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Compiled Body of Works with Thesis

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FINNAL BODY OF WORK WITH THESIS APPROVAL FORM**

As members of the board of examiners of the final body of work with thesis open defense, we certify that we have read and evaluated the body of work with thesis prepared by Aklilu Negash under the thesis entitled” Magnitude And Predictors Of Early Sexual Initiation Among Preparatory School Student In Addis Ababa, Ethiopia 2017” and recommencement for the degree of Master of Public Health in Filed epidemiology

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Final approval and acceptance of the body of work with thesis is contingent upon the submission of the final both hard and soft copies of the body of work with thesis to the department of public health.

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Acronyms

AAHB	Addis Ababa City Administration Health Bureau
AACAEB	Addis Ababa City Administration Education Bureau
AIDS	Acquired Immune Deficiency Syndrome
AR	Attack rate
ART	Antiretroviral therapy
AWD-TC	Acute watery diarrhea treatment Center
BMI	Body Mass Index
CFR	Case Fatality Ratio
CSW	Commercial sex worker
EC	Ethiopian calendar
EDHS	Ethiopian Demography and Health Survey
EFTMOH	Ethiopian Federal Ministry of Health
EP	Extra Pulmonary
EPHI	Ethiopia Public Health Institution
EPI	Expanded program for immunization
FMHAAC	Food Medicine Health Care Administration and Control
HEW	Health extension workers
HIV	Human Immune Deficiency Virus
HMIS	Health Management Information System
HSTP	Health Sector Transformation Plan
IDSR	Integrated disease surveillance and response
IgM	Immunoglobulin M
IV	Intravenous
LSC	Lideta Sub city
MCH	Mother and child health
MDGs	Millennium Development Goals
MMR	Maternal Mortality Rate
MOH	Ministry of Health
MSF	Medicine sans Frontiers
NPW	Non Pregnant women
OPD	Outpatient department
OR	Odds ratio
ORS	Oral Rehydration Salt
PHEM	Public Health Emergency Management
PNG	Pulmonary Negative
POS	Pulmonary Positive
PW	Pregnant women
RH	Reproductive Health
RX	Treatment

SDGs	Sustainable Development Goals
SPHMMC	St. Paulo's Hospital Millennium Medical Collage
SRH	Sexual and reproductive health
STD	Sexually Transmitted Disease
STIs	Sexually Transmitted Infections
TB	Tuberculosis
TVT	Technical and vocational training
UNICEF	United Nation Children Fund
USA	United State of America
VCT	Voluntary counseling and testing
WASH	Water sanitation and Hygiene
WHO	World Health Organization
WIR	Weekly Incidence Rate
YC	Youth center

Executive Summary

This document contains a two years Field Epidemiology and Laboratory Training Program outputs which is Submitted to St, Paul's Hospital Millennium Medical College in Partial Fulfillment for the Degree of Master of Public Health in Field Epidemiology. It includes reports of disease outbreak investigation, surveillance data analysis, surveillance system evaluation, health profile report and manuscripts and full thesis report on factors associated with early sex initiation among preparatory student in Addis Ababa. The report contains abstract, introduction, methods, discussions, conclusion, recommendations, and acknowledgement and references separately.

Accordingly the document is organized to five chapters; chapter one contains diseases outbreak investigations. We conducted AWD outbreak investigations in Lideta Sub city. We identified that common risk factors of the epidemic were eating vegetable, raw meat and common tap water were contributed for AWD outbreak in the Sub city.

Chapter two contains report of surveillance data analysis which was conducted on dysentery case in Lideta Sub city. In data analysis three years data were used. Trends and seasonality of dysentery were also determined. And also the incidence rates for three consecutive years were identified.

Similarly chapter three addresses surveillance system evaluation entitled “An Evaluation of Measles Surveillance system in Lideta Sub city”. This chapter clearly presents the purpose and objectives of the measles surveillance and it's Progress towards its objectives. Measles surveillance attributes: simplicity, flexibility, stability, acceptability, representativeness, timeliness, data quality, sensitivity and Predictive positive value were also assessed in the chapter.

Chapter four contains assessment of Lideta Sub city health profile. In the chapter health and health related data of the Sub city populations were evidently presented which is very imperative for prioritizing high-flying problems. It is basic for planning and undertaking appropriate public health interventions; and is entry point for operational public health researches. Stake holders of health and health related issues will access evidence based information for health planning from this chapter. Chapter five contains Scientific Manuscripts for Peer reviewed Journals. In his chapter one manuscripts on outbreak investigation was presented. Chapter six continue full thesis report on factors associated with early sex initiation among preparatory student in Addis Ababa

Chapter I – Acute watery diarrhea outbreak investigation

Acute Watery Diarrhea Outbreak Investigations in Lideta Sub City, Addis Ababa, June 2016.

Abstract

Background

Vibrio cholera is one of causative agent which causes of AWD. AWD is transmitted by the fecal-oral route. A dose of more than one million organisms is usually needed to cause illness. On June 8, 2016, Addis Ababa health bureau announce acute watery diarrhea outbreak in kolfe Sub city. The first case notification was from Kolfe Sub city and the first CTC was established in Mikile Land health center. The outbreak has spread to ten Sub city within a week. The purpose of this outbreak investigation is to control the spread of the diseases and prevention of its occurrence by identifying potential risk factors for AWD.

Methods:

Using unmatched case control design, Case-patients were identified from CTC (institutional base) which are admitted at CTC on the date of collection. The controls were selected on the same date from nearby woredas (community base).1:2 (case: control) ratio was applied. Structured questionnaire was used. A variable with p- value < 0.2 in bivariable were used to in the multivariable logistic regression to determine best explain factors of (AWD) by calculating odds ratios (ORs) with 95% confidence intervals (CIs).

Result

AWD cases were notified from week 23, the number was increased from week 23 to reach a peak in week 27 before dropping sharply in week 34. The mean age of case 40 and controls was 32 years (range: 11 - 90 years for cases and 14 – 85 for controls). In multivariable logistic regression, raw meat OR 4.1, CI (1.38-12.7), Vegetable OR = 13.7; CI (4.2-44.3) and common tap water OR = 13.6; 95% CI (4.22 – 44.0).were significantly associated with risk for AWD. Drinking treated water OR 0.117, CI (0.04 – 0.341) appeared as a protective factors.

