, political and cultural factors in the geographic area under consideration.

Documenting appropriately these summarized and analyzed health and health related baseline data at each level is very essential for effective health planning, fair resource distribution and appropriate interventions by identifying and prioritizing prominent health and health related problems/gaps of the community. It can also be used as an entry point for operational research.

A good and well organized health profile description enable stakeholders and decision makers to do evidence based and reasonable decisions and planning. For the successful implementation of HSDP as well as to achieve Millennium Development Goal (MDG), regular description of health profile is the most vital and of greatest significance in identifying gaps through continuous monitoring and evaluation of programs.

Even though, regular description of health profiles especially at Woreda level was not common practice in Ethiopia, relatively to their significance and purpose, day-to-day description and use of different health and health related survey results are common practice at national, regional and

zonal/sub city levels. In low income countries like Ethiopia such information especially at Woreda level is usually incomplete and incomprehensive.

Rationale of the Study

Data generated from this health profile description help the Woreda and other stakeholders for prioritizing community problems and health programs, public health planning, fair resource purchasing and allocation, appropriate interventions and evaluation of programs. Systematic assessment of health facility performance based on accepted standards and norms will help to improve service quality. The main reason of preparing this document was to communicate information on health and health related issues, vital statistics and local burden of diseases in simplified and practically accessible format to be used for the Woreda public health planning and by other stakeholders of health and health related issues working in the area.

6.3 Objective

General Objective

The general objective of this health profile description was:

- To describe and provide information on health and health related issues to be used for systematic public health planning in Woreda 05 of Nefas silk Sub city, Addis Ababa, Ethiopia 2018.

Specific objectives

The specific objectives of this health profile description includes:

- To describe the general situation of woreda
- To describe the population characteristics of the woreda
- To describe the school and education status of the community
- To describe the health and health related situations in the woreda

6.4 Methods and Materials

Study area

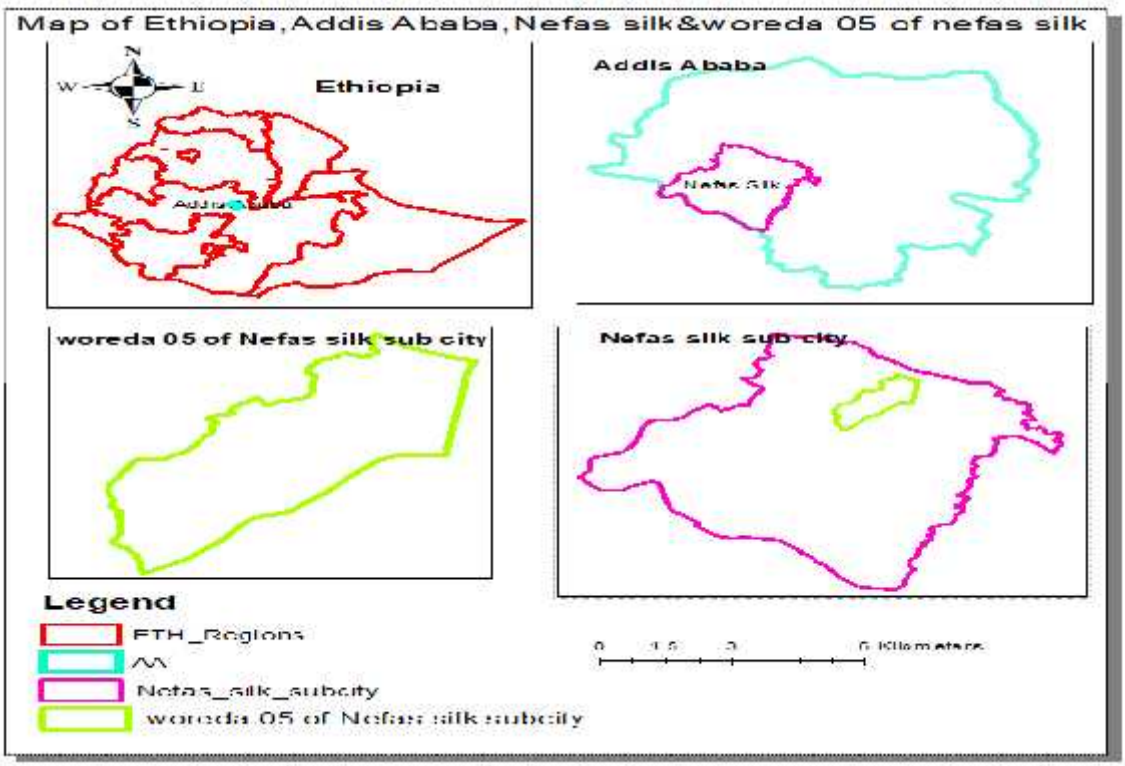
The health profile description assessment was conducted at Woreda 05 of Nefas silk sub city, Addis Ababa city administration, Ethiopia.

Study period

The health profile description assessment was conducted from February 26 to March 14, 2018.

Study design

A descriptive cross-sectional study was conducted to assess the health and health related issues of Woreda o5 of Nefas silk sub city, Addis Ababa, Ethiopia.



Map 8: Map of Ethiopia, Addis Ababa, Nefas silk sub-city and Woreda 05 of Nefas silk sub city, 2018

Data collection tool

Structured questionnaire with pertinent variables, grouped by related sector/office, was developed to be used for the intended data collection.

Data collection method

Pertinent data for describing the health profile of the Woreda was collected and compiled from each concerned authorities/sectors found in the woreda such as the Woreda health office, Education office and political administration office. Additionally, any available hard copy and soft copy documents about the area was reviewed.

Data analysis and quality control

The data completeness and consistency were checked for each respondent and it was also crosschecked with any available hard copy and soft copy documents at different level (Woreda and sub city) and in different source of data such as HMIS data, weekly data. After that the collected data was analyzed by using Microsoft Office Excel, 2016.

Ethical clearance/Ethical consideration

An official letter, written from EPHI, was submitted to each sector offices in order to get permission to do the health profile description in Woreda 05 of Nefas Silk Sub- city, Addis Ababa, Ethiopia, 2018.

Data Dissemination

The final finding/output of this health profile description project will be submitted to Addis Ababa University School of Public Health Department of Preventive Medicine, FMOH, EFELTP, AACARHB, EPHI andWoreda 05 health office and mentors.

Operational Definitions

Admission: Formal acceptance, by a health facility, of a patient who is to receive medical or paramedical care while occupying a health facility bed [4].

Antenatal care (ANC) coverage: proportion of pregnant women attended, at least once during the current pregnancy, by a health professional, for reasons related to pregnancy [4].

Average household size: The mean number of members per household [4].

Child mortality rate (CMR): The probability of dying between exact age one and the fifth birth day per 1000 children surviving to the first birth day [4].

Contraceptive acceptance rate (CAR): proportion of women of reproductive age (15-49 years) who are not pregnant who are accepting a modern contraceptive method (new and repeat acceptors) [4].

Contraceptive prevalence rate (CPR): proportion of women of reproductive age (15-49 years) who are using (whose partner is using) a contraceptive method, at a particular point in time [4].

Crude birth rate (CBR): The registered number of live births for every 1000 population in a given year or period of time [4].

Crude death rate (CDR): The registered number of deaths for every 1000 population in a given year or period of time [4].

Demography: The study of population and its characteristics, with reference to such factors as size, age structure, density, fertility, mortality, growth and social and economic variables [4].

Health Budget Utilization: ratio of Health budget utilization to allocation [4].

Infant Mortality Rate (IMR): The number of registered deaths among infants (below one year of age) per 1000 live births in a given year or period of time [4].

Leading causes of morbidity: The most frequently occurring causes of morbidity (usually 10) among inpatients for which the greatest number of cases have been reported in a given year [4].

Leading causes of mortality: The most frequently occurring causes of mortality (usually 10) under which the greatest number of deaths have been reported during a given year [4].

Live birth: The complete expulsion or extraction from its mother of conception, irrespective of the duration of pregnancy, which after such separation shows any evidence of life [5, 6].

Maternal Mortality Rate: The number of registered deaths among women, from any cause related to or aggravated by pregnancy or its management (excluding accidental or incidental causes) during pregnancy, childbirth or within 42 days of termination of pregnancy, irrespective of the duration or site of the pregnancy, for every 100 000 live births in a given year or period of time [4].

Neonatal death: A death of a live born baby within 28 days of birth [5, 6].

Population: All the inhabitants of a given country or area considered together [4].

Postnatal care (PNC) coverage: proportion of women who seek care, at least once during postpartum (42 days after delivery), from a skilled health attendant, including HEWs, for reasons relating to post-partum [4].

Proportionate mortality rate (PMR): describes the proportion of deaths in a specified population over a period of time attributable to different causes [7].

Safe water supply coverage: proportion of households using an improved water (free from harm) source as their main source of drinking water [4].

Sex ratio: The number of males in a population or specific sub-population, divided by corresponding number of females, conventionally multiplied by 100 [4].

Skilled Birth Attendant: proportion of deliveries attended by skilled health attendants (excluding trained or untrained traditional birth attendants) [4].

Still birth: A fetal death with no signs of life at ≥ 28 completed weeks of gestation [5, 6].

Stillbirth Rate: proportion of stillbirths from total births attended by skilled health attendants [4].

TB cure rate: percentage of a cohort of new smear-positive TB cases registered in a specified period that was cured as demonstrated by bacteriologic evidence (a negative sputum smear result recorded during the last month of treatment and on at least on one previous occasion during treatment [4].

TB death rate: percentage of a cohort of new smear-positive TB cases registered in a specified period that died during treatment, irrespective of the cause [4].

TB defaulter rate: percentage of a cohort of new smear-positive TB cases registered in a specified period that interrupted treatment for more than 2 consecutive months [4].

TB treatment success rate: percentage of a cohort of new smear positive TB cases registered in a specified period that successfully completed treatment [4].

Under-five mortality rate: The probability (expressed as a rate per 1000 live births) of a child born in a specified year dying before reaching the age of five if subject to current age-specific mortality rates [4].

6.5 Result

General situation of the woreda

Establishment of the woreda

The health profile assessment was conducted at Woreda 05, found in Nefas silk sub city of Addis Ababa City Administration, revealed that the Woreda was established 12 years ago in 1999 E.C. There was no any related history with the name and establishment of the Woreda as well any historical aspect in the Woreda.

Woreda location and climatic condition

The Woreda is located at an altitude of ranging from 2211-2302 meter and at 471629.63 X-coordinate and 992200.05 Y-coordinate. Woreda 05 of Nefas silk sub city is bordered with Kirkos sub city from some part of north, south and east directions, Woreda 06 of Nefas silk sub city from south and east directions, and Woreda 04 borders from west direction. The Woreda covers an area of 1,962,200 m^2 (1.9622km^2) which covers 3.34% from the total area of the sub city. The Woreda is divided in to five ketenas (ketena 1 to 5), 21 sefers and 68 blocks. The Woreda has no any rural area (100% of the Woreda is urban). The average annual rain fall of the Woreda was 1180.4mm and annual temperature ranges from 10.6 - 22.8 ^{o}c. All area of the Woreda is classified as a highland climatic zone.

Main offices in the woreda

The Woreda contains four main government organizations at woreda level, namely Woreda 05 health office, Woreda 05 education office, Woreda 05 administrative office and Kera Cattle Market (abattoir). The Woreda health office is located at 471573.95 X-coordinate and 991663.51 Y-coordinate. The Woreda administrative office and education office is found at one building, located at 471758.38 X-coordinate and 992356.44 Y-coordinate. There is no water office, transport office, electric power office and the like at Woreda level and also there is no Non-Governmental Organization (NGO) and other supporting partners working in the Woreda.

Woreda population characteristics

The Woreda contains 7594 households and a total population of 31135, 14401 male and 16734 female (sex ratio = 86% (Fig 1.1). There was no well-organized population data by age group, ethnicity and ketena. Even if there was no well-organized data, some numbers (which was not consistent with the total number of population) indicate that the majority of the populations are female, Amhara and ketena 2 by sex, ethnicity and ketena respectively. The data for religion was found well organized and consistent with total number of population. Majority, 2429 (78 %) of

the total population were Orthodox religion follower followed by 3642 (11.7 %) Muslim and 2732 (8.8%) Protestant religion follower (Table 1.1).

Depending on 2007 EC estimation, the average household size of the Woreda was 4.1 with population density of 137.5 person per hectare and there is no estimated number for average annual population growth rate for the Woreda.

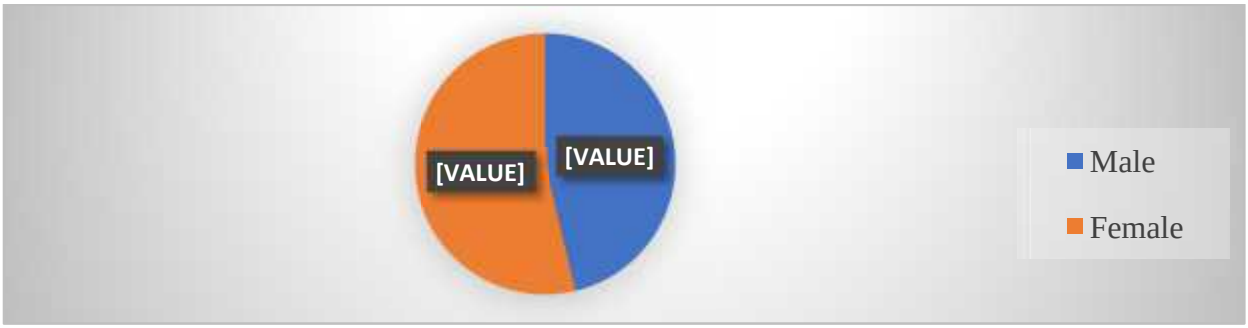


Figure 6.1: Population distribution by sex, Woreda 05 of Nefas silk sub city, 2009 EC.

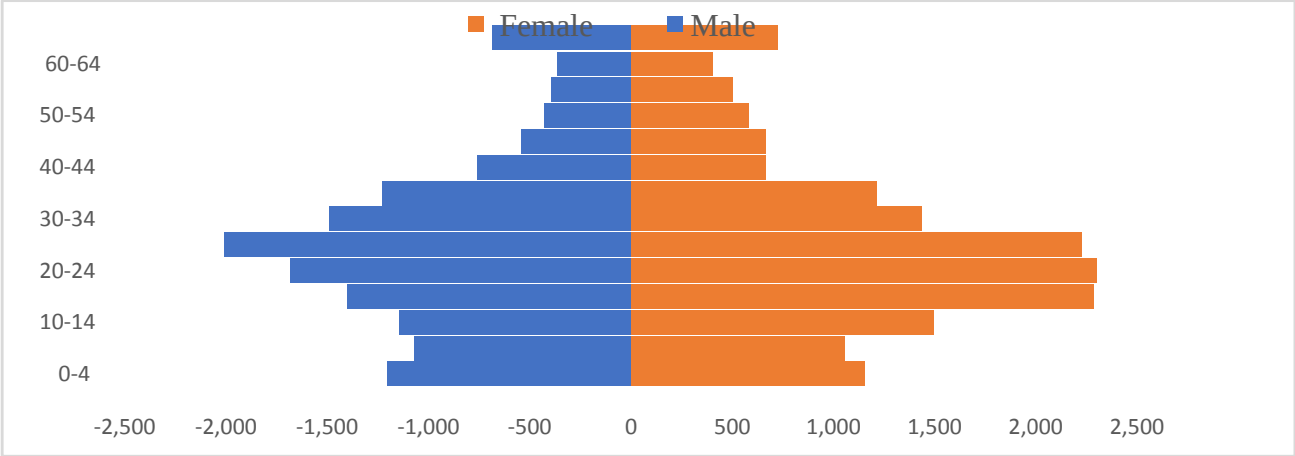


Figure6.2: Population pyramid, Woreda 05 of Nefas silk sub city, 2009 EC.

Table6.1: Population distribution by Religion, Woreda 05 of Nefas silk sub city, 2009 EC**.**

Religion	Frequency	Percent
Orthodox	24292	78
Muslim	3642	11.7
Protestant	2732	8.8
Catholic	234	0.8
Other	235	0.8
Total	31135	100

Infrastructures in the woreda

The Woreda had asphalt and coble stone made roads. The data for kilo meter of these asphalt and coble stone roads coverage as well as the daily transportation flow of vehicles in the Woreda was not available. A total of 3510 households have a latrine (732 private and 2778 communal) and the data for latrine utilization rate is not available.

A total of 10204 buildings were found in the Woreda including individual households, which covers 58.5 hectare of area (29.8 % of the Woreda's total area coverage). There was no any type of banks and post office in the Woreda, but many types of banks such as Commercial bank and other private banks are located at the border of Woreda 06 and 05. All households have electric power and water supply, but its availability is intermittent, especially the water supply. The data for daily water consumption of an individual is not available.

Bases of the woreda economy/Income

Twenty-one percent of the population are Private employer, such as merchant followed by 3804(12.22 %) Government employer and 160 (0.51 %) livestock breeding and cultivation. The rest, 20774 (66.72%) of the population economy is based on other businesses, such as daily laborer and unknown number of the population are jobless and counted in other businesses. The data for average monthly/annual income of a household was not available.

Schools and Education in the woreda

A total of 15 schools (2 Government and 13 Private) were found in the woreda. Out of these 15 schools six are kindergarten, five primary, three secondary and preparatory and one TVET school. The TVET School is a private school opened by this year (2010 EC).

Even if I can't get the data for the Woreda plan (targeted number of students) for the year (2009 EC), there are a total of 3315 students (1510 at Government schools and 1805 at Private schools). In 2009 EC a total of five students dropped out their schooling due to changing their residency area. The majority 26974 (86.64 %) of the population had learned at least college level (diploma and above), 1341(4.31%) can read and write and the rest 2819 (9.05%) are illiterate.

Infrastructures and health related issue in schools

All schools in the Woreda (government and private schools) have electric power supply and functional latrines with water supply and separated for male and female as well for students and teachers. All schools except for Kindergarten schools have health related clubs such as HIV/AIDS club. The Woreda had a total of 196 teachers (102 male and 94 female).

Health and health related situations of the woreda

Health facilities and related issues

The Woreda had a total of one government health center with 5 beds (one for emergency), four private clinics (one Internal Medicine Specialized Clinic with two beds and three medium clinics), five drug stores and six pharmacies. Of the private clinics one is newly opened by this year (2010 EC). There was no any hospital and health post found in the Woreda. The total health institution to population ratio of the Woreda was 1 to 6227.