Conclusions:

This case-control study identified three risk factors independently associated with the spread of the 2017 AWD outbreak in Lideta Sub City in Addis Ababa City Administration. These factors were, eating vegetable; eating raw meat and using common Tap water are statistically significant. More than 72% of Vegetable eaters were ill, and approximately 72% of these cases could have been prevented if vegetables had been cleaned properly

1 Introduction

1.1 Background

Vibrio cholera is one of causative agent which causes of AWD. AWD is transmitted by the fecal-oral route. A dose of more than one million organisms is usually needed to cause illness. AWD is transmitted almost exclusively by contaminated water or food. The incubation period is usually 1 to 3 days but can range from several hours to 5 days. Symptoms usually last 2 to 3 days, although in some patients they can continue up to 5 days (1). AWD epidemics often start at the end of the dry season or at the rainy season, when water sources are limited. This pushes people to accumulate at the fewer water sources available and increasing risks of contamination and transmission. Furthermore, the salinity can increase during the dry season and favors the growth of vibrio. Heavy rains can also provoke the emergence of AWD. Flooding of contaminated water from sewage systems, latrines or septic tanks may contaminate wells or water pipe (2). The global burden of cholera/AWD remains high. Sub-Saharan Africa accounts for the majority of this burden. Approximately 1.3 billion people are at risk for cholera in endemic countries. An estimated 2.86 million cholera cases occur annually in endemic countries. Among these cases, there are an estimated 95,000 deaths. There are twenty-three endemic countries that have over 10 million persons at risk. Ethiopia is one of a country among five countries with highest number of people at risk for cholera (2)

Addis Ababa health bureau declared Acute Watery Diarrhea outbreak in kolfe Sub city on June 8, 2016. In the Meanwhile team has been formulated by incorporating different stockholders like UNICEF, WHO and JSI and Federal Ministry of health. The first case notification was from Kolfe Sub city. The first AWD TC was established in Mikliland health center in the same sub city. On June 10 two cases (one female and one male) reported by Sub city Health office and admitted in mikliland AWD TC. The outbreak has spread to ten Sub city within a weak. The Minister of Health (MOH) and Addis Ababa health bureau put in place a rapid response team. The team came up with a series of prevention and control measures to stop the propagation of the outbreak like: 1) AWD surveillance and treatment capacity at existing health facilities; 2) establishing AWD treatment centers (CTC) 3) providing health education on general hygiene, improvement of sanitation, tracing case, disinfecting case's house and conducting surveillance, outbreak

investigation is carried out by field epidemiology residents. The onset of the rainy season as of June is favorable for spread of the outbreak in all corner of the city.

1.2 Statement of the problem

The global burden of cholera remains high. Sub-Saharan Africa accounts for the majority of this burden. Approximately 1.3 billion people are at risk for cholera in endemic countries. An estimated 2.86 million cholera cases occur annually in endemic countries. Among these cases, there are an estimated 95,000 deaths. Ethiopia is one of a country among five countries with highest number of people at risk for cholera (2)

Acute watery diarrhea (AWD) is often fatal without appropriate treatment. June is the starting rainy season in Ethiopia. This heavy rain can also provoke the emergence of AWD. Flooding of contaminated water from sewage systems, latrines or septic tanks may contaminate water pipe.

Since in Addis Ababa, the capital city of Ethiopia, there are large number population movement (in and out). Due to this, there will be a potential of further spread to other part of the country. Apart losing of human life, AWD will bring a large loss in tourism, air and land transport, import and export trade and. In general AWD distracting socio economy of the country unless prompt control measures is not taken.

1.3 Significance of the study

Outbreak investigation is important for identifying positional source of infection before it's going to worse and losing much human life and distracting socio economy of our country. Beside the efforts carried out by different stockholders to reducing case fatality of AWD through effective case management, investigating risk factors which enhance the spread of AWD outbreak is mandatory. Otherwise the consequence will be lead losing many lives. This information will be used to refine ongoing AWD outbreak control intervention with a view to stopping transmission. Then our intervention effort would be strategic and cost-effective and also give a clue for health programmer and police makers to prevent and control future AWD outbreak in the area. Once the AWD outbreak is clinically verified, vehicles of transmission must be investigated so that appropriate control measures can be taken.

2. Literature Review

There are over 100 vibrio species known but only the “Cholera” species are responsible for Cholera epidemics. Vibrio Cholera species are divided into 2 Sero groups: *Vibrio Cholera* O1 and *Vibrio Cholera* O139. Cholera is a diarrheal disease caused by infection of the intestine with the gram-negative bacteria *Vibrio cholera*, either type O1 or O139. Both children and adults can be infected. It is one of the key indicators of social development and remains a challenge to countries where access to safe drinking water and adequate sanitation cannot be guaranteed. There are over 100 vibrio species known but only the “cholera” species are responsible for cholera epidemics (1)

A dose of more than one million organisms is usually needed to cause illness. Cholera is transmitted almost exclusively by contaminated water or food. Water may be contaminated at its source. Surface water and water from shallow wells are common sources of infection (1)

The global burden of cholera remains high. Sub-Saharan Africa accounts for the majority of this burden. Approximately 1.3 billion people are at risk for cholera in endemic countries. An estimated 2.86 million cholera cases (uncertainty range: 1.3m-4.0m) occur annually in endemic countries. Among these cases, there are an estimated 95,000 deaths (uncertainty range: 21,000-143,000). There are twenty-three endemic countries that have over 10 million persons at risk. Ethiopia is one of a country among five countries with highest number of people at risk for cholera (2)

Cholera is usually transmitted through contaminated water and food and remains an ever-present risk in many countries (3). New outbreaks can occur sporadically in any part of the world where water supply, sanitation, food safety, and hygiene are inadequate.