All the health facilities (government as well as private facilities) found in the Woreda has Electric power supply and only two of them (one government and one private) has a generator as a backup. All health facilities in the woreda also have latrine and water supply, but the water availability is intermittent. The Woreda had no its own ambulance.

Health workers and health service coverage

A total of 103 health professionals (87 government staffs and 16 private staffs) were found in the Woreda. The majority 40 (38.8 %) of health professionals are nurses followed by health officers 18 (17.5 %). There is only one surgeon specialist working at Private Specialized Internal Medicine Clinic found in the Woreda. There is no any general practitioner, health informatics and health education expert working in the Woreda (Figure 1.3). The total health professional to population ratio of the Woreda was approximately 1 to 302 and the health service coverage of the Woreda was 128.5%.

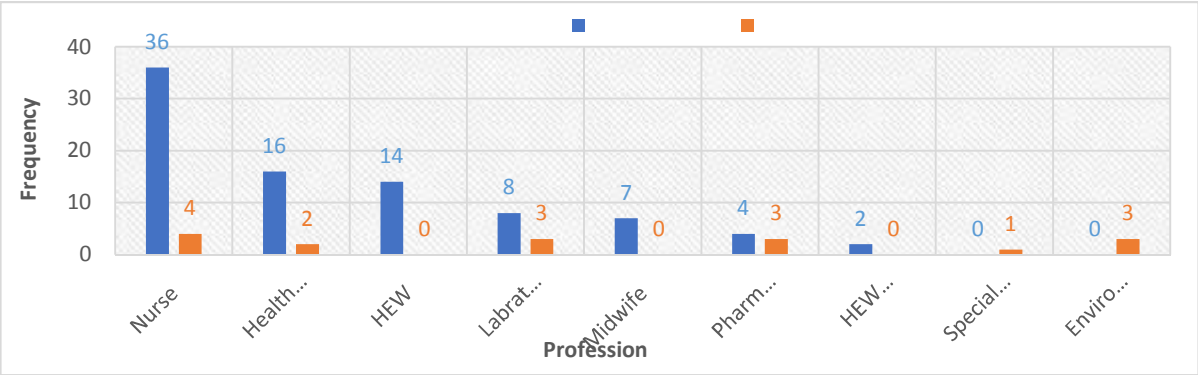


Figure 6.3: Distribution of health professionals at Woreda 05 of Nefas silk sub city, 2009 EC.

In 2009 Ethiopian fiscal year a total of 13,900,000 ETB was allocated for the Woreda budget. Out of this Woreda budget, 435,177 ETB (3.13%) was allocated for the health office excluding health facility budget. From a total of the health office budget 268202 ETB (61.6%) was allocated for health-related activities and the rest 166975 ETB (38.4%) was for staffs' salary. From a total of allocated health office budget, the health office utilizes 409506.2 ETB (Health

Budget Utilization of the health office was 94.1%). This budget was increased by 6177 ETB (1.4%) from 2008 budget and exceeds by 27762 ETB (6.4%) from total allocated health office budget in 2010 EC. The health center has a total budget of 4928440, 7444629 and 9514318 ETB by 2008, 2009 and 2010 EC, respectively. The Woreda has no any allocated budget from Non-Governmental Organizations.

Public health emergency preparedness

The Woreda had Rapid Response Team (RRT) composed of Woreda health office head, pharmacist, laboratory expert, extension supervisor and Woreda PHEM officer. The RRT investigate and respond to any suspected outbreak in the Woreda, mobilize resource for outbreak response and they coordinate other supporting organizations in relation to health activities in outbreak situation. They had also monthly meeting in which the overall Woreda's health status and related issues as well any health risks will be updated and discussed.

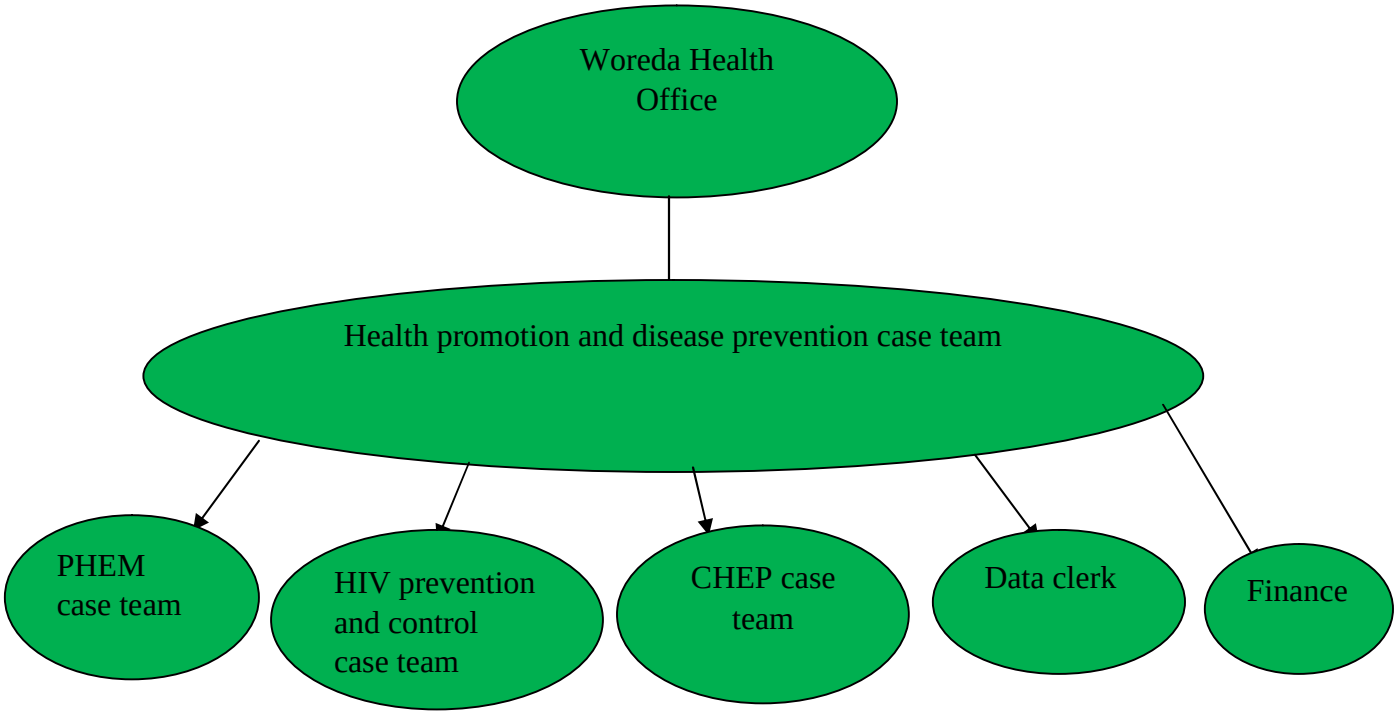
There were also a total of 40 separate teams of volunteer community workers such as CHWs/CHPs and 1 to 5 providing community services. From these 40 teams 10 of them works on health and related issues. Within each team there are five members, implying a total of 50 volunteer individuals are working on health and related issues. These volunteer community workers has the responsibility to notify any suspected outbreak or cluster of cases, unusual occurrence of events to HEWs and convince pregnant women to attend the four cycle ANC and PNC follow-up before and after delivery, respectively. They convince the community to have positive attitude towards health workers and improve community health seeking behavior. They also coordinate the community and conduct sanitation campaign as required.

The other community health service providers are HEWs. There are 14 HEWs in the Woreda providing health education, vaccination, vitamin-A supplementation and consultation service for the community. They also engage in additional need-based activities such as in an outbreak situation.

Waste management in the woreda

For waste management there were 23 cleaners (government employer), five volunteer teams and safety net team working in the Woreda. They clean waste water tubes, roads and also collect waste from each house. These cleaning activities are being done at least three times a week and disposed to waste collecting bin. The safety net team get financial advantage by selling recycled materials like metals collected from the west.

Organogram of Woreda 05 of Nefas Silk Sub City Health Office



Vital Statistics and health indicators

Even if there was no well-organized data on vital statistics, a total of 33 deaths (12 female and 21 male) and 250 births were registered in 2016/17 (Woreda vital statistics report). From the sub city HMIS data, a total of 282 live births and one still birth was occurred in the woreda. This gives Crude Birth Rate of 8(based on vital statistics data) and 9.1 (based on HMIS data), Crude Death Rate of 1.1 (based on vital statistics data) and Still Birth Rate of 0.4% (Based on vital statistics data). A total of 811 and 461 pregnant women has attended their first and forth ANC visits, respectively. A total of 283 pregnant women has attended delivery by skilled health personnel in the same year (2009 EC). Although the MCH service in the Woreda is found at good status, many pregnant mothers didn't attend the 4th ANC visit because they went to their parent to rural areas (out of Addis Ababa) to deliver there and lost to attend their last ANC visit, but they still experience skilled birth.

A total of 1161 (609 repeated and 552 new) contraceptive acceptors were identified and most (57.6%) of them are in 25-49-year age group. From many options of contraceptive methods most (44.9%) of them use implant followed by Intra Uterine Contraceptive Device (IUCD) (14.4%) (Table 1.2). The contraceptive acceptance and prevalence rate of the woreda was 11.6% and 10.8% respectively.

Table 6.2: Number of contraceptive acceptor women and contraceptive options used, Woreda 05 of Nefas silk sub city, 2009 EC.

Age group	# of contraceptive acceptors	Contraceptive options	# of users
Less than 15 years	41	Oral contraceptives	81
15-19 years	98	Injectable	124
20 - 24 years	353	Implants	521
25 -49 years	669	IUCD	167
Total	1161	Others	268
		Total	1161

The immunization coverage for children and women of child bearing age is found at good status and lost individual is linked to Community HEW to be addressed with outreach vaccination or convinced to have it at a health facility. The immunization dropout rate in the woreda was zero in 2009EC. The immunization coverage for different diseases is shown below (Table 1.3).

Table 6.3:Immunization coverage for different diseases, Woreda 05 of Nefas silk sub city, 2009 EC.

Vaccine	plan	Performance	Coverage (%)
BCG	400	485	121
Penta 1	700	805	115
Penta 3	700	889	127
Polio 1	700	818	117
Polio 3	700	890	127
PCV 1	700	803	115
PCV 3	700	889	127
Rota 1	700	818	117
Rota 2	700	889	127
Measles	700	911	130
Tetanus toxoid	700	851	122
All types completed	700	911	130

Top ten causes of OPD visit and admission

In considering the top ten leading causes of OPD visit (morbidity), Acute Upper Respiratory Tract Infections was the leading cause of OPD visit in both under5 and adult OPDs followed by diarrhea (non-bloody) in under 5 OPD and Urinary Tract Infection (UTI) in adult OPD

(Figure1.4 and 1.5). The data for top ten leading causes of OPD visit was not organized by sex for both under 5 and adult age group.

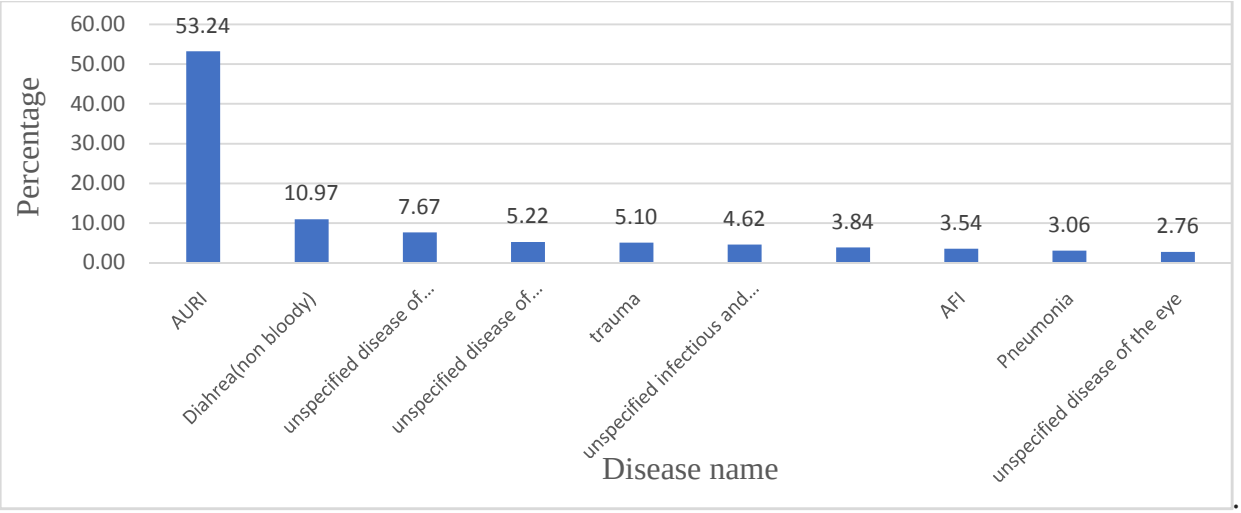


Figure 6.4: Top ten causes of OPD visit in under 5 OPD, Woreda 05 of Nefas silk sub city, 2009 EC.

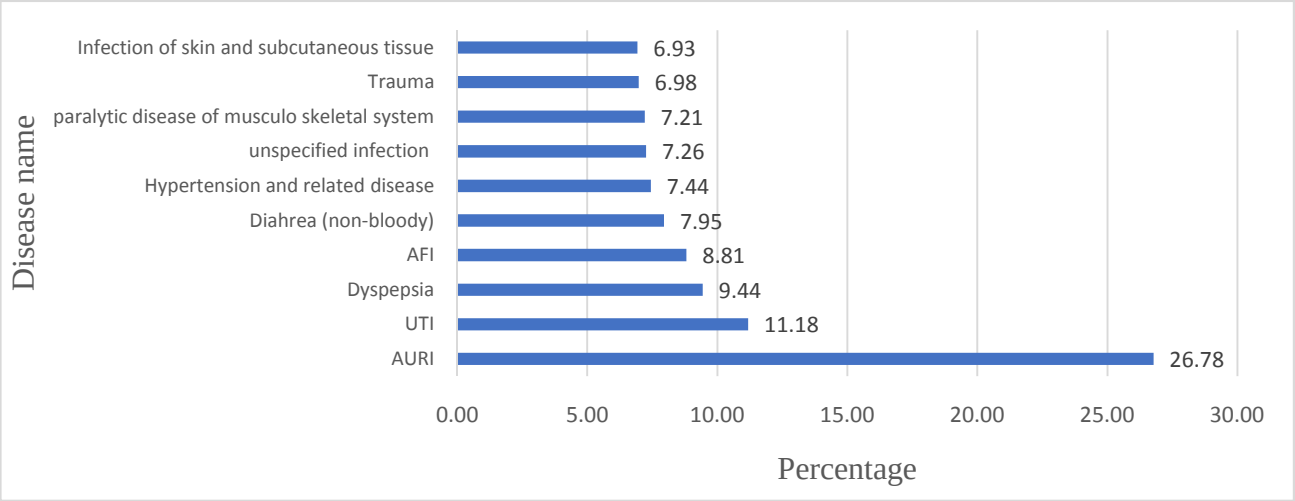


Figure6.5: Top ten causes of OPD visit in adult OPD, Woreda 05 of Nefas silk sub city, 2009 EC.

Regarding to top ten causes of admission, Dehydration secondary to diarrhea and other chronic diseases (54.55%) is the first cause of admission followed by Hyperemesis (20.46 %), Diabetic mellitus (13.64 %) and shock (11.36 %). No case was admitted due to other cause in the last year (2009 EC).

Endemic diseases and conditions

The Woreda had prioritized and includes 22 diseases and events in its public health surveillance system. These diseases and events under surveillance are similar with those diseases and events identified and prioritized to be included in the surveillance system by EPHI as well as the city administration PHEM system.

In 2009 EC a total of 236 (113 male and 123 female) malaria cases were tested positive by blood film and Rapid Diagnostic Test (RDT). Of these total cases, 9 were inpatient cases due to Plasmodium falciparum and 2 due to other species (HMIS monthly report).

A total of 738 and 3024 Clients had tested and received HIV test result at VCT and PICT respectively. Of these tested at VCT and PICT, a total of 42(5.7%) (11 male and 31 female) and 31 (1%) (6 male and 25 female), were tested positive, respectively. Most of the clients (76.7%), who received HIV positive test result were in age group of 25-49 years (productive and reproductive age group). A total of 52 adults and children with HIV infection had newly enrolled in Pre ART care and a total of 283 adults and children were on ART by the end of 2009 EC. In 2009 EC no one had received Post Exposure Prophylaxis (PEP) for risk of HIV infection in the Woreda.

A total of 13 (7 male and 6 female) bacteriologically confirmed new PTB cases and 26 new EPTB cases were diagnosed clinically in 2009 EC. Twelve bacteriologically confirmed TB cases has enrolled in the cohort, of which 9 cured (75% cure rate), 1 lost to follow-up (8.3% defaulter rate) and 2 treatment failure (16.7%) and moved to MDR TB register. This implies 91.7% TB treatment success rate and 0 TB death rate. Twenty-one clinically diagnosed new EPTB cases were enrolled in the cohort, of which 18 completed treatment, 1 lost to follow-up, 1 treatment failure and 1 death occurred (PMR of 3%). Seven (17.9%)TB cases of all forms were diagnosed through private health facilities in 2009 EC. A total of 48 TB cases (28 male and 20 female) were enrolled to DOTS and has tested for HIV, of which 8 (16.7% prevalence) (4 male and 4 female) were tested positive, 28 (17 male and 11 female) tested negative and the result for the rest 12 cases were not known or undocumented. Total number of HIV positive TB patients registered in the year were two. A total of 50 clients were newly enrolled in HIV care. No case of any form of TB was diagnosed by the community (HEWs) and referred to heath facility for TB diagnosis and treatment. No leprosy case was detected during the year (2009 EC).

By the year 2009 EC, a total of 282 live births were weighted and 36(12.8%) recorded with moderate malnutrition, 10 (3.6%) recorded as severe malnutrition and the rest were normal. A total of 6095 children were screened for malnutrition and 11 (0.18%) of them had severe malnutrition. Of these severely malnourished children 5 (45.45%) had exit from the severe malnutrition treatment, 5 (45.45%) had defaulted and no evidence for the rest one case status. 2399 children, aged 6-59 months had supplemented with vitamin-A by 2009 EC.

There was no essential emergency drug shortage in the Woreda during the year (2009EC), but insulin for diabetic mellitus and hypertension drugs shortage were happened occasionally.

Outbreak and disaster situations

In 2009 EC, there were flooding in the Woreda, which happened due to breakage of a bridge, affecting 20 households. Out of these 20 households five houses were destroyed completely together with the properties inside them. The rest 15 households were not destroyed completely, but cooking utensils and documents were out of service and some were taken by the flood.

Following the flood diarrheal outbreak was happened and 98 cases (52 female and 46 male) seen within 3 days following the flooding. From a total of 98 cases, 78 cases were adult and 20 cases were under 5 age. No one case had developed complication and no death was happened. Together with other collaborating organizations such as Disaster Preparedness and Prevention Commission (DPPC) organization, the Woreda Health Office had done many response and rehabilitative activities such as provision of shelter, food, cloth and free medical service were provided.

Three prioritized public health risks

Considering risks for public health, the Woreda had prioritized three risk factors causing diseases in humans:

1. Many toilets are linked to waste tubes which enter to Akakai river, in turn the river water is being used for irrigation and other purposes
2. Cattles were being stayed in daily rented compounds around Kera Cattle market, in which their urine was flowing to waste tubes and roads causing a bad odor contributing to the increment of Upper Respiratory Tract infections
3. Even though there was 100% water coverage in the Woreda the quality of the water was impaired and disrupted with many coliforms and low chlorine residual as reported by Addis Ababa regional laboratory

Actions taken for prioritized risks

To resolve these problems, the Woreda has taken the following interventions/activities:

1. Official letter was written for the sub city water, agriculture, trade and industry offices regarding the above risk factors
2. Woreda RRT was informed about the issues
3. Recommendation was given for the Woreda cleansing department to identify waste tubes affected by toilets and cattle urine and communicate to the concerned body

6.6 Discussion

Woreda 05 of Nefas silk sub city includes some offices/organizations such as Woreda health office and education office at Woreda level, but there is no water office, transport office, electric power office at Woreda level rather these organizations exist at sub city level. This leads poor quality service delivery and infrequent monitoring of services related to these organizations at the Woreda level. No NGO and supporting partners were working in the Woreda.

Different offices found in the woreda are being used different population number, that means some offices use updated population number and some use not updated one, indicating poor quality data utilization and management. The sex ratio for the woreda was 86.1% which is less than the sex ratio for Addis Ababa (91%) as well national (102%) [4]. The data for source of income or occupation is not well counted, for example majority 20774 (66.72 %) of the population economy base is classified as other business including jobless individuals and also the possible options for other business was not clearly indicated.

Most (86.7%) of the schools found in the Woreda were private schools. Even though, most of the populations (86.64%) in the Woreda has learned at least college school there were many peoples (9.05%) who were illiterate. This is not expected by this time because education is basic element for development now.

All households, schools and health facilities have water and electric power supply, but these two supplies may not available for more than two weeks especially the water. As a backup, all health facilities/schools has a water tanker (1500 to 10,000 liter) for storing water bought from other water available Woreda and only two health facilities(one government and one private) has a generator as a backup for electric power intermittency. This supply intermittency affects quality of service delivery and is a risk factor for many diseases especially faeco-oral transmitted diseases.

The Woreda has a total of 196 teachers almost with a 1:1 sex ratio. This number gives a teacher to student ratio of 6 to 100, that means 6 teachers are assigned for 100 students or one teacher assigned for approximately 17 students.

The Woreda had no its own ambulance, but at sub city level there are two ambulances serving for all 13 woredas found in the Sub city. Although there were two ambulances at sub city level, they were not functional for long time due to lack of driver because of unsatisfactory salary compared to the work load. Health professionals working at emergency and delivery were challenged and critically complaining about lack of ambulance. The total health institution to population ratio of the Woreda was 1 to 6227 and there was only one government health center for a total of 31135 population, which is below the standard (1 health center for 25 000 population).

The Crude Birth Rate of 8(based on vital statistics data) and 9.1 (based on HMIS data) was very low when compared to CBR for Addis Ababa (23.3) and national (33.62) and the Crude Death

Rate (CDR) of 1.1 (based on vital statistics data) was also very low compared to CDR for Addis Ababa (6.3) as well national (9.22) (4). These low rates might be due to low People understanding on the importance of registering deaths and births. As a result, most individual didn't go to the vital statics registration office to register deaths and births. The other thing that need stress is, any person died or born at any time is counted as died or born in the registration year, hence it didn't show the true rate of birth and death of the registration year. Now there is an initiative to capture deaths and births timely through HEWs and other volunteer CHWs.

In analyzing the data for ANC and PNC coverage of the woreda, lower ANC (111.8%)coverage was seen compared to ANC coverage for Addis Ababa (116.9%) and higher than national (82.2%). The PNC coverage (80.8%) of the woreda was higher than PNC coverage of Addis Ababa (37.2%) as well national (42.1%). The contraceptive acceptance rate of the woreda was 11.6% which is much lower than contraceptive acceptance rate for Addis Ababa 28.4% as well national (61.7%) [4].

Of 282 live births weighted, 16.3% of them were below the normal (low birth weight), which was higher than the low birth weight rate for Addis Ababa (12%) as well national (11%). The annual TB cure rate of the woreda was 75%, which was almost equal with TB cure rate of Addis Ababa (76.4%) and higher than the national cure rate (65.7%) [4].

The immunization coverage of the woreda for measles and full immunization (130% each) was very high compared to vaccination coverage of measles (86.5%) and full immunization (84.4%) for Addis Ababa as well for national measles (81.5%) and full immunization (74.5%) [4].

Although the immunization coverage of the Woreda is appreciable, the coverage for all diseases were above 100%, this might be due to planning problem (planned to provide the service for small number of individuals) and provision of vaccine for not recommended group of population. Some vaccines were opened and not used (discarded) and some were given for not recommended group, leading high vaccine wastage.

Acute Upper Respiratory Infections (AURI) were the leading cause of morbidity in both under 5 and adult OPD, but at national level malaria was the leading cause of morbidity, admission and mortality (4). Dehydration secondary to diarrhea and other chronic diseases, hyperemesis, diabetic mellitus and shock are the only causes of admission in the Woreda in 2009 EC. These AURTI and diarrhea may be related to poor sanitation and high intermittency of water supply. Other cases with complication or in need of admission were referred to Zewditu Memorial Hospital (catchment area for the Woreda).

A total of 3510 households have a latrine (732 private and 2778 communal). The communal latrine is for households living by renting governmental (kebele) houses, who uses a single latrine and a private latrine is owned by an individual (owner of the house) and serves for the household as well for individuals living by renting their home.

There is number discrepancyat Woreda and Sub city level and between different data source (HMIS and OPD data) for example malaria data and vaccination coverage data.

The flooding event happened in 2009 EC, was managed effectively by the Woreda. They had provided essential services such as food, shelter, cloth, free medical service and some rehabilitative activities for affected individuals. Especially in the health sector side, it is appreciable result to have no complication and death following diarrheal disease outbreak happened following the flooding. This indicates the Woreda has a good performance and capacity in managing public health emergencies.

In the Woreda, there was a local organization at each ketena called community police, responsible for Woreda justice office. Each community police have 5 to 10 members (polices) depending on the number of the populations in the ketena and there is one sagin as a leader in each community police organization. These community police have the responsibility to negotiate local conflicts and if not resolved by them, they will transfer it to the higher level (Woreda) justice office. They also collaborate with HEWs in sanitation campaign and in convincing even enforcing TB defaulter to continue their treatment. As all they work for the community peace and health.

6.7 Limitation

Although, most of the data for describing the health profile of Woreda 05 of Nefas silk sub city was accessed, there were data which were not available/not accessed such as water coverage of the woreda, telecom information and transport flowdue to many reasons like absence of the responsible person in the office during the assessment time. Since all information was not available at the related sector, any available recent hard copy and soft copy documents prepared since 2007 EC were used as a data source. Some government organizations such as water office, Electric Power office and transport officealso not established at Woreda level, this affects data availability at Woreda level.

Data for conversion factor and expected number of some events and population such as pregnancy and women of fertile age group was used from 2007 EC estimation for Addis Ababa, this might not be exactly correct for 2009 EC and for Woreda 05 of Nefas silk sub city. Some data also not aggregated by pertinent variables such as ketena, sex and age, therefore some rates such as child mortality rates were not computed and discussed. There is data variation at different organizational level (Woreda and sub city) and at different data sources (for example HMIS data and IPD/OPD data). There was also limited time to do the assessment which might compromise the data completeness and quality, therefore understanding and interpretation need to consider these limitations.

6.8 Conclusion and Recommendation

There were many problems found in the Woreda including absence of some governmental organizations at Woreda level, lack of supporting NGOs, lack of referral hospital, lack of ambulance, lack of experts on health informatics, health education, environmental health etc in the Woreda. The access of ambulance for emergency case was limited. There was also data management and organization gap with discrepancy seen at different reporting level and different data sources. The top ten causes of morbidity was Acute Upper Respiratory Tract Infections in both adults and under 5 year age group. Depending on assessment result the following recommendations were given:

1. Pertinent governmental organizations such as water office and electric power office need to be available at Woreda level
2. Supporting partners and NGOs need to be attractedto the Woreda to provide support
3. Referral hospital with full of logistics including human resources need to be avail in the Woreda
4. The Woreda need to have its own ambulance with driver for timely referral of acute cases
5. The data discrepancy at different reporting level and different data sources need to be avoided and training should be given on data organization and management
6. Health interventions in the woreda need to be implemented according to their priority
7. The water and electric city power availability need to be improved
8. Schools need to be expanded to increase access to the population especially the governmental schools
9. Registration of births and deaths need to be our culture and documentation should be in the same year of event occurrence
10. Immunization/vaccination planning should be based on previous years trend
11. Data quality should be maintained to have appropriate decision and planning
12. The health profile of the Woreda need to be assessed regularly

6.9 Reference

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Chapter Seven: Epi-project thesis proposal

7. Assessment of predisposing factors of undernutrition in Addis Ababa City Administration, 2019.

7.1 Summary

Introduction: Malnutrition is a state in which the physical function of an individual is impaired to the point where he or she can no longer maintain adequate bodily performance process. Malnutrition is directly or indirectly responsible for approximately one-half of all childhood deaths globally. Global prevalence of stunting, underweight and wasting in children under-five years are 26, 16, and 8%, respectively. Under 5 mortality is expected to increase in Sub-Saharan Africa where the prevalence of childhood malnutrition is about 41%. Ethiopia is also one of the countries in the Sub-Saharan Africa with the highest rates of malnutrition. The burden of malnutrition in Ethiopia is the second highest in sub Saharan Africa. The prevalence of child stunting, underweight and wasting in Ethiopia were 44% stunted, 10% wasted and 29% underweight.

Objective: The objective of this study was to identify predisposing risk factors of undernutrition to reduce the number of malnutrition cases and its consequences in Addis Ababa City Administration, 2019.

Methodology:A1-2 unmatched case-control study to assess predisposing risk factors of undernutrition in under five children will be carried out at Addis Ababa City Administration from 2nd week of July to end of September/2019. The study will be conducted at maternal and child health departments of selected health facilities. Two health centers with high number of case report will be selected from each sub-cities and additionally Missionary of charity clinic providing free health service for the poor will be included in the study. The sample size is determined by using Epi-info software and found to be 335.All children less than five years old who visited the maternal and child healthclinics during the data collection period will be screened and classified as case or control based on their anthropometric measurement. After measurements, mothers of the children will be interviewed by using pre-prepared data collection tool. A brief orientation will be provided to the data collectors to maintain data quality. Data analyses will be performed using Epi-info software version 7.2.2.16. Micro Soft Excel 2013 will also be used to do simple calculations. Bivariate and multivariate logistic regression will also be applied to test association. The proposal will be reviewed and approved by the Ethiopian Public Health Institute ethical review committee to proceed. Permission to carry out the study will be obtained from Ethiopian Public Health Institute, Addis Ababa City Administration Regional Health Bureau, sub-city and woreda health office and selected health centers. Informed consent will also be obtained from the participants before they are recruited to participate in the study.

Key words: Undernutrition, predisposing risk factors, Addis Ababa, Ethiopia.

7.2 Introduction

Malnutrition literally means "bad nutrition" and technically includes both over- and under-nutrition. The World Food Program (WFP) defines malnutrition as "a state in which the physical function of an individual is impaired to the point where he or she can no longer maintain adequate bodily performance process such as growth, pregnancy, lactation, physical work and resisting and recovering from disease".[1]

The term “malnutrition” is usually used to describe Protein Energy Malnutrition (PEM). The comprehensive term of PEM” is universally accepted and its severe forms are called “marasmus”, “kwashiorkor” and “marasmic kwashiorkor”. The distinction between the two forms of PEM is based on the presence of edema (kwashiorkor) or absence of edema (marasmus). Marasmus involves inadequate intake of protein and calories, whereas a child with kwashiorkor has fair-to-normal calorie intake with inadequate protein intake. [2]

Protein-energy malnutrition (PEM) was first described in the 1920s, is observed most frequently in developing countries but has been described with increasing frequency in hospitalized and chronically ill children in the United States. [3]

Protein-energy malnutrition (PEM) is not due to deficiency in a single nutrient, but is often a result of inadequate intake or poor utilization of the food. For a long period the focus was on lack of protein in the diet, however now it is generally accepted that the lack of energy in the food is a more important and common factor for development of PEM. [4]

Statement of the problem

Protein energy malnutrition (PEM) is one of the most serious nutritional problems with fatal consequences accounting for almost half of all premature deaths from nutrition related diseases. Malnutrition increases the risk and worsens the severity of infections. Infants and young children are most affected by malnutrition as they have increased nutritional needs to support growth. Undernourished children, as well as children with severe malnutrition, have a higher risk of dying than children with an optimal nutritional status. [5, 6]

Malnutrition, however, remains widespread globally, and its recognition and prioritization are often neglected by clinicians, practitioners, and policy makers. Of the $10.3 billion budgeted in 2017 for funding US global health programs, the majority is focused on diseases such as HIV, malaria, and tuberculosis, and only $109 million or 1% is directly allocated for nutrition. 3 Because the etiologies of malnutrition are multifactorial and interrelated, no single magic bullet exists to eradicate it. [7]

Although malnutrition is a prognostic factor associated with morbidity, mortality, and costs of care nutritional problems in older adults often remain undetected or unaddressed. One-fourth of the patients who are nutritionally at risk do not receive nutritional support or counseling, despite having been in contact with health care professionals. [8]

Malnutrition is directly or indirectly responsible for approximately one-half of all childhood deaths globally. Throughout the world, approximately 9% of children from below five years of age are suffering from wasting, stunting and are at risk of several impairment in growth, psychological development and health. Global prevalence of stunting, underweight and wasting in children under-five years are 26, 16, and 8%, respectively.[9, 10, 11]

A study of school-age children from Developing countries found the overall prevalence of stunting to range between 48-52% with an overall prevalence of underweight between 34-62% notes that among school-age children stunting and underweight are more prevalent than wasting. Malnutrition is one of the most important global child health problems and accounts for 11% of the global burden of disease. Globally, it was estimated that one in every three preschool children is malnourished. [12, 13, 14]

In 2011, an estimation of 165 million children under-five years of age were underweight, 101 million were stunted and 52 million were wasted. Malnutrition is also recognized as the underlying cause of related deaths of childhood disease such as measles, diarrhea, and acute respiratory infectious diseases. Studies have reported that despite the economic development, childhood malnutrition still remains a significant public health problem in developing countries. [14, 15, 16]

Undernutrition contributes to half of all deaths and 28% of stunting in children worldwide. In the developing countries, 52% and 34-62% of the school-age children are stunted and underweight, respectively. If interventions are not carried out, it is estimated that close to one billion children will be physically and mentally impaired by 2020. UNICEF had reported 15% of under five children suffer from being under weight and 25% from stunting worldwide. [17, 18, 19]

Interestingly, under 5 mortality is expected to increase in Sub-Saharan Africa where the prevalence of childhood malnutrition is about 41% compared to other regions of the developing world. This current trend of malnutrition and under 5 mortality in Sub-Saharan Africa is far from that of the Millennium Development Goals (MDG). [20, 21]

The level of under nutrition and the finding that 90% of the chronically malnourished (stunted) are to be found in children living in Asia and Africa remain not only unacceptable but also poses a serious challenge against making rapid progress towards improvement in child health and wellbeing. A number of African and Asian countries have wasting rates that exceed 15 per cent, including Bangladesh (17%), India (20%) and Sudan (16%). [22]

Ethiopia is also one of the countries in the Sub-Saharan Africa with the highest rates of malnutrition. The burden of malnutrition in Ethiopia is the second highest in sub Saharan Africa. The prevalence of child stunting, underweight and wasting were 44% stunted, 10% wasted and 29% underweight. [23, 24]

A study targeted on school age children in Addis Ababa revealed that about 31% of the children were undernourished (19.6% stunted, 15.9% underweight). Another study targeted on women also showed that more than one-third (34.7%) of women in Addis Ababa were either under or overweight. [25, 26]

Rationale of the study

According to the National Public Health Emergency Management (PHEM) guide line, malnutrition is among the twenty-two prioritized events and diseases prioritized based on established criteria's and included in the national surveillance system. These prioritized events and diseases are categorized in to immediately and weekly reportable events and diseases. Of which SAM is a weekly reportable condition by using a standardized weekly reporting format at all levels of the government (community to national level). MOH has also been developed and implementing a nationwide nutrition program and initiatives by setting strategic objectives and targets that directly or/and indirectly contributes to the reduction of malnutrition.

Ethiopia is being challenged by repeated humanitarian crisis such as droughts, flooding, conflict affecting the agricultural production and provision of balanced diet for the population. Addis Ababa City Administration is the one being affected by the situation directly or/and indirectly causing an increment of malnutrition cases and deaths. These humanitarian crisis and presence of low socio-economic class communities and street children in the city administration contribute a lot for the increment of SAM cases and deaths. Due to these reasons high number of malnutrition cases and deaths were being reported through the surveillance system from the city administration. Therefore, the aim of this study is to identify the predisposing risk factors of malnutrition, which enable to decrease the number of malnutrition cases by avoiding these identified risk factors.

Significance of the study

The significance of this study was primarily to identify predisposing risk factors of malnutrition in Addis Ababa City Administration. Following identification appropriate intervention measures will be applied to reduce malnutrition cases in the city administration. If the intervention measures are implemented with regular monitoring and evaluation, the burden of malnutrition will be reduced to an acceptable level. This in turn will reduce the cost of treating malnutrition and the time waste for attending cases will also be reduced. The time used to care malnourished patients will be used to do another productive activity. These implemented measures also enable to achieve the objectives setted in the national nutrition program and nutrition surveillance. Generally, this contributes to develop the country's economy and change the countries appearance which attract tourists and investors to invest in the country.