Once the cholera outbreak is clinically verified, the following potential “vehicles of transmission” must be investigated so that appropriate control measures can be taken: drinking-water that may have been contaminated at source or during transport and storage, or ice made with contaminated water, food that may have been contaminated during or after preparation, seafood, fruits and vegetables.(3). In 2005 Africa was 95 times higher than the reported incidence in Asia and 16,600 times higher than the reported incidence in Latin America (0.01 cases/million population). In the same year, the cholera case fatality rate in sub-Saharan Africa (1.8%) was 3 times higher than that in Asia (0.6%); no cholera deaths were reported in Latin America (4) Cholera was eliminated from developed countries by water and sewage treatment over a century ago. Today it remains a

significant cause of morbidity and mortality in developing countries, where it is an indicator for inadequate drinking water and sanitation infrastructure (4)

There are considerable differences in cholera incidence across endemic areas but in all sites, children are the most affected. The study in Africa had shown the highest cholera incidence consistent with a growing impression of the large cholera burden in Africa (5). Studies in Sierra Leone has shown that exposures significantly associated with cholera-like illness included unsafe water, street-vended food and drink, street-vended water (6). In Haiti in 2014, about 700,000 cholera cases have been reported, with over 8,000 and Between April 2013 and March 2014, toxigenic *V. cholera* O1 was isolated from 17 (8.6%) of 197 surface water samples and from 10 (59%) of the 17 sample collection sites.(7) Study in Zambia .Consumption of raw vegetables was strongly associated with cholera in Lusaka. Exposure could occur if the vegetables were handled in markets which lack facilities for maintaining adequate hygiene (8). Study in southern Tanzania showed that distance to the water source having eaten dried fish and bathing in the river were independently significantly associated with risk for cholera(9). Study in Central Africa persons who ate cold cassava leaves (one of the staple foods in the region) were at greater odds of having cholera.(10). Cholera outbreak resulted primarily from insufficient access to clean water and poor sanitation(11). Unsafe water, street-vended water, and crab remained significantly associated with cholera outbreak (12).

3. Objective

3.1 General objective

To identify risk factors and describe the spread of AWD outbreak in Lideta Sub City, Addis Ababa June, 2016.

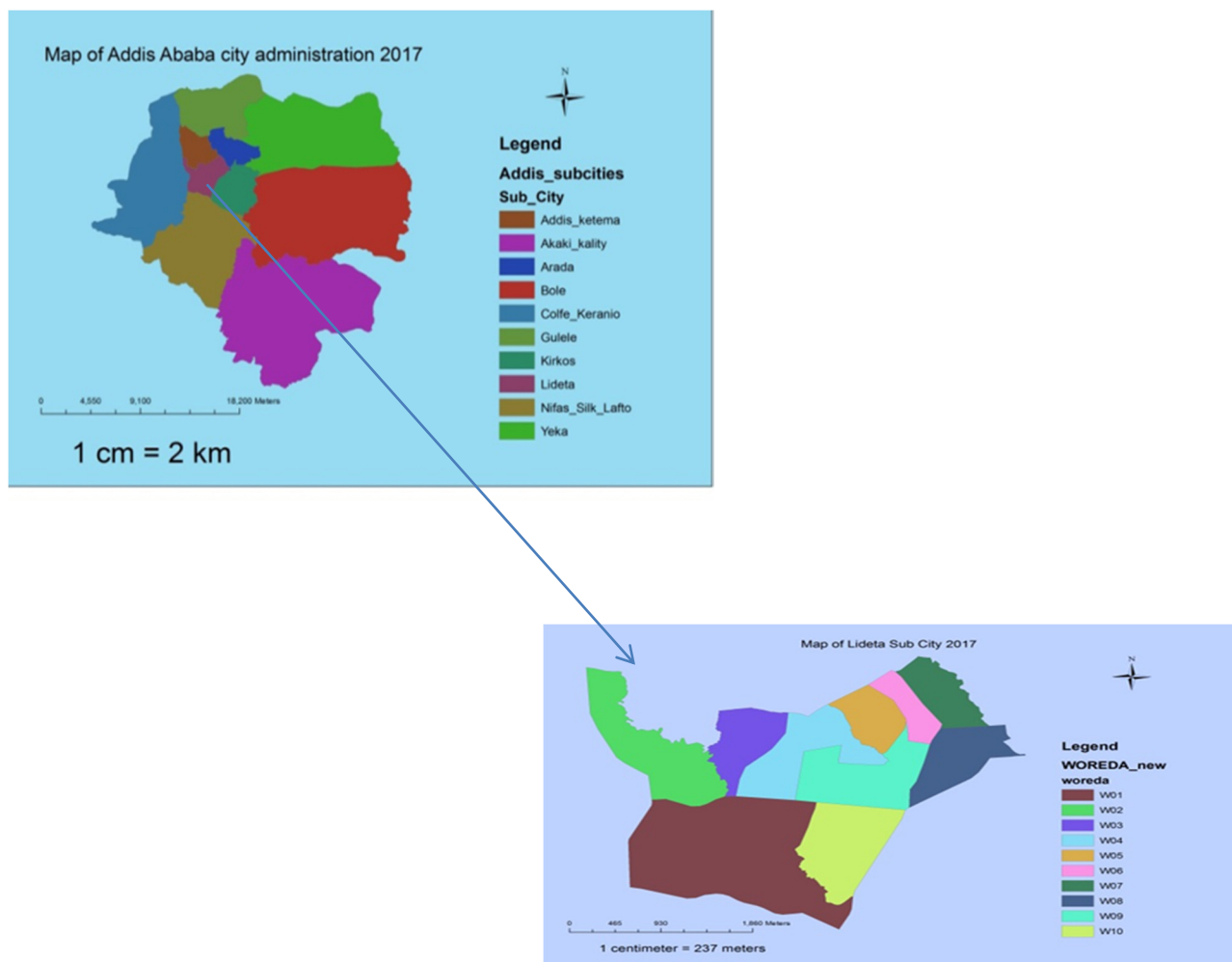
3.2 Specific objective;

- ✓ To describe AWD outbreak in time ,place and person in Lideta Sub city, Addis Ababa
- ✓ To identify risk factor for AWD outbreak in Lideta Sub city, Addis Ababa

4. Method

4.1 Study area and period

AWD outbreak investigation was conducted in Lideta sub city. The sub city total population according to 2016/17 projection is 246,803. Lideta Sub City is one of the 10 sub city under Addis Ababa City Administration and in this sub city there are 10 Weredas. The sub city is bounded on the north by Arada sub city, on south by Nefas Silk Lafeto sub city, on the east by Kerkos sub city and on the west by Kolfe Keranio sub city. Total area of Lideta sub city is 918.4 Sq.Km. AWD outbreak investigations was conducted from July 1-5, 2016.



Map 1: Map of study area for outbreak investigation in Lideta sub City, June 2016

Source: Addis Ababa city Administration integrated land Management

4.2 Study population

The case population were included all cases who ill during an outbreak. Control population persons living in Lideta Sub city but in different woreda of the case but who had not suffered from acute diarrhea and vomiting until the date of the case interviewed.

4.3 Study Subjects

A Patient who are diagnosed clinically or confirmed by laboratory test and admitted in AWD – TC on the date of data collection (Institution base). And control who are not suffered from AWD and vomiting and who are available in the selected house during data collection (community base).

4.3.1 Inclusion criteria

Cases with age of above 5 and suffered from acute watery diarrhea
Controls are with age of above 5 and who are not suffered with diarrhea.

4.3.2 Exclusion Criteria

Cases those are under five year of age and cases that are suffered by other illness before the onset of outbreak

Controls who are visitors at selected house on the date of interview were excluded.

4.4 Study design

Unmatched Case control study was conducted to identify risk factors associated with acquiring AWD outbreak in Lideta Sub city.

4.5 Sample size

Table 1: Sample size determination using double population proportion formula

$$n = \frac{(1+r)^2 [z_{\alpha/2} + z_{\beta}]^2}{r(\ln OR)^2 p(1-p)}$$

Factors	Attacked By AWD		Ratio	CI	OR	power	Sample size		Total sample size
							Case	control	
No latrine (9)	9.8 Unexposed	55.3 Exposed	2	95%	11.4	80	14	28	42 FleisseW /CC
Eating fruit (9)	30.4 Unexposed	78.0 Exposed	2	95%	8.1	80	15	30	45 FleisseW /CC
Eating vegetable (8)	30 Unexposed	62.9 Exposed	2	95%	3.9	80	31	62	93 FleisseW /CC
Unbilled water (9)	79.2 Unexposed	96.8 Exposed	2	95	8.1	80	50	100	150 FleisseW /CC

Among factors listed above unbilled (Untreated water) water gives us maximum sample size. This gives us 50 cases and 100 controls. Therefore our sample size was 150.

4.7 Variables

Dependent variable

- Acquiring/having Acute watery diarrhea

Independent variable

- Water for source for drinking
 - Household tap water
 - Common tap water
 - Drinking treated water
- Toilet facilities
 - Common toilet
 - Private toilet
- Food exposure
 - Raw meat
 - Vegetable
 - Milk
 - Roasted meat
- Hygienic factors
 - Hand washing after toilet
 - Hand washing before eating
- Eating area
 - At hotel
 - Outside home
 - Holy water

4.8 Data collection

A standardized questionnaire was developed from the results of hypothesis-generating interviews conducted with hospitalized AWD patient. Following the selection of case and control and receipt of informed verbal consent, case and control subjects was interviewed using the structured questionnaire. Case was interviewed at AWD_TC those are admitted on the date of data collection .on the same date control were selected from adjacent woreda of the case. After the woreda selected center of the village identified then Control households were randomly chosen after spinning a bottle at center of the village. Then the person in that household met the criteria of being control was interviewed. If no suitable control existed in the chosen household, the investigator jump to the next nearest home in the same direction and continued in this manner until an appropriate and expected number of control subject is found.

4.9 Data quality control

At the time of the data collection, data was checked for completeness and consistency by the principal investigator. Appropriately completed questionnaires were coded. Data cleaning was done by running frequencies of each variable to check for accuracy, outliers, and consistencies prior to entering the data in to EPI –INFO version 7 software.

4.10 Data analysis

Data were entered into an Epi Info 7 database and export in to SPSS version 20. The data was cleaned for inconsistency and missing value. To assess the association between independent variable and AWD case bivariable and multivariable logistic regression was done. Variables with p- value < 0.2 in bivariable were used in the multivariable logistic regression to determine best explain factors of (AWD) by calculating odds ratios (ORs) with 95% confidence intervals (CIs).

4.11 Operational definition

Cases: A case of AWD in this study is a patient aged 5 year or more who develops profuse acute watery diarrhea, with or without vomiting and admitted in AWD-TC.

Controls: Person who didn't ill by AWD at time of Case subject interviewed

Raw meat: in this study is meat which is not cooked at all

Eating out side home: in this study eating or drinking in hotel, cafe, at social ceremony (Maheber, serge, lekeso.)

Common toilet: in this study is when more than one family uses a single toilet

Private toilet: in this study is when a family has their own private toilet /not share with others/

Common tap water: in this study is when more than one family use a single tape water

Household tap water: in this study, when a family has a pipe in their house or compound

Holy water: in this study, any type of water source in church compound or out of compound which people believed it is blessed and use for the treatment of disease and any other purpose

4.12 Ethical consideration

Letter from SPHMMC department of public health was submitted to Lideta sub city health office and before administration of questionnaire; verbal consent was obtained from respondent. The respondents was informed about the objective and purpose of the study and informed consent was taken from each respondents also they was informed about their right not to participate in the study and interruption at any time. No personal identifiers were used on data collection form. The

recorded data will not access by a third person except the principal investigator, and was kept confidentially and anonymous. There was an explanation for study participant that no risk will be incurred because of their involvement, no personal benefits to their participation in this study and that the information they provided can contribute to control the AWD outbreak in the community.