7.3 Literature Review

A healthy diet provides an adequate supply of all the nutrients that is necessary for best functioning of body cells Water as a transport medium of all chemical processes, Protein for tissue repair, maintenance and growth, Carbohydrate for energy given, Fat for insulation, nerve conductivity and hormones structure and Vitamins and mineral for regulation on body physiological processes. [27]

Malnutrition, especially micronutrient deficiency, adversely affects health, cognition, motor development, and general growth of children 5 years of age and younger. Malnutrition in early childhood is also associated with functional impairment in adult life, reduced work capacity, and decreased economic productivity of the individual. Malnourished children have also been found to score lower on the Bayley Scales of Infant Development compared to their healthy counterparts. Malnutrition is also related to a decline in general functional status and to decreased bone mass, immune dysfunction, delayed post-surgery recovery, high hospitalization and readmission rates, and increased mortality, among other problems. [28, 29, 30]

Nutrition transition, being experienced in low- and middle-income countries (LMICs). Undergoing rapid economic transition and urbanization, is a major driving force behind the increase in levels of obesity in LMICs, despite persistence of undernutrition. Therefore, both undernutrition and obesity-related diseases contribute substantially to the burden of disease in these societies. [31, 32]

Childhood obesity is the driving force behind pediatric metabolic syndrome risk that has become a growing public health concern in LMICs. Childhood obesity is associated with short-term health problems including heightened risk of psychosocial morbidity, cardiovascular complications and type 1 and type 2 diabetes. It is also associated with long-term problems including obesity and cardio-metabolic diseases and impaired social and economic productivity in adulthood. [33, 34]

The incidence of protein energy malnutrition in children have been the subject of extensive research for several decades, and studies shows that protein energy malnutrition affects the growth and development of children especially (0-5years). A well nourish child is one with access to adequate food supply, care and health, such a child will have weight and height measurements that compare very well with the standard normal distribution of height (H) and weight (W) of healthy children of the same age and sex. The nutritional status of children can be evaluated by their growth.The best way to evaluate the nutritional status and overall health of a child is to compare the child's growth indices with the set cult off points in the standard normal distribution of well-nourished children that are associated with adequate growth and development. [35, 36]

In general, the nutritional status of preschool children, as the most vulnerable age group, can be used as an indicator of health and nutrition of community. Consequences of childhood under-nutrition have been explained as growth failure, impaired intellectual and physical development, lower resistances to infection and high incidence rate of some chronic disease.[15, 16]

Malnutrition is not only an urgent global health issue; it is also an impediment to productivity, economic growth and poverty eradication. Despite of these consequences, malnutrition is a treatable with prompt identification, anticipation and management. Child undernutrition can be mitigated through nutritional information campaigns, broader access to maternal and child health care practices and availing affordable, diverse, and nutrient-rich food. Despite continued prevention efforts, child undernutrition remains a major public health problem in Sub Saharan Africa, including Ethiopia. [17, 37, 38]

The prevalence of stunting is on the increase in Ethiopia. This has serious implications, because child health goals for the early part of the next century have specifically targeted at improvements in the rates of stunting. One of the five health outcome targets (out of eleven total targets for health) given by the World Health Organization (WHO) in its recently revised "Health for all in the 21st century" has envisaged to reduce the percentage of children under five years who are stunted to be less than 20% in all specific sub-groups within countries by the year 2020.[32]

The prevalence of childhood malnutrition is disproportional according to region and socio-economic status of the family, as well as ecological zone with little known about children from semi-rural farming communities. Previous studies have also linked childhood malnutrition with maternal education and employment, family support and social network. Others have also associated childhood malnutrition with a number of biomedical characteristics, such as birth interval (preceding and following each child birth), maternal age at child birth, child's age and gender. [39, 40, 41]

Childhood malnutrition is influenced by multidimensional factors. These factors vary from biological, behavioral and environmental. According to the UNICEF conceptual framework for causes of malnutrition in society are immediate, underlying or intermediate and basic or root causes of malnutrition, which all interact at various levels of life to lead to child malnutrition. [42]

UNICEF, in the year 2006, reported the causes of childhood malnutrition as insufficient diet, frequent infections, poor breastfeeding practices, delayed introduction of complementary foods and inadequate protein in the diet. Other factors that influence food intake include health status, food taboos, growth and personal choice related to diet. Malnutrition can also develop due to neglect, abnormal mealtimes, insufficient quantities of food and insufficient parental knowledge. [37]

A number of studies demonstrated that childhood malnutrition is strongly rooted in poverty. However, the relationship between poverty and childhood malnutrition is rather complex. High household income may not guarantee a satisfactory nutritional outcome of the children if households are lacking of care, dietary quality and health care access. Malnutrition affects both poor and non-poor households. [43]

The primary type of PEM is purely due to dietary deficiency. This begins at the fetal stage and continues into infancy and childhood. Secondary malnutrition arises due to a serious illness like tuberculosis, cancer or inability of the body to absorb nutrients. For example in bowed disease

like ulcerative colitis, metabolic syndromes and long standing gastro-enteritis. Dietary factors contributing to PEM are inadequate breast feeding by the mother due to inability of mother's body to make milk due to inadequate nutrition, ignorance of weaning and weaning foods, inverted or cracked nipples in mother causing difficulty in breast feeding. [44, 45]

In developing countries, it is secondary to insufficient or inappropriate food supplies or early cessation of Breastfeeding. In some areas, cultural and religious food customs may play a role. Inadequate sanitation further endangers children by increasing the risk of infectious diseases that increase nutritional losses and alters metabolic demands. Poor environmental conditions may increase insect and protozoan infections and also contribute to environmental deficiencies in micronutrients. Additional factors are bottle–feeding, inadequate knowledge of proper child rearing practices and parental illiteracy. [46]

For decades it has been known that breast milk is the best nutrition for infants. Breast milk is cheap, easily available and provides all the nutritional needs of a baby up to six months of age. Some studies have found an association between prolonged breastfeeding and malnutrition, based on demographic and health surveys in19 countries, has found that still breastfed children in countries outside sub-Saharan Africa were shorter and lighter than those no longer breastfed. This became apparent at 12-18 months of age. [47]

According to international recommendation, six months old children need complementary food in addition to breast milk. A study of infant feeding practices in Malawi has shown that complementary feeding was introduced as early as 2.5 months and was seen as a risk factor for infant malnutrition. [48, 49]

Lack of education, inadequate or inappropriate education Breeds illiterate or semi–illiterate individuals who easily Succumbs to superstitions, taboos and irrational beliefs about some food items. A study conducted by Smith LC, Haddad L J, 2002 showed that one of the significant causes of malnutrition was found to be illiteracy. Study conducted in a decertified area of Sudan - Alrawakeeb valley revealed that maternal education was found to be the strongest factor associated with malnutrition among under five children. [50, 51]

Low maternal income and overcrowding were associated with higher prevalence of wasting. Studies show that Environmental and social factors as well as hygiene habits are important risk factors associated with nutritional status, as reported by Ferrari et al, 1998 in São Paulo, Brazil. [2, 52]

Overpopulation, more commonly seen in developing countries, can reduce food adequacy, leading to inadequate food intake or intake of foods of poor nutritional quality and quantity. Conversely, the effects of malnutrition on individuals can create and maintain poverty, which can further hamper economic and social development. This is explained with children starting life with low intellectual quotients and being impossible later to offer the best of their expected intellectual abilities. [53]

Research conducted in Ethiopia showed that in households where the mother attended more antenatal care visits, the children are less likely to be wasted, and those children receive vaccination against measles are also less likely to be underweight. [54]

Children are most vulnerable to undernutrition due to their low dietary intake, less access to food, inequitable distribution of food within households, improper food storage and preparation, dietary taboos and infections with pathogens. [39]

A study done in Somalia, Ethiopia showed that the level of wasting, stunting and underweight all increased with age, particularly from the age of 6 - 12 months old. At this age illness is at its highest rate, weaning foods have either not started or are of inadequate quality and mothers start to leave the children for extended periods with other careers. Catch up growth is inadequate thereafter although levels of wasting improve after about 24 months.[55]

Similarly, study conducted in Tigray, Northern Ethiopia revealed that older children were more likely to be malnourished. A cross-sectional study conducted on 622 mother-child pairs of 0 - 59 months old children in Mecha and Wenberma districts of West Gojam Zone revealed that child's age was among the contributing factors for malnutrition.[56, 57]

Older adults (aged $65 y) tend to be more prone to nutritional deficiencies because aging may come with an accumulation of diseases and impairments. These include cognitive and physical decline, depressive symptoms, emotional variations, and poor oral health, along with socioeconomic changes. All of these factors may directly influence the balance between nutritional needs and intake. Even in cases of adequate nutrient and energy intake, the nutritional status of older adults can be challenged by a compromised nutrient metabolism (such as absorption, distribution, storage, utilization, and excretion), drug–nutrient interactions, or altered nutrient needs. [58]

Between 2010 and 2050, with a predicted global increase in life expectancy, the population over the age of 80 y will grow from 11.5% to 21.0% worldwide and from 9.0% to 19.0% in the developed countries. This will result in an increase of older adults at risk of malnourishment. [59]

Study conducted in Somali, Ethiopia revealed that boys tend to be more malnourished than girls at most ages, although this is not understood to be related to any differences in practices or conditions but rather to biological differences. At the same times, stunting is less prevalent in girls than boys (OR 0.76, p = 0.004) although for wasting there is little difference. Likewise, study conducted by Ethiopian Development Research Institute and Save the Children UK showed that being a male child increases the likelihood of being wasted, stunted and underweight. [60, 54]

Several determinants contribute to childhood malnutrition including intra-uterine growth retardation, low birth weight, inadequate exclusive breast feeding, unsuitable complementary feeding, maternal illiteracy, low nutritional knowledge, insufficient energy and micronutrient intake, birth spacing, birth rank, socio-economic background, food availability, housing, health services, vaccination, infectious disease, etc. [61]

As long as so many children remain malnourished, Ethiopia will find it difficult to achieve the first Millennium Development Goal which is eradication of extreme poverty and hunger. Indeed, for evidence-based decision making process; timely, adequate and quality of data is mandatory. [23]

The Federal Government of Ethiopia has been working to reduce malnutrition significantly through public education and providing nutritional and financial support to vulnerable families. However, the risk factors of malnutrition are diverse and could potentially change in place and time. Thus, there is a need to determine the predisposing risk factors to design effective malnutrition intervention strategies in Addis Ababa City Administration.

To the best of our knowledge, there was no studies that adequately identify and quantify the risk factors of undernutrition in Addis Ababa City Administration. Therefore, the aim of this study will be to generate a baseline data on risk factors of malnutrition and guide appropriate interventions to alleviate/reduce incidence of undernutrition in the city administration.

7.4 Objective

General Objective

The general objective of this study was to identify the predisposing risk factors of undernutrition in order to reduce the incidence of malnutrition cases and its consequences in Addis Ababa City Administration, 2019.

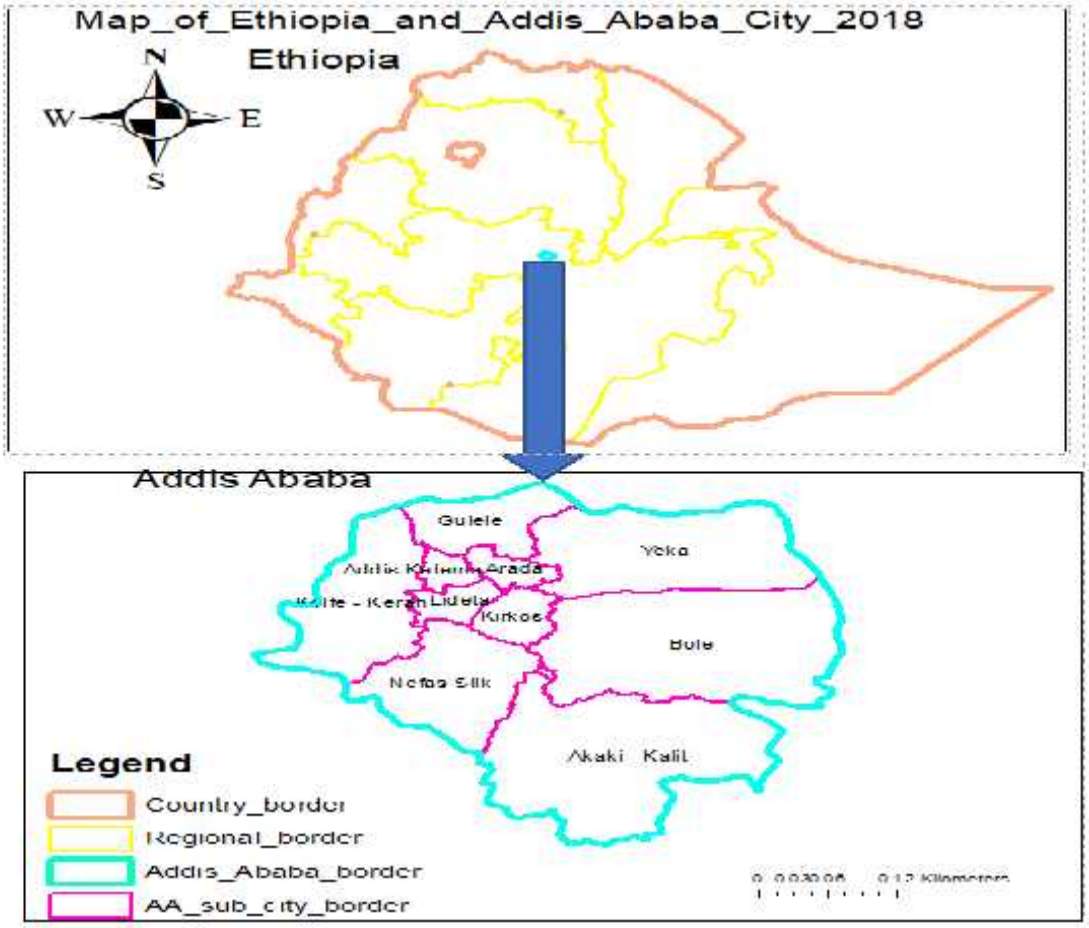
Specific Objectives

- To identify the immediate cases of undernutrition
- To identify the underlying cause of undernutrition
- To identify parental and child related causes of undernutrition

7.5 Methods and Materials

Study area

Assessment of predisposing factors for malnutrition will be carried out at Addis Ababa City Administration (capital city of Ethiopia). The city has been divided in to ten sub-cities and 118 woredas. The population of Addis Ababa was projected to be 3,433,999 based on 2007 population enumeration with yearly growth rate of 3.8% and population density of 5,165/km2. The population of the city administration is increasing due to increased migration of peoples from rural areas to the city. The total area of the city administration is 530.14km2. The study populations were all females in the age group of 15 to 49 years. The city had an international airport which enables peoples in the world to contact within hours of travel. (62, 63)



Map 9: Map of Ethiopia and Addis Ababa, 2019.

Target population

The target population for this study will be all under five children living in Addis Ababa cityadministration, 2019.

Source population

The source population for this study will be all children living in Addis Ababa city administration aged between 6months and 5 years, 2019.

Study unit

The study unit for this study will be all individual children who will meet the inclusion criteria and selected from the source population, 2019.

Study period

The study to assess predisposing risk factors for undernutrition will be carried out from 2nd week of July to the end of 2nd week of September, 2019. The study period may be extended or shortened based on availability of study subjects to reach representative sample size.

Study design

Unmatched case-control study will be conducted to assess the predisposing risk factors of malnutrition in Addis Ababa City Administration. The study will be conducted in the maternal and child health (MCH) departments of selected health facilities. Two health centers with high number of case report will be selected from each sub-cities.

Inclusion and exclusion criteria

Inclusion criteria

All children aged less than or equal to 5 year who have visited selected health centers in Addis Ababa city administration.

Exclusion criteria

Children with mental retardation, physical challenges and serious illnesses will be excluded from the study. Children accompanied by individuals other than their own mothers or/and guardian will not be included in the study. No more than one child will be included from a household.

Sample size determination and sampling technique

Sample size determination

Sample size for unmatched case-control study was determined by using Epi-info software version 7.2.2.16and the continuity correction sample size was found to be 335. During the sample size determination, we assumed that, confidence level of 95% and power of 80%, mostly used confidence level and power in many researches, ratio of controls to cases is 2, percent of exposed controls will be 50% and odds ratio of 2.

Sampling technique

All children less than five years old who visited the MCH clinics during the data collection period will be screened using their anthropometric data. Children identified as undernourished based on the anthropometric measurement will be selected as a case and children with normal anthropometric measurement will be selected as control. After measurements, mothers of the children will be interviewed by using pre-prepared data collection tool. Only children accompanied by their own mothers or/and guardian will be recruited to minimize recall bias. Only one child will be selected from a household. A total of 5 cases and 10 controls will be selected from each selected health center, which gives the sample size of 315. Additional 7 cases and 14 controls will be selected from those health center with early availability of cases and the sample size will be 336 (intended sample size).

Data collection tool

Structured questioner to collect pertinent information on Socio-demography, socio-economic factors, infant and child feeding practices, reproductive health issues, protective behavior and health care practices to assess the predisposing risk factors of malnutrition in Addis Ababa City Administration will be used from previous similar studies with some amendment.

Data collection method

Data will be collected using a structured questionnaire. The questionnaire will be used to gather information regarding socio-demography (age, weight, height, ethnicity, religion and sex of the child and parents, marital status, educational status, employment, parity, birth interval of the child and occupation of the parents), household size, source, quality and adequacy of water, sanitation issues, access to health services, healthcare practices, biomedical (gestational age, weightat birth, delivery type, antenatal care, place of delivery, attendant at delivery), household monthly income, infant and child feeding practices (time of initiation of breastfeeding and complementary feeding, colostrum feeding, bottle feeding, exclusive breastfeeding, reasons for not frequent and continuity of breast feeding, types of weaning foods given within 24 hour prior to the interview), reproductive health, protective behavior, power of mother to make decision in the household, food habits, history of family planning, mothers BMI, health care practices and

other related information. These information will be collected through face to face interview with the child's mother by the local language. Mothers will be asked about any occurrence of illness during the last one month in order to identify retrospective morbidity of children. Collected data will be reviewed on daily basis and identified error will be corrected by thedata collectors.