5. Result

An increase in acute severe diarrhea cases in adults was noted in late April, 2016. On June 8 2016, the first AWD case was confirmed. At that time, AWD control campaigns were launched by Addis Ababa city administration .As part of control activities, two AWD treatment sites were established in each Sub city. The first AWD T-center was in kolfe Sub city, where the outbreak was first noticed. At the same time outbreak investigation lunched in all Sub cities. As part of this effort a case - control study was conducted in Lideta Sub city. In the present case -control study we enrolled 50 cases and 100 unmatched controls .response rate was 100%.

5.1 Descriptive result

AWD cases were notified from (WHO week 23, 2016. The number increased exponentially from week 23 to reach a peak in week 27 before dropping sharply in week 34. Only one case was notified in week 42 (October 17 – 23).

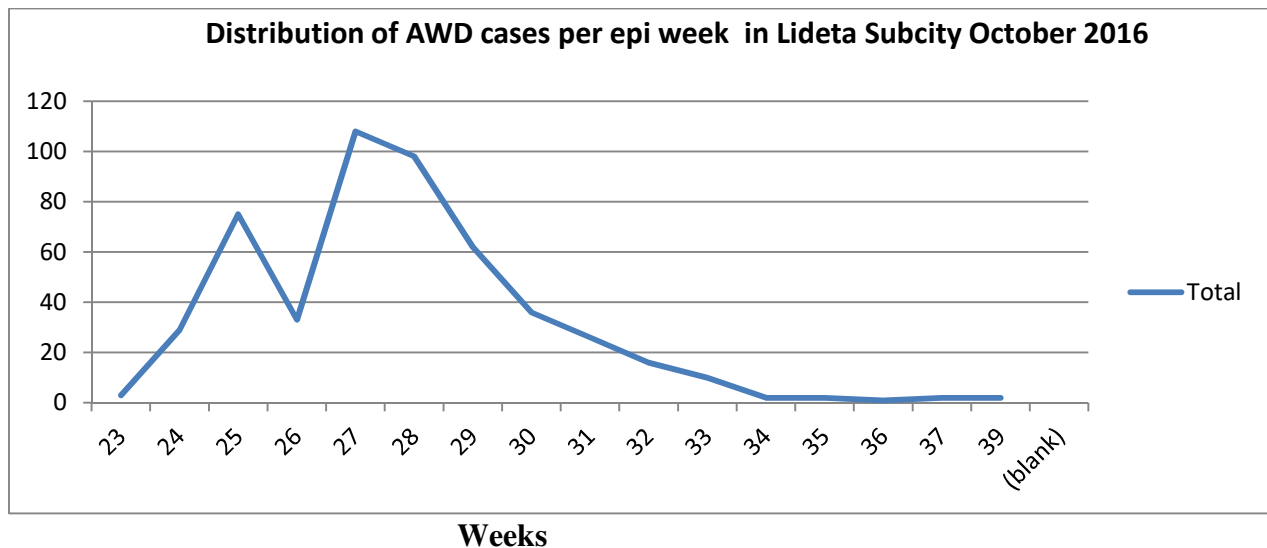
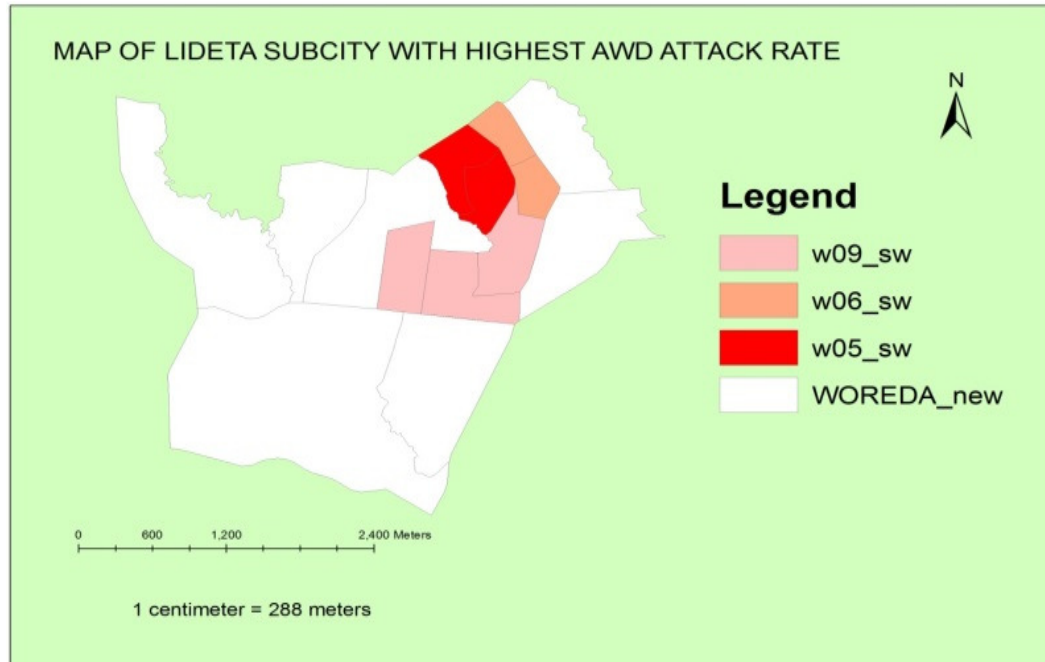


Figure 1: Epi -curve of AWD outbreak, Lideta Sub city, 2016

There were 2 peaks overall: week 25 and week 27. The number of cases steadily declined thereafter, and, by the end of week 39, the outbreak was nearing its end.

All sub cities in Addis Ababa City administration were affected by the outbreak. Most notified cases were from Lideta Sub city Region 282 (53%). Next to Lideta, kolfe Sub city patient were the highest number 48 (9%) which served in Lideta Sub city AWD-TC. There was also 10 and 1 AWD

case from Oromia and SNNPR treated in Lideta AWD-TC respectively. Woreda 6, 9 and 5 record highest attack rate 4.6, 3.01 and 2.79 respectively in Lideta Sub city.



Map 2: Woreda with highest attack rate during AWD outbreak in Lideta Sub city, 2016

The most affected age group was 15-24 age groups(57%) followed by 44+age group (38%) and the 5-14 age group (4%). Men were more affected by the outbreak than women. Out of 505 notified cases, 305 (60%) were men and 200 (40%) were women

Table 2: Distribution of AWD case and attack rate per 1000 population in Lideta sub city, 2016

Woreda	Number of case	Population	Attack rate (%) per
			1000
1	12	18,685	0.64223
2	31	12,774	2.4268
3	32	20,583	1.55468
4	30	22,096	1.35771
5	87	31,104	2.79707
6	17	3,625	4.68966
7	44	27,375	1.60731
8	6	9,950	0.60302
9	11	3,643	3.01949
10	12	16,421	0.73077

Case fatality

If left untreated, severe AWD has a CFR of about 50%. However, if AWD patients receive prompt and high quality treatment, all AWD patients should survive. Thus, for AWD, the CFR is used as a measure of the quality of care since timely and appropriate treatment should prevent death. Therefore, a generally accepted bench mark for quality of care is a CFR of <1%. The Case Fatality Rate (CFR) in this outbreak was 0.59. One death in the community and 2 deaths in AWD TC were recorded.

The mean age for cases was 40 and controls were 32 years (range: 11 - 90 years for cases and 14 – 85 for controls). All case-patients experienced acute watery diarrhea and half of the case-patients presented with severe dehydration (which requiring intravenous fluids. A majority of case-patients reported nausea and vomiting (82%).Treatment consisted of oral fluids; doxycycline, and an intravenous fluid were given to case. All the case-patients received oral fluids. 30% of cases and 72% of controls were used household tap water source for drinking. And more than 20% of cases and 97 % of control shared latrine with other neighbor. 24% of case and 73% of control used treated water.10% of case and 70 % of control have private toilet

Table 3: Clinical presentation of AWD cases in Lideta Sub city, June, 2016

	Frequ ency	Percent
Watery diarrhea	11	22
Watery diarrhea & Vomiting	39	78
Total	50	100

Among case subjects 78 % are present with watery diarrhea and vomiting. Only 11% are compelling watery diarrhea

5.2 Analytic result

In Bivariable logistic regression, exposure significantly associated with AWD included, eating raw meat odd ratio 4.373; (CI) 2.117- 9.031, vegetable OR =8.4, (CI) 4.04-19.22, eating outside home OR 2.7; (CI) 1.325 -5.520, common Tap water OR 9.97; (CI) 4.328-22.159, using common toilet OR 8.273; (CI) 3.739-18.304 were all significantly associated with AWD. No significant associations were observed between AWD and holy water [OR 0.28. [0.13- 7.13], Roasted meat (OR= 1.35, CI= [0.635 – 2.90] and the hygiene related factors like washing hands before eating 0.85 [0.257 - 1.053] P=0.069 with 95 % confidence interval

Whereas washing hands after toilet (OR=0.265; 95% CI [0.120-0.582], drinking treated water (OR=0.117, 95% CI [0.053-0.256] and having private toilet (OR= 0.10 [0.045-0.231] p=0.000) are protective for AWD

Table 4: Bi variable and Multivariable analysis of risk factors for AWD case in Lideta sub City, June, 2016

Variable		Case n (%)	Control n (%)	COR(95% CI)	AOR(95% CI)
Vegetable	Yes	33(66)	21(21)	8.84(4.06-19.22)*	13.7(4.24-44.31)**
	No	17(34)	79(79)	1	
Common Tap water	Yes	40(80)	29(29)	9.79(4.328 - 22.159)*	13.6(4.22 – 44.0)**
	No	10(20)	71(71)	1	
Common toilet	Yes	39(78)	30(30)	8.273(3.739 - 18.304)	5.1(0.97-3.8)***
	No	11(22)	70(70)	1	1
Raw meat	Yes	11(58)	19(19)	4.373(2.11 - 9.031)*	4.19(1.38- 12.73)**
	No	39(42)	81(81)	1	1
Holy water	Yes	12(24)	10(10)	0.28(0.13 - 7.138)	0.34(0.3- 1.44)***
	No	38(76)	90(90)	1	1
Eating outside home	Yes	34(68)	44(44)	2.7(1.325 - 5.520)*	2.1(0.91- 1.9)***
	No	16(32)	56(56)	1	1
Roasted meat	Yes	15(50)	24(24)	1.35(0.635 - 2.90)	4.1(0.3- 5.6)***
	No	35(70)	76(76)	1	1
Raw milk	Yes	11(22)	21(21)	1.202(0.552 – 2.77)	3.1(0.23 - 6.8)***
	No	39(88)	79(79)	1	1
Hand washing before Eating	Yes	28(56)	71(71)	0.51(0.257 - 1.053)	3.1(0.5- 14.6)***
	No	22(44)	29(29)	1	1
Hand washing after Toilet	Yes	30(60)	85(85)	0.265(0.120 - 0.582)*	1.1(0.8-2.7)***
	No	20(40)	15(15)	1	1
Household tap water	Yes	15(30)	72(72)	0.167(0.79- 0.351)*	0.18(0.46 - 7.1)***
	No	35(70)	28(28)	1	1
Drinking treated water	Yes	12(24)	73(73)	0.117(0.053 - 0.256)*	0.117(0.04- 0.341)**
	No	38(76)	27(27)	1	1
Private toilet	Yes	10(20)	70(70)	0.102(0.045 - 0.231)	0.41(0.45—9.1)***
	No	40(80)	30(30)	1	1

* =p-value < 0.2, **=p-value < 0.05, ***=p-value >0.05,1= reference

Variable in the final multivariable logistic regression model included, Vegetable OR = 13.7; CI (4.24 - 44.3), common tap water OR = 13.6; 95% CI (4.22 – 44.0) and raw meat OR= 4.19, CI (1.38- 12.7) were significantly associated with risk for AWD. Drinking treated water with OR= 0.117, CI (0.04 – 0.341) appeared to be protective factors. Private toilet did not emerge as a significant protective factor when added to the model after adjusting