Dependent and Independent Variables

Dependent variables

- Gender and sex specific anthropometric measurement standards
- Status of study participants (stunted, wastedor underweight)

Independent variables

- Child and parental related factors (age, sex, parity, occupation, religion, ethnicity, educational status, income etc)
- Immediate and underlying causes of undernutrition (disease status, feeding practice, household and environmental factors)

Data analysis

Data analyses will be performed using Epi-info software version 7.2.2.16. Scientific calculator will also be used to do simple calculations (addition, subtraction, multiplication and division). Bivariate and multivariate logistic regression will be applied to test association between possible predisposing risk factors and undernutrition. The analysis finding will be compared and interpreted in relation to other regions and countries finding and also with national and global standards. The result will be summarized by using tables, figures and maps.

Data quality control

One day brief orientation will be provided to the data collectors to apply the same methodology and maintain the data quality. The training will focus on the purpose of the study, procedure and techniques of interview. They will also be trained on how to position and measure the child and reading and calibrationof measuring instruments. During anthropometric measurement, children will be measured on barefoot and wear light clothing. Height and weight of children greater than or equal to 2years and mothers will be measured by stadiometer in standing position stretched upward to the full extent so that their head, shoulders, buttocks, and heels are attached with the vertical surface of the stadiometer. Length of children less than two years old will be measured in recumbent position by length measuring board and their weight will be measured by using infant and toddler weighting scales. The measuring instrument will be calibrated to zero for every measurements of weight and height. All data collectors will be monitored closely and supportive supervision will beprovided regularly by the Principal Investigator (PI). Pretest will be done on 5% of the study participants and necessary correction will be made onthe data collection tool and its application based on identified problems.

Ethical clearance

Permission to carry out the study will be obtained from Ethiopian Public Health Institute, Addis Ababa City Administration Regional Health Bureau, sub-city and woreda health office and selected health centers. The proposal will be reviewed and approved by the EPHI ethical review committee to proceed. Informed consent will also be obtained from the respondents before their children are recruited to participate in the study.

Data Dissemination

The final result of the study will be submitted to Addis Ababa University School of Public Health Department of Preventive Medicine, Addis Ababa City Administration Regional Health Bureau,FMOH, EFELTPand EPHI. The result might also be presented at conferences, published and be free on the web for the public use.

Operational Definitions

Bottle feeding:an infant or young child from a bottle with a rubber nipple on the end as a substitute for or supplement to breastfeeding.https://medical-dictionary.thefreedictionary.com/bottle+feeding

Case: were children with a diagnosis of moderate to severe malnutrition regardless of the types of malnutrition with z-scores < −2SD from the median of WHO reference [19].
Child-related factors: were basic demography, birth history, feeding practices and immunization status.
Complementary foods: are foods which are required by the child, after six months of age, in addition to sustained breastfeeding.
Control: were children without malnutrition with z-scores between -2SD and +2SD (−2SD ≤ z-scores ≤ +2SD) [19].
Diarrhea: A child with loose stools for three or more times in a day and/or a sign of dehydration
Family size: refers total number of people living in a household during the study period.
Immediate causes of undernutrition: are causes of undernutrition in a child following inadequate dietary intake or/and disease.
Income: It is the total amount of money earned/provided for doing some activities/work per month.
Parental factors: were basic demography, education level and employment status.
Parity: The classification of a woman by the number of liveborn children and stillbirths she has d elivered at morethan 20 weeks of gestation.https://medical-dictionary.thefreedictionary.com/parity

Predisposing risk factors: are any attributes, characteristics or exposure of an individual that increases the likelihood of developing a disease or injury.**https://www.who.int/topics/risk_factors/en/**

Socio-economic factors: were household and environmental factors including number of people and income earners in the household, area of residence, type of housing, sanitation and water supply.

Source Population: The population from which the study subjects will be drawn.

Study unit: individuals who meet the inclusion criteria and selected to participate in the study.

Stunting:height for age < –2 SD of the WHO Child Growth Standards median. [64]

Target Population: The population to which the final result of the study will be generalized.

Underlying causes of undermatron: are factors, including household food insecurity, inadequate care and feeding practices for children, unhealthy household and surrounding environments, and inaccessible and often inadequate health care that causes undernutrition in a child.

Undernutrition: is a term comprising of the three terms, underweight, stunting and wasting.

Underweight:weight for age < –2 standard deviations (SD) of the WHO Child Growth Standards median. [64]

Wasting:weight for height < –2 SD of the WHO Child Growth Standards median. [64]

7.6 Project Work Plan and Budget Break Down

Project Work Plan

Activities	Responsible body	Feb				Mar				Apr				May				June				July				Aug				Sept	
		Wk 1	Wk 2	Wk 3	Wk 4	Wk 1	Wk 2	Wk 3	Wk 4	Wk 1	Wk 2	Wk 3	Wk 4	Wk 1	Wk 2	Wk 3	Wk 4	Wk 1	Wk 2	Wk 3	Wk 4	Wk 1	Wk 2	Wk 3	Wk 4	Wk 1	Wk 2	Wk 3	Wk 4	Wk 1	Wk 2
Topic selection & approval	PI & Advisors																														
Submission 1st draft proposal	PI																														
Submission of final proposal	PI																														
Ethical clearance	EPHI Ethical Review Board																														
Obtain letter permission	EPHI & AARHB																														
Mobilize fund and logistics	PI																														
Data collectors orientation	PI and data collectors																														
Data collectors	PI and Data collectors																														

preparation time																															
Actual data collection time	PI and Data collectors																														
Data processing and analysis time	Secretariats and PI																														
Report writing time	Secretariats and PI																														
Submission of 1st draft result	PI																														
Submission of final result	PI																														

5.2 PROJECT BUDGET PROPOSAL

I-Personal and material cost

S.n	Activities	Person/material		#of days	Cost/capita/d	Total cost
1	Data collection	21		30	300	189,000
2	Orientation (Perdiem and Materials)	Perdium	23	1	300	6,900
		Bottled water of 1L	23	1	10	230
		Hall	1	1	1000	1000
3	Secretary	2		10	300	6,000
4	Transport	21		30	75	47,250
Total Personnel cost						250,380

II – Stationary cost for data collection

S.n	Item	Unit of items	Quantit	Unit/price	Total cost
1	Notebook	Number	23	15	345
2	A4 Paper	# of RIM	2	250	500
3	Pen	Number	23	5	115
4	Pencil	Number	23	3	115
5	Pencil sharpener	Number	23	10	230
6	4GB Flash Disk	Number	23	150	3450
7	Eraser	Number	23	10	230
8	Binder	Number	23	10	345
9	Duplication	Number of pages	75	1.5	112.5
Total Stationary cost					5442.5

III – Total cost

S.no		Total resource	Total cost
1		Human resource	250,380
2		Stationary	5442.5
3		Contingency	12,791.13
	Total research cost		268,613.63 (9593.34

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Annexes

Annex 1: Data collection tool for Case - control study on Rubella outbreak, General Tadesse Biru Primary School, Addis Ababa, 2018

*Participant status

1. Case _____, Control_____

Case / Control Name_____, Date of Data collection_____

Region_____ Zone_____ Woreda_____ Kebele _____ Got _____ Phone_____

Location: Longitude: _____ Latitude: _____

I. Socio-demographic Characteristics

S. No	Questions	Alternatives
1.1	Sex	1. Male 2. Female
1.2	Age	years_____ Months_____
1.3	Family Occupation	1. Farmer 2. Housewife 3. Student 4. Unemployed 5. Daily laborer 6. Merchant 7. Gov't 8. Other (specify)_____
1.4	Religion	1. Orthodox 2. Protestant 3. Muslim 4. Catholic 5. Other (specify)_____
1.5	Ethnicity	1. Oromo 2. Tigre 3. Amhara 4. Other (specify)
1.6	Educational level of the case/control	1. KG 2. Grade 1-2 3. Grade 3-4 4. Grade 5-6 5. Grade 7-8
1.7	Educational level of the family	1. Illiterate 2. Read and write 3. Elementary 4. Secondary 5. Above secondary
1.8	Family size	_____
1.9	Is there any sick person with rash, fever, running nose/conjunctivitis	1. Yes 2. No

	(illness) In the family?	
1.10	If yes, number of sick persons	_____
1.11	What is monthly average income of the family?	_____

II**. Clinical History of Diseases:**

2.1	What was the symptoms?	1. fever *2.* Rash 3. Cough, if present is it 1. productive_____or 2. Non productive_____ 4. coryza (runny nose), 5. conjunctivitis (red eyes) 7. loss of appetite 8. Vomiting 9. malaise 10. Lymphadenopathy 11. arthralgia 12. Others_____
2.2	**What was the complication? if any?**	a) Pneumonia:☐ yes no ☐ b) Cornea bleeding: ☐ yes no ☐ c) Blindness : ☐ yes no ☐ d) Convolution ☐ yes no ☐ e) Otitis media (ear discharge): ☐ yes no ☐ f) diarrhea : ☐ yes no ☐ g) Sign of malnutrition☐ yes no ☐ h) Mouth ulcers ☐ yes no ☐
2.2	Date of rash on set	__/__/____
2.3	Duration of rash_____	
2.4	Did you visit health facilities?	☐ yes no ☐, if yes date_____
2.5	Illness duration before visiting the health facility	_____ in days/hours
2.6	Did you (he/she) take treatment?	1. Yes 2. No

2.7	If yes, treatment taken	1.ORS 2. Antibiotics 3.Vitamin A 4. Supplementary food 5. TTC ointment 6. Anti pyretic 7. Others (specify)_____
2.8	From which part of the body rash started?	_____
2.9	Status of the case patient after treatment	1. cure 2. partially 3. deteriorated/disabled 4. death

III. Risk factor

3.1	Did you have any travel history 7-18 days to areas with active rubella cases before onset of symptoms?	1. Yes 2. No If Yes where _____
3.2	Did you contact with a person with rubella symptoms within the last 2-3 weeks?	☐ yes ☐ no
3.3	Do you have any travel history four days before and after rash onset	1. Yes 2. No If yes where _____
3.4	Do you have any contact history with someone else four days before and after rash onset	1. yes 2. No If yes with whom_____
3.5	Do you know modes of transmission for rubella?	1. Yes 2. No 3. If yes

		specify_____
3.6	Nutritional status of the cases	1. Normal 2. Moderate 3. Severely malnourished
3.7	How many family members live together?	_____
3.8	House condition?	☐ ventilated ☐ not-ventilated
3.9	What is distance from house to health center?	☐ greater than 2km ☐ equal or less than 2 km
3.10	Where did you go first when you get ill?	1. Health Facility 2. Traditional Healers 3. Holy Water 4. Stayed at home 5. Other :(Specify)_____
3.11	Whom do you think can be affected by rubella?	1. Children of aged less than 5 years 2. Children of aged less than 18 years 3. Women of any ages 4. Any age groups of both male and women 5. Other (specify):_____
3.12	How do you think rubella can be cured?	1. Using modern medicine 2. Using traditional Medicine 3. Holly water 4. By feeding nutritious foods 5. Keeping the sick person indoor 6. Other(Specify)_____

Annex 2: Data collection tool for Case-control study on suspected chickenpox outbreak, Aleltu Soldier Training center, Oromia, Ethiopia, 2019

*****Case status

1. Case _____, Control_____

Date of Data collection_____

I. **Socio-demographic Characteristics**

S. No	Questions	Alternatives
1.1	Sex	2. Male 2. Female
1.2	Age	years_____ Months_____
1.3	Occupation of the case/control before joining the training center	1. Farmer 2. Housewife 3. Student 4. Unemployed 5. Daily laborer 6. Merchant 7. Gov't 8. Other (specify)_____
1.4	Religion	6. Orthodox 7. Protestant 8. Muslim 9. Catholic 10. Other (specify)_____
1.5	Ethnic group	5. Oromo 6. Tigre 7. Amhara 8. Other (specify)
1.6	Educational level of the case/control	6. Illiterate 7. Read and write 8. Elementary 9. Secondary 10. Above secondary
1.7	Marital status	1. Single 2. Married 3. Divorced 4. Widowed
1.8	Number of trainees in a single room	_____
1.9	Is there any sick person with rash, and fever in the room	1. Yes 2. No
1.10	If yes, number of sick person	_____
1.11	For how long do you stay in the center?	

II**. Clinical History of Diseases:**

2.1	What was the symptoms?	1. fever *2.* Rash 3. cough, 4. coryza (runny nose), 5. conjunctivitis (red eyes) 7. Ear discharge 8. pneumonia 10. Vomiting 11. Others_____
2.2	What was the complication?, if any	i) Pneumonia:☐ yes no ☐ j) Cornea bleeding: ☐ yes no ☐ k) Blindness : ☐ yes no ☐ l) Convolution ☐ yes no ☐ m) Otitis media (ear discharge): ☐ yes no ☐ n) diarrhea : ☐ yes no ☐ o) Feeding problem☐ yes no ☐
2.3	Date of rash onset	__/__/____
2.4	From which part of the body rash had started?	1. Face 2. Trunk 3. Upper extremity 4. Lower extremity 5. Other
2.5	Duration of rash	_____days
2.6	Did you visit a health facility?	1. Yes 2. No
2.7	Date seen at health facility	__/__/
2.8	Duration of illness before health facility visit?	
2.9	Did you (he/she) take treatment?	1. Yes 2. No

2.10	If yes, treatment taken	1.ORS 2. Antibiotics 3.Vitamin A 4. Supplementary food 5. TTC ointment 6. Anti pyretic 7. Others (specify) _____
2.11	Status of the case patient after treatment	1. cure 2. partially 3. deteriorated/disabled 4. death

III. Risk factor

3.1	Did you have any travel history to areas with active chickenpox cases 7-18 days before onset of symptoms?	1. Yes 2. No If Yes where _____
3.2	Did you have contact history with a person having chickenpox symptoms within the last 2-3 weeks?	☐ yes ☐ no
3.3	Do you have any travel history four days before and after rash onset	1. Yes 2. No If yes where _____
3.4	Do you have any contact history with someone else four days before and after rash onset	1. yes 2. No If yes with whom_____
3.6	Did you ever had chickenpox infection?	1. Yes 2. No 3. I don't know
3.7	Nutritional status of the case/control	1. Normal 2. Moderate 3. Severely malnourished
3.8	What is the estimated area of the room?	_____
3.9	Room condition?	☐ ventilated ☐ not-ventilated

3.10	Distance from house to the health center?	☐ greater than 5 km ☐ equal or less than 5 km
3.11	Where did you go first when you get ill?	6. Health Facility 7. Traditional Healers 8. Holy Water 9. Stayed at home 10. Other :(Specify)_____
3.12	Do you know modes of transmission for chickenpox?	1. Yes 2. No
3.13	What are the modes of transmission for chickenpox?	1. Physical contact with ill person 2. Sharing of patients cloth and utensils 3. Droplet transmission 4. From God 5. Other (Specify) _____
3.14	Whom do you think can be affected by chickenpox?	6. Children of aged less than 15 years 7. Adults between age of 15 and 30 years 8. Any individual of age greater than 15 years 9. Any age groups can be affected 10. I don't know
3.15	Which sex can be affected by Chickenpox?	1. Male 2. Female 3. Both
3.16	How do you think chickenpox can be cured?	7. Using modern medicine 8. Using traditional Medicine 9. Holly water 10. Feeding nutritious foods 11. Keeping the sick person indoor 12. Take rest 13. Other (Specify)_____
3.17	Did you visit a health facility within last 21 days?	1. Yes 2. No

Annex 3: Maternal Death Surveillance and Response (MDSR) System Evaluation Data Collection Tool (questioner), Addis Ababa, 2018

Data collection date _____

Name of data collector _____ Phone number_____

Region/Subcity/woreda/health facility name _____

Name of interviewee_____ Phone number_____

Position of the interviewee _____

Date MDSR system implementation was started at that level_____

General Information

1. Total number of targeted population under surveillance_____ (% from total population_____ %)
2. Which type of surveillance system did you use for MDSR implementation?
   A. Comprehensive B. Sentinel C. Passive D. Active E. Other
3. Do you have national PHEM Guide line or manual? A. Yes B. No
4. Do you have national MDSR Guide line or manual? A. Yes B. No
5. Do you have all other recommended forms for MDSR? A. Yes B. No
6. Have you lacked recommended forms at any time during the last year? A. Yes B. No

If yes,

- How many times do you lacked these forms? _____
- Which type of forms you lacked? _____
  _____
  _____
  _____

(Question number 6-9 are only for a health facility level)

7. Is there a clinical register for MDSR at a health facility? A. Yes B. No
   If no, why? _____
8. Does the health facility correctly register cases during the last year? A. Yes B. No
   If no, why? _____
9. Do you have a standard case definition for MDSR? A. Yes B. No
   If no, why? _____
10. Does the health facility use standardized case definition for MDSR? A. Yes B. No
    If no, why? _____
11. What is the incidence of maternal death in the last year _____
12. What is the action threshold defined for maternal death? _____

13. The region/Subcity/woreda/health facility have the ability to respond for maternal death within 48 hours of notification? A. Yes B. No
If no, why? _____
_____

Framework of MDSR implementation

1. Is there a focal unit/person for collecting, analyzing and reporting maternal death data? A. Yes B. No
If yes,
   - Who is responsible for MDSR data collection and analysis? _____
   - Who is responsible to report maternal deaths happening at each level? _____
2. How often do you collect, analyze and report MDSR data?
A. Daily B. Weekly C. Every 2 weeks D. Monthly E. Quarterly F. As needed G. Other_____
3. Did you describe data by place, person and time? A. Yes B. No
4. Did you have appropriate denominators for maternal death surveillance? A. Yes B. No
If yes, what is it? _____
5. Is there any graphs, tables and maps prepared from the data analysis? A. Yes B. No
If no, why_____

Maternal death review committee

1. Is there a functional maternal death review committee at each level? A. Yes B. No
If yes, please list members of maternal death review committee_____
_____
2. Number of sub cities/districts/ Hospitals/health centers that have maternal death review committee_____ (_____ %)
3. Is there standard death review protocol for maternal death? A. Yes B. No
If no why? _____
_____
4. Total number of notifications reported to the review committee at each level within last year? _____
5. Total number of maternal deaths for which death review including verbal autopsy was conducted in the last year_____ (_____ %)
6. Total Number of true maternal deaths out of those reviewed by maternal death review committee_____ (_____ %)

7. Number of true maternal deaths among all notifications after verified by maternal death review committee _____ (_____ %)
8. Number of deaths for which risk factors were identified _____ (_____ %)
9. Number of reviewed deaths for which findings were used for action_____ (_____ %)
10. Does the maternal death review committee at each level have preparedness and response plan for maternal death? A. Yes B. No
11. Number of sub cities/woredas/health facilities with maternal death preparedness and response plan _____ (_____ %)
12. Number of preparedness and response plans developed at each level with in last year? _____
13. Did maternal death review committee at each level evaluate their plan, preparedness and response activities during the last one year? A. Yes B. No

Reports

1. Is there posted reporting flow chart? A. Yes B. No
   If no, why?_____
2. How do you disseminate the results of maternal death surveillance to staffs, higher level and other stakeholders?
   A. we haven't shared yet B. Workshops C. Printed reports D. Email E. Phone call F. Other specify _____
3. In what frequency do you update/disseminate the results of MDSR activities to the staffs, next higher level and other stakeholders? _____
4. Total number of deaths registered on labour and delivery log book in the last year (only for health facilities) _____
5. Total number of reports submitted to the next higher level in the last year? _____ weekly_____ (_____ %) immediately_____ (_____ %)
6. Total number of community based maternal death reports _____ weekly _____ (_____ %) immediately_____ (_____%)
7. Total number of facility based maternal death reports_____ weekly _____ (_____ %) immediately_____ (_____%)
8. Number of sub cities/woredas/health facilities/HEWs which report consistently (9 months in annum) _____ (_____ %)
9. Number of regional/sub city/woreda/health facility reports submitted based on the national/regional/zonal/woreda agreed time period in the last year_____ (_____ %)
10. Percent of reports which are complete (that is with no blank or unknown responses) from last year total reports at each level _____ (____ %)

11. Number of blank or unknown data elements at each reporting month of last year_____
12. Specify common data elements which are reported blank or unknown in the last year _____ _____

- ❖ To which organizations you are expected to report MDSR data?