Environmental observation

Most of the sub city residents live in slum area some are along dirty River. The general hygiene in the sub city was poor. There were stagnant water and open defecation almost everywhere due to renovation. Children were playing on open defecation filed. Latrines were poorly maintained most of them have leakage. River is used as defecation site specially for homeless peoples and considerable amount of toilets connected to those rivers. There are some ground facts that the city administration water supplies could have been unsafe. Because, during filed work it is custom to observe leaking pipes throughout the Sub city. This creating opportunities for the introduction of human fecal and other pathogenic into the water system before the water reached household's taps. In addition to this water from sources not adequately chlorinated to sustain effective chlorine residual levels throughout the water distribution system. Some water taps and stored water were tested for Chlorine residual level in the sub city and found that it was (0.02) which is below the standard level. For Public water systems that use surface water or ground water under the influence of surface water the residual disinfectant concentration in the water entering the distribution system cannot be less than 0.2 mg/L

6. Discussion

Food and drink exposure like raw meat, vegetable, using common tap, were significantly associated with AWD outbreak in Lideta Sub city. This result in line with epidemiological evidence from Zambia showed that contaminated food was a major vehicle of transmission of cholera during an outbreak in particular consuming raw vegetable has association with AWD (8). Using Common tap water for drinking also has significant association with the disease. This result from poor sanitation due to insufficient access to clean water and also cross contamination during using common water tap. This result also in line with results found in study in Guji, Bale and east Shewa zones of Oromia (9). Hand washing after toilet no association with AWD, in contrast to this result study in Afar identified hand washing after toilet as protective of AWD and age from 15-44 are more affected group the same is true in Afar investigation (13)

In one or other way water is the major source of transmission since all eating item supposed to clean by water. The above associated risk factors mentioned are supposed to contact with water in any menas.in connection with this, there are some ground facts that the city administration water supplies unsafe. Because, during filed work(environmental observation) it is custom to observe leaking pipes throughout the Sub city .This creating opportunities for the introduction of fecal into the water system before the water reached household's taps. Second, water from improved sources has not been adequately chlorinated to sustain effective chlorine residual levels throughout the distribution system. Investigations of cholera outbreaks in Sierra Leone showed that pathogenic microbes entered piped water networks through cross-contamination with sewer pipe (12).

The other evidence from environmental observation was during testing for stored household drinking water and some institution water taps the result show that water from sources not has been adequately chlorinated to sustain effective chlorine residual levels throughout the distribution system. Study in Sierra Leone stored drinking water was tested in 76 control households; of these, 30 samples (40%) showed the presence of free chlorine residual. Testing of four public water sources in the study area showed no evidence of chlorination (12).

In response to the outbreak, water, sanitation, and hygiene (WASH) works has been done by the government and partners included educating the public about household chlorination and distributing chlorine tablets throughout the Sub city.

7. Conclusion.

This community and Treatment center-based, case-control study identified 3 risk factors associated with the spread of the 2016 AWD outbreak in Lideta Sub city, Addis Ababa. These factors were, eating vegetable, common tap water, and eating raw meat. Data from woreda-specific attack rates also suggest an increase in AWD cases in the densely populated woreda of the town. The highest attack rate was recorded in woreda 9 but large number of case recorded in woreda 5, which is densely populated woreda. 80% cases and 29% of controls had used common tap for drinking. This may be an indirect measure of poor hygienic practices caused by lack of water. More than 72% of Vegetable eaters were ill, and approximately 72% of these cases could have been prevented if vegetables had been cleaned and cooked properly.

8. Study Limitation

Since suspected case and “healthy” control has taken without Laboratory test control selection bias will affect the result in some level. To minimize the effect of bias investigator screen the control groups if they have any sign of AWD and cases selected those are clinical confirmed by clinician and admitted at AWD- TC.

9. Recommendations:

Immediate Action

- Eating vegetable and raw meat become major risk factor, therefore to stop the propagation of the outbreak intensive public message should distribute for the community not eat raw meat and vegetable by Sub city health office

For finding from environmental observation

In Long Run

- Old Pipe with leakage should replace by AA city Administration water and sewerage Authority.
- Correction measure should be taken on toilets which are connected with river by woreda health office.
- Household Water supply coverage should increase by AA city administration to minimize common tapes.

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Annexes 1: Data collection form for AWD outbreak investigation

Part A: General information

1. Serial No/code-----

2. Case ☐ Control ☐

3. Age (in years): -----

4. Sex: Male ☐ Female ☐

5. Occupation-----

6. Residential Address-----

7. Sub-city-----

8. Telephone Number-----

Clinical Information (for cases)

1. Date of onset (dd/mm/yyyy) -----

2. Presenting symptoms

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

3. Hospitalized? Yes ☐ No ☐

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

Part B: Exposures

Water

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

Household Tap water ☐ Communal tap water ☐ River ☐
Well ☐
Borehole ☐ Spring ☐ Street vended water ☐
Tanker water (Roto) ☐ Bottled water ☐
others(specify)_____

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

Household Tap water ☐ Communal tap water ☐ River ☐ Well ☐
Borehole ☐ Spring ☐ Street vended water ☐
Tanker water (Roto) ☐ Bottled water ☐
others(specify)_____

3. Did you treat the water before drinking? Yes ☐ No ☐

4. If yes, how did you treat it? Filter ☐ Boiling ☐ Aqua tab ☐
water guard ☐ Bishangare ☐ Pure ☐
Other(specify)_____

5. Did you drink water from a holy water site in the last five days? Yes ☐ No ☐

6. If yes, what is the source of the holy water site? Spring ☐ Piped water ☐
Well ☐ others (specify)_____

Food and Beverages

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

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

Fish ☐ Milk ☐ others (specify)-----

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

Local market ☐ Private garden/farm ☐ Street shops ☐ Supermarkets

Others (specify)-----

9. Did you eat food outside your home in the last 3days? Yes ☐ No ☐

10.If yes, where? Sold by street vendors ☐ Hotel ☐ Restaurant ☐

At a gathering ☐ School/work cafeteria ☐

Others (specify)-----

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

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

University ☐ Others (specify)-----

Hygiene and sanitation

13. Do you systematically wash your hands with soap before eating? ☐ Yes ☐ No

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

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

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

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

Others (specify) _____

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

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

Open pit ☐ In the river ☐ Bury ☐ Burn ☐

Others (specify) _____

Other exposures

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

Yes ☐ No ☐

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

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

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

Yes ☐ No ☐

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

Chapter II: Surveillance Data Analysis Report

Surveillance data analysis of dysentery Lideta Sub city, Addis Ababa, Ethiopia 2013 – 2015