_____ _____

- ❖ How can the reporting system be improved?

Training

1. Have you ever trained PHEM disease surveillance system? A. Yes B. No
   If yes, specify when_____ where_____ how long_____ by whom? _____
2. How many of regional/sub city/woreda/health facility staffs were trained on PHEM surveillance system? _____ (_____%)
3. Have ever you trained MDSR surveillance system? A. Yes B. No
   If yes, specify when_____ where_____ how long_____ by whom_____
4. How many of regional/sub city/woreda/health facility staffs were trained on MDSR? _____ (_____%)
5. Are the data collectors at each level trained? A. Yes B. No
6. What was the content, strength, weakness, opportunity and threats of MDSR training?

Contents_____ _____

Strengths_____ _____

Weaknesses_____ _____

Opportunities_____ _____

Threats_____ _____

Supervision and Feedback

1. Have you supervised sub cities/woredas/health facilities in the last year? A. Yes B. No

If yes,

- How many of sub cities/woredas/health facilities were supervised in the last year?_____ (_____%)
- How many times did you supervised in the last year? _____

If no, the most usual reasons for not making all expected supervisory visits: _____
_____
_____

2. Did you get any supportive supervision from higher level in the last year? A. Yes B. No

If yes, how many times have you been supervised in the last year? _____

3. Did you receive feedbacks from national/regional/sub city/woreda level regularly?

A. Yes B. No

If yes,

- How many feedbacks did you receive in the last year?_____
- In what duration/frequency do you receive feedbacks? _____

4. Did you give regular feedbacks for sub city/woreda/health facility in the last year?

A. Yes B. No

If yes,

- How many feedbacks did you provide in the last year?_____
- In what duration/frequency did you give feedbacks? _____

5. Have you conducted meeting with community in the last year? (for woreda and health facility level) A. Yes B. No

If yes, how many times you have it in the last year?_____

Logistics

1. Has the region/sub city/woreda/health facility had all necessary supplies such as emergency drugs at all times in the last one year? A. Yes B. No
2. If there were any supply shortage for MDSR activities, list them:_____
   _____
   _____
3. Is there a separate budget line for MDSR in the Regional/Subcity/woreda health bureau and health facility budget? A. Yes B. No

   If yes, what was the proportion of it_____ %

4. Logistics Available to be used for MDSR activities?
   A) Vehicle other than ambulance B) Ambulance C) Stationery materials D) Electricity
   E) Computer F) Printer G) Copy machine H) Software I) Calculator J) Other_____

5. Information education and communication materials available
   A) Office phone B) Fax C) Email access (modem) D) Posters E) Megaphone F) TV Screen G) Projector H) Other_____

- How could MDSR system be improved? _____
  _____
- What opportunities are there to integrate MDSR activities and functions with other surveillance
  systems?_____
  _____

Attributes of the surveillance system

S.n	Attributes	Scales of Measurement				
		Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
	1. Simplicity					
1.1	The data sources of MDSR is easy and manageable					
1.2	The case definition for maternal death is easy to be used by all level health workers					
1.3	MDSR system doesn't take much time and have no influence on other activities					
1.4	MDSR data analysis is easy and manageable					
1.5	The type of data collected are clear and easy					
1.6	The system (MDSR) is integrated with other surveillance systems					
1.7	Data collection formats are clear and easy to be filled by all level data collectors					
1.8	To work in the system it doesn't need a high level training (can be done just by orientations)					
1.9	Methods of disseminating MDSR data to whom concerned are easy and manageable					
1.10	Any comment to make it more simpler than what is now					
	2. Flexibility					
2.1	The surveillance system can adopt to the users improvement demands (New case definitions, new data, new technology New reporting sources)					
2.2	If you don't agree pleases give an example of your comment or suggestion that the system needs to adopt					
	3. Acceptability					
3.1	Staffs working on MDSR are satisfied and well accepted the current system					
3.2	If not satisfied, what are the reasons?					
3.3	Health professionals are comfortable when assigned to participate in verbal autopsy activities					
3.4	What Proportion of sub cities/woredas/health					

	facilities were regularly and consistently participating in the system (at least for 9 months per year)					
	4. Sensitivity					
4.1	The system picks most maternal deaths in the region/Subcity/woreda/health facility /Community					
4.2	If you don't agree, what are the reasons for not picking most of the deaths					
	5. Predictive Value Positive					
5.1	Most of the deaths reported in this system are actually maternal deaths					
5.2	Proportion of notified maternal deaths that were actually maternal deaths					
5.3	If you don't agree give explanations and comments to improve it					
	6. Representativeness					
6.1	The report of maternal death represents the situation at each level					
6.2	If you don't agree give explanations and Comments to improve it					
	7. Timeliness					
7.1	All sub cities/woredas/health facilities submit their report on expected time					
7.2	Proportion of sub cities/woredas/health facilities that report in an acceptable time in the last year					
7.3	What do you recommend to improve the timeliness of the reporting					
	8. Cost					
8.1	The system is cost effective as compared to the current benefits we gain from it					
8.2	Estimate the total annual cost of the system (including all personnel, transportation and material costs)					
	9. Usefulness					
9.1	The current system have an ability to estimate the incidence of maternal deaths in the area					
9.2	The current system have an ability to show the trend of maternal deaths in the area					
9.3	The current system have an ability to show the progress and effect of preventive and control methods applied to prevent maternal deaths					
9.4	The current system have an ability to indicate major causes of maternal deaths in the area					

9.5	The current system have an ability to help the health facilities to improve clinical and ethical practices					
9.6	The data from MDSR stimulates research in maternal death prevention					
9.7	The data from MDSR uses for decision making					
9.8	What recommendations do you have to further improve the usefulness of the system					
	10. Stability					
10.1	MDSR data is always ready when we need it for planning and other purposes					
10.2	The system was interrupted due to lack of resources within last year					
10.3	If yes, how did you manage it					
10.4	The new BPR restructuring affect the procedures and activities of MDSR					
10.5	What do you suggest to overcome such problems					
	11. Data Quality					
11.1	MDSR data collection forms are clear					
11.2	MDSR data collectors are trained					
11.3	Most of the records are complete (no missing variable)					
11.4	Collected data are consistent with the event (maternal death)					
11.5	The quality of MDSR data is as expected					
11.6	What do you suggest to improve data quality					

Annex 4: Data Collection tool for IDP assessment, Kochere and Yirga chefe woreda of Gedeo zone, SNNP region, 2018

Ethiopian Public Health Institute
Center for Public Health Emergency Management
Public Health Emergency Early Warning and Response Unit

NAME OF THE IDP CENTER	

INITIAL RAPID ASSESSMENT (IRA):FIELD ASSESSMENT FORM

Name (Team Leader first)	Institution	Title/position	Profession/qualifications

IRA SUMMARY

Date(s) of field assessment ___/___/___ - ___/___/___
Principal contact(s) at the site _____
Position in community _____
Telephone # _____
GPS coordinates in decimal degrees _____

Summary of the crisis

- overall judgment of humanitarian situation and the severity of needs identified
- short-term outlook (whether the crisis is worsening or becoming less serious)
- underlying causes of problems and risks
- threats to security (natural hazards, population movements, armed groups, etc)
- population groups that are inaccessible (and if so, why)
- risk-factors that could worsen humanitarian conditions or impede relief operations (bad weather, insecurity etc.)

Problems and priorities identified by the affected population

Source of information code	**KI** - Key Informant interviews **GD** - Group Discussions **O** –Observation

Key issues identified, by section, by severity ranking

Key for severity ranking	
Red	Severe situation: urgent intervention required
Orange	Situation of concern: surveillance required
Yellow	Lack of/unreliable data: further assessment required
Green	Relatively normal situation or local population able to cope with crisis, no action required

Section	**R O Y G**	Key issues identified (maximum of 3)	Recommendations
Population			
Sites and shelter			
Essential non-food items			
Water supply			
Sanitation			
Hygiene			
Food security			
Nutrition			
Health risks and health status			
Health facilities and services			
Other (specify) _____			

SECTIONone : Population Description

1.1 Resource persons and other information sources

1.2 Registration:

1.2.1 Are the crisis affected people being registered, or have they been registered (Check one)?
Yes No Not necessary DNK

1.2.2 If yes, by which institution(s)?

1.3 Size of crisis-affected population:

1.3.1 Total estimated current population of site:	# People:
1.3.2 Source of these population data (several responses possible)	
Estimate by local authorities Estimate by affected population Registration	Estimated from # households and # people per household Census/name list (specify date of census) _____ Other (specify) _____

1.4 Movement to and from this site:

1.4.1 Is the population at this site increasing, decreasing, or staying about the same?	1.4.2 If changing, by how much (note time period, e.g. # per day)
Increasing Decreasing About the same	_____ per _____

1.5 Displaced population (only complete this section if part or all of the affected population is made up of internally displaced people and/or refugees)

1.5.1 Quadrat location (or name) for place of origin of displaced people (If different displaced groups are in this site, indicate the origins separately for each.)
1.5.2 Organization of the settlement

Camp in rural area	Staying with host families in a rural area
Camp in urban area	Staying with host families in an urban area
DNK	Collective settlement in large buildings
Other (specify)	

1.5.3 Relations between the displaced and the host community? (Check all that apply.)

Host community willing to assist	Tensions	Other (specify)	DNK

1.6 People dead, missing or injured due to the crisis

1.6.1	Dead	_____ People	last _____ days	DNK
1.6.2	Missing	_____ People	last _____ days	DNK
1.6.3	Injured	_____ People	last _____ days	DNK

1.7 Vulnerable groups:

1.7.1 If there is information suggesting that some groups are under- or over-represented (e.g. women or girl children, ethnic minorities), explain here:

1.7.2 Estimated number of unaccompanied children :	# _____

1.8 Additional information (free variables):

1.8.1 _____		1.8.3_____	
1.8.2_____		1.8.4_____	

SECTION 2 SHELTER AND ESSENTIAL NON-FOOD ITEMS

2.1 Resource persons and other information sources

2.2 Shelter quality

2.2.1 For houses and temporary family shelters housing people affected by the crisis, note the following points				
	Very poor/ none	Poor	Acceptable	DNK
Protection from cold, heat, wind, rain, snow etc.				
Privacy				
Personal security and security of belongings				
Protection from fire				
Covered space for essential household activities				

2.2.2 For collective shelters housing people affected by the crisis, note the following points				
Average number of people sleeping in the shelters _____				
Types of building: Emergency Temporary Permanent				
	Very poor/ none	Poor	Acceptable	DNK
Protection from cold, heat, wind, rain, snow etc.				
Privacy				
Personal security and security of belongings				
Protection from fire				
Covered space for essential household activities				

2.3 Is support available for people who cannot build their own shelter?

Yes	No	DNK

2.4 Access to essential non-food items (NFIs):

2.4.1 Proportion of households with sufficient: (tick appropriate box)					
	< ¼	≥ ¼, < ½	≥ ½, < ¾	≥ ¾	DNK
Clothing					
Blankets and bedding					
Cooking utensils					
Plastic sheeting					

2.4.2 Main types of fuel used for cooking and heating		Is there enough cooking fuel?	Is there enough heating fuel?
Firewood	Petrol	Yes	Yes
Coal	Gas	No	No
Diesel	Other (specify) _____	DNK	DNK

2.5 What are the priorities expressed by the population concerning shelter and non-food items?

2.6 Additional information (free variables):

2.6.1 _____		2.6.3_____	
2.6.2_____		2.6.4_____	

4

SECTION 3 WATER SUPPLY, SANITATION AND HYGIENE

3.1 Resource persons and other information sources

3.2 Existing capacities and activities

	Organisation or person(s) responsible	Since when? (date: dd/mm/yyyy)	Normal / current activities	Limitations to capacity or performance (lack of staff, materials and equipment, funds, access etc.)
3.2.1 Water supply				
3.2.2 Sanitation				
3.2.3 Hygiene				

3.3 Water supply

Water resources : note in this table data concerning sources of water available for the population at the site	3.3.1 Number of water sources of each type	3.3.2 Water source most used for human consumption at this site	3.3.3 Water source most used for animal consumption at this site	3.3.4 Any water sources producing dirty-looking water	3.3.5 Any sources for which it is likely that the quantity of water available will fall in the

					near future
Borehole or well with functioning motor pump					
Borehole or well with functioning hand pump					
Protected spring					
Protected open well					
Piped water					
Unprotected spring					
Unprotected open well					
Surface water (specify if a lake, a river or other) _____					
Traditional water sellers (specify the source) _____					
Other (specify) _____					
Borehole or well with non-functioning motor pump					
Borehole or well with non-functioning hand pump					

3.3.6 Average quantity of water used per day for all uses (in litres)

Drinking, cooking and hygiene

<25 litres	26-50 litres	51-75 litres	>75 litres`	DNK

Animals _____ l	Washing clothes _____ l	Other _____ l

3.3.7 # minutes on average it takes to collect total water supply for a household (incl. travel, waiting and filling the containers)

0 - 15	15 - 30	30 - 60	> 60

3.4 Sanitation:

3.4.1 Percentage of people currently using each of the places listed below to go to defecate

	Adults	Children
In the open, not in a defined and managed defecation area		
In a defined and managed defecation area		
In public toilets (pit latrines, pour-flush latrines, flushing toilet+s etc.)		
In family toilets and shared family toilets (pit latrines, pour-flush latrines, flushing toilets etc.)		

DNK Check that each column adds up to 100

3.4.2 Average number of users per functioning toilet

≤ 20	21-50	51 – 100	> 100	DNK

3.4.3	Total # of functioning toilets _____			
3.4.4	If there are latrines, are there separate facilities for girls and women?	Yes	No	DNK
3.4.5	Is there adequate lighting?	Yes	No	DNK
3.4.6	If there are latrines, are the openings small enough to prevent children falling in?	Yes	No	DNK

3.4.7 Presence of human faeces on the ground on and around the site

substantial presence close to shelters (<20m)	no substantial presence	DNK

substantial presence close to water sources (<20m)	no substantial presence	DNK

3.5 Hygiene

Proportion of households possessing: (tick appropriate box)					
	< ¼	≥ ¼, < ½	≥ ½, < ¾	≥ ¾	DNK
Soap					
Mosquito nets (in good condition)					
Narrow-necked water container (e.g. Jerrycan)					

3.6 What are the priorities expressed by the population concerning water supply, sanitation and hygiene?

3.7 Additional information (free variables):

3.7.1 _____		3.7.3_____	
3.7.2_____		3.7.4_____	

SECTION 4: Food security and Nutrition

FOOD SECURITRITION

4.1 Resource persons and other information sources

4.2 Existing capacities and activities

	Activity specification (present / absent)	List organisation or person(s) implementing these programs NOW	Since when? (dd/mm/ yyyy)	# beneficiaries	Geographic coverage	Comments
4.2.1 Management of severe acute malnutrition (facility or community based)	Inpatient therapeutic feeding (TF) only In- & outpatient TF Outpatient TF only					
4.2.2 Management of moderate acute malnutrition	Selective supplementary feeding Blanket supplementary feeding					
4.2.3 Micronutrient supplementation programs (e.g., vitamin A, iron)	Yes No					
4.2.4 General food distribution	Yes					

	No					
4.2.5 Other nutrition programs	Specify _____					

4.3 Changes in the total amount of food that people are eating since the crisis began, on average:

Amount consumed has increased	Amount consumed has decreased	Amount consumed is the same	DNK

4.4 How many people in the community currently have food stocks in their households?

Most	About half	Some	None	DNK

4.5 On average, how long will food stocks last in the households, according to the community?

Cereals and roots/tubers	less than 1 week	1-2 weeks	more than 2 weeks
Pulses and legumes	less than 1 week	1-2 weeks	more than 2 weeks
Oils and fats	less than 1 week	1-2 weeks	more than 2 weeks

4.6 Does the community have physical access to functioning markets?

Yes	No	DNK

4.7 Have infant milk products and/or baby bottles/teats been distributed since the beginning of the emergency?

Yes	No	If YES, by whom? _____

4.8 What percentage of infants in your area are formula fed /formula dependent?

None	Less than 10%	10-25%	More than 25%	DNK

4.9 Has the community/health staff identified any problems in feeding children <2 years since crisis started?

Yes	No	If YES, what problems? _____

4.10 Describe the current livelihood/food situation in this area

4.10.1 What are the major livelihoods in the area?	4.10.2 Has the crisis had an impact on livelihoods, markets

		& food stocks?
Agriculturalists Agro-pastoralists Pastoralists	Small businesses/trading Other (Specify) _____	Livelihoods disrupted Food prices increased Food stocks disrupted / depleted Other (Specify) _____
4.10.3 What population groups are most affected?		4.10.4 What are the priorities expressed by the population concerning livelihoods, food security or infant and young child feeding?
Children / youth Women Men Elderly people	Different religious / cultural / socio-economic groups (specify) _____ Other (Specify) _____	

4.11 Additional information (free variables):

4.11.1 _____		4.11.3_____	
4.11.2_____		4.11.4_____	

SECTION 5 Health risks and health status

5.1 Resource persons and other information sources

5.2 Health profile:

5.2.1 How many BIRTHS have there been during last 7 days? How many of these with skilled attendant present?	
# Births (total) _____ # Births (w/ skilled attendant) _____	# visibly pregnant women at site _____

Morbidity (disease in population)
5.2.2 Main health concerns from clinic records or reported by health professionals (list)

	# cases in last 7 days	# deaths in last 7 days		# cases in last 7 days	# deaths in last 7 days
Measles			Cholera		
Malaria			Injuries		
Diarrhoeal diseases			Pregnancy-related conditions		
Acute Respiratory Infections			Other (Specify) _____		

5.2.3 Have there been any reports of any unusual increases in illness or rumours of OUTBREAKS? If so, describe

No Yes (Specify) _____

5.2.4 Patients suffering from CHRONIC DISEASES for which sudden interruption of therapy could be fatal and are NOT able to receive treatment

	# Patients not able	Total # in need		# Patients not able	Total # in need
Hypertension			Epilepsy		
Insulin-dependent diabetes			Others (Specify) _____		
Kidney disease (in need of dialysis)					

5.2.5 Have there been reports of SEXUAL VIOLENCE? If so, describe

No Yes (Specify) _____	# Cases in last 7 days _____

5.2.6 Is there evidence of PSYCHOSOCIAL TRAUMA among the affected population? If so, describe

No Yes (Specify) _____	# Patients _____

5.2.7 Have there been reports of NON-INFECTIOUS RISKS (e.g. cold, heat, radiation, poisons, toxins)?

No Yes (Specify) _____

5.2.8 Have there been reports of HAZARDOUS SUBSTANCE USE (e.g. injecting drugs, heavy alcohol use)?

No Yes (Specify) _____

Disease Control and Prevention

5.2.9 Is there a functioning EARLY WARNING SYSTEM in place? How regularly is data reported?

No Yes | at least weekly | at least monthly | Other (Specify) _____

5.2.10 Local measles vaccination coverage of children (at 12 months of age)	5.2.11 Existence of special disease control programmes?
	No Yes (Specify)

5.2.12 Impact of crisis on disease control programmes? (check one box for each programme)			
Disease control programme	Completely interrupted	Somewhat disrupted	Unaffected

5.3 Humanitarian Health intervention:

Current humanitarian health interventions	No Yes	
Organisation	Since when? **(date: dd/mm/yyyy)**	Main activity

5.4 What are the priorities expressed by the population concerning health?

5.5 Additional information (free variables):

5.5.1 _____		5.5.3_____	
5.5.2_____		5.5.4_____	

SECTION 6 Health Facility/Outreach site Assessment (fill one per facility/site visited)

6.1 General information

6.1.1 Name of point of delivery	6.1.2 GPS location in decimal degrees (if relevant)
Name: Contact :	
6.1.3 Point of delivery type	6.1.4 Management
Hospital Health post Outreach Health centre Clinic Other	Ministry of Health Other NGOs
6.1.5 Is facility/outreach site temporary or permanent?	6.1.6 Has facility/material been damaged?
Temporary Permanent	Yes No
	If so, Full damage / Partial damage
	Building
	Equipment
	Medical supply
6.1.7 Physical access to facility (check one):	6.1.8 Financial access to facility (check one)
Easy With obstacles (Explain) _____ Very difficult (Explain) _____ Distance in km: …… Number of hours by normal means of transport : …..	Free of charge Small payment (Explain) _____ Large payment (Explain) _____ Cost per consultation in local currency: ……
6.1.9 Name and type of closest referral facility?	6.1.10 Are vehicles or other means of transport available for referrals?
	Yes No DNK
6.1.11 Are community-based health services delivered in the catchment area of the health facility? If yes, who provides & how many?	Yes No
# _____ village midwives # _____ community health worker(s)	# _____ traditional healer(s) # _____ others (specify) _____

6.2 Resources

6.2.1 Who provides health care in this facility? (Check all that apply)					
	# staff	# consultations/day		# staff	# consultations/day
Nurse			Midwife		
Medical doctor			Lab technician		
Medical assistant			Public health officer		
Vaccinator			Other _____		
6.2.2 Essential drugs, vaccines and supplies					
	Available	Unavailable		Available	Unavailable
Antibiotics			Tetanus toxoid		
ORS			Measles		
Anti-malarials			DPT		
Antipyretic			Polio		
Contraception			BCG		
Dressing materials			Functioning cold chain?		

6.3 Additional information (free variables):

6.3.1 _____		6.3.3_____	
6.3.2_____		6.3.4_____	

10

Variables			**Remark**
1	Name of Woreda		
2	Number of IDP sites		
3	Total number of HHs		
4	Total number of IDPs		
5	Male		
6	Female		
7	PLW		
8	Under 5		
9	Old age (age ≥ 65)		
10	Number of totally damaged health posts		
11	Number of partially damaged health posts		
12	Number of temporary Health Posts established		
13	Number of existing Health Centers		
14	Number of totally damaged health centers		
15	Number of partially damaged health centers		
16	Number of temporary Health Centers established		
17	Number of existing Primary Hospitals		
18	Number of MHNTs available		
19	Number of health facilities with SC		
20	Number of health facilities with OTPs		
21	Number of Surveillance/PHEM officers		
22	Number of Doctors		
23	Number of Health Officers		
24	Number of Nurses		
25	Number of Lab technicians		
26	Number of Pharmacists		
27	Number of HEWs		
28	Number of WASH officers		
29	Number of EPI officers		
30	Number of Nutrition officers		
31	Number of existing trench/pit latrines X # seats		
32	Number of trench/pit latrines constructed X #seats		
33	Number of existing tap waters		
34	Number of existing rotos/tankers available		
35	Number of roto tankers distributes		
36	Number of water trucks available		
37	Number of soaps distributed		
38	Mass chlorination performed		
39	Number of water guard/chemicals distributed		

Annex 5: Data collection tool (questioner) for health profile description, woreda 05 of Nefas silk sub-city, Addis Ababa, 2018.

Date: _____

Interviewer name: Kefyalew Amene Telephone number 09 21 37 55 08

Respondent name_____ Telephone number_____

District: _____

1. Historical aspects of the area (Culture and Tourism Office)
   - District Name_____
   - When was the District established_____
   - How & why the name given_____
   - Any other historical aspect_____
2. Geography and Climate (including map, altitudes, agro-ecological zones etc)
   - District map_____
   - Location(distance from Addis Ababa) _____Direction _____
   - Altitude _____
   - Surface Area _____(_____% from the zone)
   - Town _____rural _____
   - Geographical coordinate
     - Latitude _____
     - Longitude _____
     - Annual rain fall(Max and min)_____
     - Annual temperature (average)_____
     - Climaticzones _____%Highland_____% Midland_____ %Lowland
   - District boundaries
     - North _____South_____East_____West_____
3. Political and Administrative Organization
   - Total no. of kebeles: _____
     - Rural_____Urban_____
   - Sectors offices:
     - Health office-location_____
     - Political administration office-location_____
     - Water bureau-Location_____
     - Education office-location_____
     - Transport office-location_____
     - Electric power office-location_____
     - Other_____

- Main supporting organizations /partners and their location:_____ _____

4. Population and Population structures

A. Demographic data

- Total Population(by kebele)_____Male_____Female_____ sex ratio_____
- Urban Total _____ Male_____Female_____
- Rural Total _____ Male_____ Female_____
- Population <1years_____ Population 1-5 years_____ Population < 15 years_____ , Population 15-64 years_____,Population >64 years_____ Women 15-49 years of age_____
- Average household size _____
- Annual population growth rate (_____%)
- Population pyramid by age and sex

B. Ethnicity

- Amhara_____ (____ %), Gurage_____ (____ %), Oromo_____ (_____ %), Tigrae_____ (_____ %), Others_____ (_____ %)

C. Religion

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

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

- Main income sources
  - Agriculture
    - ✓ Cultivated area_____
    - ✓ Grazing area_____
    - ✓ Cropping seasons_____
    - ✓ Population density_____
  - Livestock _____ (_____ %)
  - Tourism _____ (_____ %)
  - Trade _____ (_____ %)
- Government Employer_____ (_____ %)
- Private Employer _____ (_____ %)
- Daily Laborer _____ (_____ %)
- Other business_____ (_____ %)

- Jobless _____ (_____ %)
- Average Income of a household_____

6. Education and school Health

- Number of educational institution _____
  - Kindergarten_____
  - Primarily school_____
  - Secondary school_____
  - Preparatory_____
  - College_____
  - University_____
  - TVET_____
- Total School Age Children (target) _____
  - Total Enrolment _____Male _____Female_____ Male to Female ratio_____
- School dropout in last 6 months _____
  - If there is school dropout, why? _____
- Educational status of the community
  - Total Educated people_____ Male _____ Female _____
- School health activities:
  - Schools with water supply_____ (_____%)
  - Schools with functional latrines _____ (_____ %)for Male_____(___%) for Female_____(_____%)
- Schools with HIV/other Health clubs_____(_____%)
- Number of teachers in the District_____Male_____Female_____
- Teacher to student ratio_____

7. Facilities

A. Transport, Telecommunication, Power supply, Water supply

- How many of the health posts have access to Transportation (road) _____(_____%), Ambulance_____ (_____ %) Telecommunication_____(_____%), Electric power_____(_____ %), Water supply _____(_____%) .
- How many of the health centers have access to Transportation (road) _____(_____%),Ambulance_____(_____ %),Telecommunication_____ (_____%) ,Electric power_____ (_____%) ,Water supply _____(_____%)

- How many kebeles have access to Transportation_____ Telecommunication_____(_____ %),Electric power_____(_____%),Water supply _____(_____ %)
- How many people have access to fixed telephone?_____(_____%)
- How many people have access to mobile phone? (coverage)_____(_____%)
- Type of roads:
  - Asphalt_____ (_____ %), Pista_____ (_____ %)
- Flow of transportation per day _____ vehicles, _____people

B. Post Office_____

C. Bank (each type) _____

D. Power supply

- How many households get power supply?_____(_____%)

F. Water supply

- Total safe water coverage _____ (___ %)
- Main source of water supply _____
- Kebeles getting safe water____ (__ %)
- Populations getting safe water_____ (__ %)
- Daily water consumption per day per person_____

8. District Health system

- The general health system structure of the District(flow chart) _____
- Is there health management team (HMT) at District level? Yes/No
- If yes, describe the HMT in detail (composition and function)_____
- Are there NGOs working on health and health related issues? Yes/No
- If yes, List the NGOs and their contribution in relation to health and health related issues_____

9. Vital Statistics and Health Indicators

- Infant Mortality Rate (IMR) _____ (last year's total <1year death_____)
- Child (1-5year) Mortality Rate_____(lastyear's total 1-5year death_____)
- Crude Birth Rate_____ (total births of last year_____)
- Crude Death Rate_____ (total deaths of last year_____)

- Maternal Mortality Rate_____(last year total maternal deaths_____)
- Total live births_____ (_____ %) Total still births_____(____%) Total neonatal deaths_____ (____ %)
- Contraceptive Prevalence rate_____ Contraceptive acceptance rate _____
- ANC rate
  - How many of the total expected pregnancies had attended 1st ANC _____(_____%), 2nd ANC_____(_____ %), 3rd ANC_____ (_____%) and 4th ANC _____ (_____ %)
  - How many of the total expected deliveries had attended PNC visit _____ (_____ %).

- Percentage of deliveries attended by skilled birth attendants_____
- Percentage of deliveries attended by HEWs_____

- Percentage of deliveries attended by TBA _____
- Percentage of deliveries attended by TTBA _____
- Number of children <5 year treated for diarrhea at public health facility_____(_____%)
- Immunization Coverage (for children and Women);
  - BCG _____ (__ %), OPV0____ (____ %), OPV1_____ (___ %), OPV3_____(___%), Penta1_____ (___ %), penta2 _____ (___ %) penta3_____ (___ %) , Measles_____ (___ %), PCV-1_____ (__ %), PCV-2_____ (___ %), PCV-3_____ (___ %), TT2+PW_____ (__ %), TT2+ NPW_____ (___ %), TT coverage _____Rota_____(____%).

1. Health Service

A. Type and Number of Health Institution

Type		Number	Total number of beds	Health institution to population ratio
Government Hospitals				
Government Health centers	Type A			
	Type B			
Private health facilities (clinics/diag.	Clinics(all type)			
	Diagnostic laboratories			

lab/drug stores)	Drug store			
Government Health posts				
NGOs	Health posts			
	Health centers			
	Hospitals			
	Clinics			
Facilities under constrictions	Health posts			
	Health centers			
	Hospitals			
Total				

B. Type and Number of health professionals

Type	Number	Professionals to population ratio	Remark
Specialist			
General practitioner			
Health officer			
Nurses (Degree and Diploma)			
Mid wife (Degree & Diploma)			
Laboratory(Degree &Diploma)			
Pharmacy (Degree & Diploma)			
Environmental health(Deg&Dip)			
Health Informatics			
Health education			
HEWs			
Others			
Total			

- Health service coverage _____%

C. Top 10 causes of morbidity, admission and mortality

- Top ten leading causes of OPD visit (morbidity):

Serial number	Under 15 OPD (<15years)		Adult OPD (≥ 15years)	
	Male	Female	Male	Female
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

- Top ten causes of admissions

Serial number	Pediatrics ward (<15years)		Adult ward (≥ 15years)	
	Male	Female	Male	Female
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

- Top ten causes of death (mortality)

Serial number	Under 15 years		Adult (≥ 15years)	
	Male	Female	Male	Female
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

D. Health budget allocation:

- Government
  - Annual budget allocated for the District(birr) _____
  - Annual budget allocated for health or health institutions _____ (____%)
  - Annual budget allocation increment in percent comparing to the previous year___%
  - Health budget utilization_____ (_____ %)
- Funds from NGO
  - Total _____ (purpose/programs)_____
  - Health budget utilization_____ (_____ %)

11. Community Health Services;

- Status of services provided by community health workers:
  - Number of TBAs/TTBA_____ and their responsibility _____
  - Number of CHWs/CHPs_____ and their responsibility _____
  - Number of HEWs and their responsibility _____
  - Others_____

12. Status of Primary Health Care Components – with focus on the PHC and MDGelements

- MCH (Delivery, ANC, PNC)_____ _____
- EPI(outreach service, cold chain, vaccine)_____ _____
- Environmental Health and sanitation
  - Latrine coverage_____ & utilization rate_____
  - Solid waste management_____
  - Liquid waste management_____
- How many diseases are under surveillance (reportable either immediately or weekly) _____
- Which diseases are under surveillance (reportable diseases)? _____
- Is it similar with the region and national? _____ If not why?_____

- Endemic diseases:
  - Malaria:
    - ✓ Total malarious kebeles_____ & Population at risk_____
    - ✓ ITNs coverage_____

- ✓ Is there IRS this year (Number of kebeles)_____householdscovered_____ population covered_____
- ✓ Total cases/year_____ deaths/year_____,<5 year cases_____ deaths_____
- ✓ PMR_____ (last year total malaria death_____)
- ✓ Malaria supplies (Coartem, RDT, etc) shortage _____

- ✓ Other issues_____

• TB/Leprosy:
- ✓ Total TB cases_____
- ✓ PTB negative_____
- ✓ PTB positive_____
- ✓ Extra PTB _____
- ✓ TB detection rate _____
- ✓ TB cure rate _____
- ✓ TB Rx success rate _____
- ✓ TB defaulter_____
- ✓ Death on TB Rx_____
- ✓ PMR_____ (last year total TB death_____)
- ✓ Total TB patients screened for HIV_____
- ✓ Total Leprosy cases_____on Rx_____

• HIV/AIDS:
- ✓ Total people screened for HIV (last one year)_____
- ✓ Total VCT_____ PITC_____PMTCT_____
- ✓ HIV prevalence in last year_____
- ✓ HIV Incidence (new cases/last year)_____
- ✓ Total PLWHA_____
- ✓ On ART_____on Pre-ART_____
- ✓ Other HIV prevention activities_____

• Nutrition (malnutrition related OTPs,SC,TSF,CBN and PSNP activities):
- ✓ Total OTP sites_____, total admissions to OTP/year_____
- ✓ Total SC sites,_____, Newly opened last year_____, total admissions to SC/year_____
- ✓ Is there TSF (targeted supplementary feeding) program in the District_____
- ✓ CBN program_____ PSNP_____ other_____

- ✓ General food security condition_____
  _____

- ✓ Nutrition screening: how often nutritional screening is done _____how many children screened for malnutrition in the last year_____ (____ %)

- Essential drugs (shortage):

_____

13. Disaster situation in the District

- Was there any disaster (natural or manmade) in the Districtin the last one year? _____
- Any recent disease outbreak/other public health emergency such as drought, flooding…_____
- If yes,number of cases_____ and deaths_____

14. Problem Identification and Priority Setting

- Setpriority health problems based on the public health importance, magnitude, severity, community concern and feasibility._____

_____

15. Action plan and recommendations

- how to address the problems identified clearly depicting responsibilities, required resources and timeline _____

_____

Annex 6: Data collection tool (questioner) for identifying predisposing risk factors of undernutrition at Addis Ababa City Administration, 2019

Date of Data collection_____

Participant ID: _____

I. Sociodemographic information

1. Participant status A. Case B. Control
2. Address: Sub-city _____ Woreda_____ Kebele _____ Got _____
3. Sex of child: A. Male B. Female
4. Age of child: _____year _____month_____ day
5. Age of mother/care giver: _____year
6. Weight of child: _____kg
7. Weight of mother:_____ kg
8. Height of child:_____ meter
9. Height of mother:_____ meter
10. Religion of the child: A. Orthodox B. Muslim C. Protestant D. Catholic E. Other (specify)_____
11. Religion of the mother: A. Orthodox B. Muslim C. Protestant D. Catholic E. Other (specify)_____
12. Religion of the father: A. Orthodox B. Muslim C. Protestant D. Catholic E. Other (specify)_____
13. Ethnicity of the child: A. Oromo B. Tigre C. Amhara D. Other (specify)_____
14. Marital status of the mother: A. single B. married C. divorced D. widowed
15. Educational status of the mother: A. illiterate B. read and write C. elementary D. secondary E. above secondary
16. Educational status of the father A. illiterate B. read and write C. elementary D. secondary E. above secondary
17. Occupation of the mother: A. housewife B. daily laborer C. private employee D. government employee E. unemployed F. other (specify)_____
18. Occupation of the father A. daily laborer B. private employee C. government employee D. unemployed E. other (specify)_____
19. Family size of the household: _____
20. What is the monthly income of the household? _____

II. Obstetric related information

1. Did you use family planning? A. yes B. no
2. What type of family planning did you use? _____
3. For how long did you use the family planning before having this child? _____

4. Parity of the mother during this birth? A. first B. second C. third D. other (specify)_____
5. Birth interval of the mother for this child? A. 1 year B. 2 years C. 3 years D. other (specify) _____
6. What was the gestational age during delivery? _____weeks
7. What was the weight the child during delivery? _____kg
8. What was the delivery type? _____ A. vaginal delivery B. cesarean section
9. If the answer for Q no_ 8 is cesarean section, what was the reason for the recommendation? _____
10. Did you attended ANC follow-up when you were pregnant of this child? A. yes B. no
11. If the answer is yes for Q no_ 10, how many times did you visit a health facility for ANC follow-up? _____ (choose all ANC visit) A. 1st ANC B. 2nd ANC C. 3rd ANC D. 4th ANC
12. Where were place of delivery for this child? A. health facility B. home C. on transportation D. other (specify) _____
13. By whom the delivery was supported? A. health professional B. traditional birth attendant C. trained traditional birth attendant D. other (specify) _____

III. Accessibility and practice on health and related services

1. Do the household had access to health service? A. yes B. no
2. How far is the health facility from your home? _____km
3. Can you afford all health services that you need to have? A. yes, yes I can B. I can afford partially C. I can't afford
4. Do you visit a health facility regularly? A. yes B. no
5. Why do you visit a health facility? A. for vaccination B. for treatment C. for consultation d. other (specify)_____
6. How often do you visit a health facility with in last month? _____
7. Did the mother use any drug? a. Yes b. No
8. If the answer for Q no_7 is yes, what type of drug she use? _____
9. Did the mother had history of vaccination during pregnancy? a. Yes b. No
10. If the answer for Q no_9 is yes, what vaccination did she had? _____
11. Did the child had history of vaccination? a. Yes b. No
12. If the answer for Q no_11 is yes, what vaccination did the child had? _____
13. What is the source of water for the household: A. bottled water B. pipe water C. spring water D. other_____
14. Do you have access to adequate water supply: A. yes B. no
15. How far is the water source from your home? _____km
16. How much water do the household utilize per day? _____liter
17. Do the household had their own appropriate waste disposal pit? A. yes B. no
18. Do the household had access to a latrine all the time? A. yes B. no

19. If the answer is yes to Qno_18, is there hand washing facility near by the toilet? A. yes B. no
20. Is there adequate communal waste disposal pit in your community? A. yes B. no
21. If the answer is yes to Qno_20, how far is it from your home? _____km
22. Did the mother had a trend of doing sport regularly? a. Yes b. No
23. Did the child had been seek within the last one month? A. yes B. no
24. If the answer for Q no_23 is yes, what was the illness? _____

IV. **Household food security and child feeding practices**

1. Did you worry that your household would not have enough food in the past one month? A. yes b. no
2. If the answer to Qno_1 is yes, how often did this happen? A. Rarely (once or twice) b. Sometimes (three to ten times) c. Often (more than ten times)
3. Were you or any household member not able to eat the kind of foods that you want to eat within last month? A. yes B. no
4. If the answer to Qno_3 is yes, what was the food? (list all)_____
5. If the answer to Qno_3 is yes, what was the reason? A. lack of money B. unavailability of the food in the market C. other (specify) _____
6. Did any household member have to eat a limited variety of foods due to a lack of resources within the last month? A. yes B. no
7. If the answer to Qno_6 is yes, what was the common and always available food type in the household? _____
8. Did any household member have to eat some foods that they really did not want to eat because of a lack of resources within last one month? A. yes B. no
9. If the answer to Qno_8 is yes, how often did this happen? A. Rarely (once or twice) B. Sometimes (three to ten times) C. Often (more than ten times)
10. Did any household member have to eat a smaller meal than you felt you needed due to lack of enough food within last one month? ? A. yes B. no
11. If the answer to Qno_10 is yes, how often did this happen? A. Rarely (once or twice) B. Sometimes (three to ten times) C. Often (more than ten times)
12. Have you ever faced lack of any kind of food to eat in your household and no way of getting more due to lack of resources within last one month? A. yes B. no
13. If the answer to Qno_12 is yes, how often did this happen? A. Rarely (once or twice) B. Sometimes (three to ten times) C. Often (more than ten times)
14. Did you or any household member go to sleep at night hungry due to lack of food within last one month? A. yes B. no
15. If the answer to Qno_14 is yes, how often did this happen? A. Rarely (once or twice) B. Sometimes (three to ten times) C. Often (more than ten times)
16. Did you or any household member go a whole day and night without eating anything due to lack of food? A. yes B. no

17. If the answer to Qno_16 is yes, how often did this happen? A. Rarely (once or twice) B. Sometimes (three to ten times) C. Often (more than ten times)
18. Did you or any household had eaten food that you would not like to eat due to lack of resource? A. yes B. no
19. If the answer to Qno_18 is yes, how often did this happen? A. Rarely (once or twice) B. Sometimes (three to ten times) C. Often (more than ten times)
20. When was breast feeding initiated? A. immediately after delivery B. an hour after delivery C. 12 hours after hours D. A day after delivery E. other (specify) _____
21. How long had been exclusive breast feeding continued? A. 3 months B. 6 months C. other (specify) _____
22. When complementary feeding was started? A. after 3 months B. after 6 months C. after a year D. other (specify) _____
23. What type of complementary feeding was used? (list all) _____
24. How often these complementary foods was given to the child? A. once a day B. twice a day C. three times a day D. once a week E. other (specify)_____
25. What was the reasons for not continuing exclusive breast feeding? A. insufficient breast milk production B. lack of awareness C. boring of feeding breast D. it changes my shape E. other (specify)_____
26. What was the common foods that the child use? _____
27. What type of foods did the child had eaten within 24 hours prior to the interview? (list all foods eaten and drunk)_____
28. Did the mother had the power to decide on family issues? A. yes B. no

Annex 7: Informed Consent to Participate in a Research Study

Institutional Contact:

- **Name:** Addis Ababa University
- **Website:**
- **Email:**
- **Phone number:**

Title of Research Project:

- Assessment of predisposing factors of undernutrition in Addis Ababa City Administration, 2019.

Contact of Principal Investigator:

- **Name:** Kefyalew Amene
- **Email:** kefyalewamene@gmail.com
- **Phone Number:** +251921375508

A. PURPOSE AND BACKGROUND

I am Kefyalew Amene learning my master's degree in the department of Field Epidemiology at Addis Ababa University. As a partial fulfillment of master's degree I am expected to do a research on health related topics. Following that my research proposal was accepted by the institution ethical review board. The research objective is identify predisposing risk factors of undernutrition and intervene based on the finding of the research to decrease the incidence of undernutrition in Addis Ababa city administration, 2019. The purpose of your participation in this research is to help the researcher to achieve his objectives by providing the right information. You are selected as a possible participant in this study because you fulfil the all of the inclusion criteria's for this research.

B. PROCEDURES

If you agree to participate in this study, the following will occur. First height and weight of you and your child will be measured using appropriate measuring instrument to identify your nutritional status. This will take 5-10 minutes and then you will be asked some questions on sociodemographic and other practices to get information on the possible causes of undernutrition. Your answers will be captured by writing it on a paper. This might take 15-20 minute and a total of 20-30 minutes is required to finish all the activities.

C. RISKS

The procedures had no risk except a little discomfort might be happen for the child during height and weight measurement.

D. CONFIDENTIALITY

All your responses will be kept confidential and no individual identities will be used in any reports or publications resulting from this study. The data collection tool will be given a code and participant name or other direct identification will not be known. All the information will be kept in a locked file and only the principal investigator will have access to those files. After the data collection and analysis is completed and published all the collected data will be deleted. This will happen within 6 months since now.

E. BENEFITS OF PARTICIPATION

There is no direct benefit like free medical care or cash payment to you from participating in the study. The anticipated benefit of your participation will be protection of your and other children from undernutrition following the interventions done on identified undernutrition predisposing risk factors. The interventions might be done by the government or/and you depending on the type of identified predisposing risk factors.

F. VOLUNTARY PARTICIPATION

Your decision whether or not to participate in the study is voluntary and it has no any effect in your relationship with Addis Ababa University or the health center services. By understanding the above explanations, you are free to have your own decision regarding participation.

G. QUESTIONS

If you have any questions about the study, please contact the data collector or Mr. Kefyalew Amene by calling +251921375508. You can also contact Addis Ababa University ethical review board by calling (phone number) with any questions about the rights of study participants or research related concerns.

CONSENT

YOU ARE MAKING A DECISION WHETHER OR NOT TO PARTICIPATE IN THIS STUDY. YOUR SIGNATURE BELOW INDICATES THAT YOU HAVE DECIDED TO PARTICIPATE IN THE STUDY AFTER READING ALL OF THE INFORMATION ABOVE AND YOU UNDERSTAND ALL THE INFORMATION IN THIS FORM, HAVE HAD ANY QUESTIONS ANSWERED AND HAVE RECEIVED A COPY OF THIS FORM FOR YOU TO KEEP.

Signature _____ Date _____
Research Participant

Signature _____ Date _____
Interviewer

Annex 8: Amharic version of Informed Consent

በጥናትላይለመሳተፍየተደረገግልፅስምምነት

የመኖሪያቤቱአድራሻ፡

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ዌብሳይት፡

ኢሜል፡

ስልክቁጥር፡

የጥናቱርዕስ፡ በአዲስአበባከተማውስጥለሚኖሩየምግብእጥረትክስተቶችአጋላጭሁኔታዎችንመለየት 2011

የጥናቱዋናአስተባባሪአድራሻ፡

ስም፡ ከፍያለውአመኔ
ኢሜል፡

ስልክቁጥር፡

የጥናቱአላማ

እኔስሜ ከፍያለውአመኔ ስሆንበአዲስአበባዩኒቨርስቲየማስተርስዲግሪዬንበመከታተልኢፒዲሚዮሎጂየትምህርትዘርፍበመማርላይእገኛለሁ።
በመሆኑምይህጥናትበአዲስአበባከተማውስጥለሚኖሩትየምግብእጥረትክስተቶችአጋላጭሁኔታዎችምንእንደሆኑበመለየትናመደረግያለባቸውንአስፈላጊተግባራትለመጠቆምከተውአካልበመቆምከተማችንውስጥየሚከሰቱትንየምግብእጥረትክስተቶችበመቀነስብሎምበማስወገድየግሌንአስተዋፅዖለማበርከትናየጥናትፅሁፌንለማጠናቀቅየታቀደነው።
ይህንንበሚደትእርስዎየሚሰጡትምላሽትክክለኛነትለጥናቱአላማመሳካትወሳኝመሆኑንበሚደትትክክለኛሚጀእንድትሰጡኝእንጠይቃለን።
በዚህምመሰረትእርስዎበጥናቱለመሳተፍየሚያስፈልጉትንመስፈርቶችስላሟሉየጥናቱተሳታፊሆነውተመርጠዋል።

የጥናቱአተገባበርቅደምተከተል

በጥናቱለመሳተፍፍቃደኛከሆኑበኋላየእርስዎእናየልጅዎከብደትንቁመትትክክለኛውንየመለኪያመሳርያበመጠቀምይለካል። በዚህምእናንተያላችሁበትንየምግብደረጃለማወቅእንችላለን። ይህም ከ5-10 ደቂቃሊወስድይችላል፡
በመቀጠልለምግብእጥረትሊያጋልጡይችላሉተብለውየሚታሰቡጉዳዮችንበተመለከተጥያቄዎችንትጠየቃላቹ።
ይህም ከ15-20 ደቂቃሊወስድይችላል። በአጠቃላይም ከ20-30 ደቂቃሊወስድብንይችላል።

ሊያጋጥሙሚችሉየጎንዮሽጉዳቶችን

የጥናቱ አተገባበር ላይ በተመረተ ምንም ሊያጋጥም የሚችል የጎንዮሽ ጉዳት አይኖርም።
ምን አልባት ግን የህፃኑ ክብደት ና ቁመት በሚለካበት ግዜ ትንሽ ያለመመቸት ስሜት ሊኖር ይችላል፡፡

ሚስጥራዊነትን በተመለከተ

ከዚህ ጥናት የሚገኙ ማናቸውም መረጃዎች ከጥናቱ ዋና አስተባባሪ በስተቀር ሌሎች ማግኘት እንዳይችሉ በደለፍ ቋልይዘጋ፡፡ በተጨማሪም ማናቸውም የጥናቱ ተሳታፊ ማንነትን ሊገልፅ የሚችሉ ለምሳሌ እንደስም ያሉ መለያዎችን አንጠቀምም፡
መረጃዎችን ሰብስበን እንደጨረስን ይመረጃትን ነተናሰርተን ካሳተምን በኋላ ሁሉም የተሰበሰቡ መረጃዎች እንዲጠፉ ይደረጋል፡፡ ይህም ከአሁን ግዜ ጀምሮ በ6 ወር ውስጥ ይከናወናል፡፡

ከጥናቱ የሚገኙ ጥቅሞችን በተመለከተ

በጥናቱ በመሳተፍዎ የሚያገኙት ምንም አይነት ቀጥተኛ ጥቅም ለምሳሌ እንደ የገንዘብ ክፍያ አይኖርም፡
ነገር ግን ጥናቱ የሚያቸው የምግብ እጥረት አጋላጭ ሁኔታዎች ላይ በሚሰራው ስራ ልጆዎትን ና ሌሎች ልጆችን ከምግብ እጥረት ተጋላጭነት ሊታደጉ ይችላሉ፡፡
የተለዩት አጋላጭ ሁኔታዎች ላይ የሚናምሩ ትስራዎች በማግስት ወይም እርስዎ ሊከናወኑ ይችላሉ፡፡

ፈቃደኝነትን በተመለከተ

በጥናቱ ላይ ለመሳተፍ ወይም ላለመሳተፍ ውሳኔ ሙሉ በሙሉ በእርስዎ ፈቃደኝነት ላይ ብቻ የተመረተ ሲሆን ከዩኒቨርስቲው ወይም ከጤና ጣቢያ ወቅ የሚያገኙት ማንኛውም አገልግሎት ጋር ግንኙነት የለውም፡
ስለሆነ ም ካላይ የተጠቀሱትን ነጥቦች በሚዳኘት የራስዎን ውሳኔ የመወሰን ሙሉ መብት አለዎት፡፡

ማብራሪያዎችን ስለማግኘት

በማንኛውም ግልፅ ያልሆኑ ነገሮች ላይ ማብራሪያ ለማግኘት ወይም መብት ጥሰት ካጋጠምዎት የጥናቱን ዋና አስተባባሪ አቶ ከፍያለው አመነ ን በስልክ ቁጥር 09 21 37 55 08 ወይም የዩኒቨርስቲውን አድራሻ በመጠቀም ማስወቅ ይችላሉ፡
፡

ስምምነት

አሁን በጥናቱ ላይ ለመሳተፍ የመወሰኑ በትጊዜ ነው፡፡
ከታች የምትፈርሙት ፈርማ ከላይ ያሉትን ነጥቦች አንብበው ተረድተው እንዲሁም ስለ ጥያቄዎቻችሁ በቂ ምላሽ በማግኘት በጥናቱ ላይ ለመሳተፍ መወሰኖትን ሚጋገጫ ነው፡፡ የዚህ ም ውል ግልባጭ እርስዎ የሚጥ ይሆናል፡፡

የጥናቱ ተሳታፊ ፊርማ _______________ ቀን _________________

የመረጃ ሰብሳቢው ፊርማ _____________ ቀን _________________

Annex 9: Pictures taken from the conflict consequences during the response activity, Yirga chefe and Kochere woreda of Gedeo zone, 2019.

Picture 1: mixed storage of medical supplies and other NFIs at Gemerso tikakin IDP site, August 2018.

Picture 2: Poor quality of room at Gemerso tikakin IDP site, August 2018

Picture 3: IDP site compound contaminated with cattle's excreta and urine at Gemerso primary school, August 2018.

Picture 4: New toilets with 14 pits constructed at Cherba primary school, August,2018.

Picture 5: water source for IDPs at Gemerso primary school,August 2018.

Picture 6: Ian toilets at Gemerso primary school,August 2018.

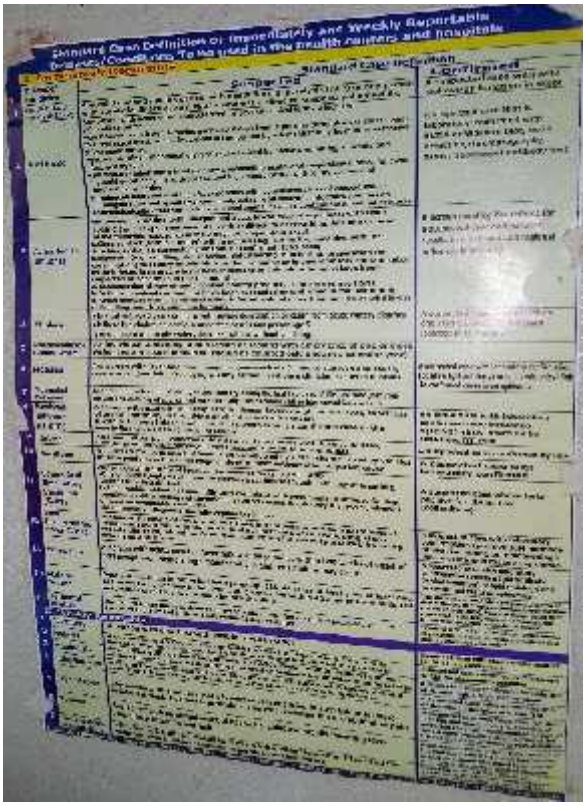
Picture 7: Solid and liquid waste flow out of the IDP site compound at Gemerso tikakin IDP site August,2018.

Picture 8: Insects breading on stagnant water at Gemerso tikakin IDP site, August 2018.

Picture 9: RRT training given for health workers from health centers and woreda offices, August 2018.

Picture 10: Damaged houses dueto the conflict at Chirku kebele, Yirga chefe woreda, August 2018.

Picture 11: Damaged school at Chirku kebele, Yirgachefe woreda, August 2018.



Picture 12: Posted case definitions in OPD of visited health facilities, Yirga chefe and Kochere woreda of Gedeo zone, 2018.

Picture 13: New temporary houses under construction by the returnee at Chirku kebele, 2018.