Summery

Dysentery is an intestinal inflammation, especially in the colon, that can be lead to severe diarrhea with mucus or blood in the feces Patient typically mild to severe abdominal pain or stomach cramps. In some case, untreated dysentery can be life threatening, especially if the infected person cannot replace lost fluids fast enough. It is caused either by bacteria such as shigella, or by parasites such as Entamoeba. These forms are called bacillary dysentery, or shigellosis, and amoebic dysentery respectively the bacteria or parasite are usually transmitted via the fecal- oral route. The vector could be a housefly or other pest, or a food handler might have an undiagnosed infection and neglect proper hand hygiene procedures. Poor sanitation is a leading cause of transmission in low income area and regions. Another route is the use of untreated human waste as fertilizer. Composting destroys the amoeba in all its forms, and renders the waste suitable for use. Analysis of surveillance data is important for detecting outbreaks and unexpected increases and decreases in disease occurrence, monitoring disease trends, and evaluating the effectiveness of disease control programs and policy. **Objectives:** the aim of this surveillance analysis report describes the epidemiological presentation of dysentery from July, 2012 and June 2015 in the Lideta Sub city. **Methods and materials:** Three year data, from July, 2012 to June 2015 was officially requested. A Descriptive retrospective cross sectional study was applied. Data was collected in spread sheet paper. And enter excel 2007 for analysis. **Results:** from July, 2012 to June 2015, a total of 2649 dysentery cases were reported in Lideta Sub city. The annual cases ranged from 1149 to 629, with a mean 883 cases per year. The annual incidence ranged from 607 per 100,000 to 254 per 100,000 populations, with a mean of 404 per 100,000. **Conclusion:** We can see from the data the incidence of was found to be high in month of November and May. This seasonality trends correlated with the end and the beginning of rain season. The incidence of dysentery Case in Lideta sub city is less when we compare with in Addis Ababa. The Sub city has rank of 8th in the capital city in 2014-2015. but the incidence of dysentery in the Sub city has been decreasing from last three years.

1 Introduction

1.1 Background Information

Dysentery is an infectious gastrointestinal disorder, characterized by inflammation of the intestines, mainly the colon. WHO defines dysentery as any episode of diarrhea in which there is blood in loose and watery stool (1). Shigella, enterohemorrhagic, Escherichia Coli serotype O157:H7, Campylobacter jejuni, enter invasive E.coli, Salmonella, Entamoeba histolytica. And E.coli O157:H7 are organisms can be cause dysentery (2). The pain is usually intense often associated with cramping. Patients of dysentery pass stool mixed with blood. Pain in the lower abdominal region is the most common signs and symptoms of the dysentery symptoms (3). The most common spreading or crossing way of dysentery among people through contaminated food and water as well as poor sanitation (1). Shigella is the most common cause of outbreak of bloody diarrhea worldwide affecting up to 30% of the population and case fatality rate is up to 50 % (4).

During the past decade, the number of countries reporting dysentery to WHO has increased from 3 in 2003 to 23 in 2007 during the past decade (5).

Surveillance data analysis helps to uncover if there were an outbreak which is not recognized by concerned body. Within ten year back major outbreak has occurred in Ethiopian. A total of 566 cases of bloody diarrhea visited Jimma University Specialized Hospital and private health facilities were seen with one month in 2008 G.C (6). A total of 104 suspected cases were identified with an attack rate of 6.8%. during Addis Ababa University (AAU) Technology Campus reported occurrence of an outbreak of diarrheal illness among students in March, 2010 (7). In addition to this there was a report of a bloody diarrhea outbreak in Southern Nations Nationalities Peoples Region (SNNPR) with a total of 209 cases and 1 death in 2006 GC (8)

Disease surveillance is essential for early detection of outbreaks, epidemics and pandemics in order to initiate timely response and also it is essential to evaluate or monitor progress of ongoing interventions targeted for disease reduction (9). Well-functioning disease surveillance system is critical to measure the burden of a disease (health-related event), identification of populations at high risk and the identification of new or emerging health concerns to the health system, in providing evidence-based information for planning, implementation, monitoring trends in the burden of a disease and evaluation of public health intervention programs to prevent and control disease, injury, or adverse exposure, evaluate program performance, prioritize the allocation of health resources, describe the clinical course of disease; and stimulate for epidemiologic research(9).

Study Rationale

Analysis of surveillance data is important for detecting outbreaks and unexpected increases and decreases in disease occurrence, monitoring disease trends, and evaluating the effectiveness of disease control programs and policies. This information is also needed to determine the most appropriate and efficient allocation of public health resources and personnel. Surveillance data analysis and interpretation is a crucial part that guides response to public health emergencies. Therefore, Lideta sub city will use this document in controlling and prevention of dysentery cases. Regular data analysis and timely providing feedback will motivate health care providers, guide public health intervention, allow monitoring of diseases, identify population at risk. In this data analysis, trends, seasonality, place of burden was identified. The output of this report will have value to take public health action based on the variation of cases incidence according to seasonality and place of occurrence in the sub city.

2 Objectives

2.1 General objective

- ✓ To describe the epidemiological presentation of dysentery from July, 2012 and June 2015 in the Lideta Sub city

2.2 Specific objective;

- ✓ To describe trend of dysentery case in Lideta Sub city from 2012-2015
- ✓ To determine burden and prevalence of dysentery in the sub city
- ✓ To describe the distribution of dysentery by person, time, place

3 Method and material

3.1 Study area and period

Surveillance disease analysis was conducted in Lideta sub city. The sub city total population according to 2016/17 projection is 246,803. Lideta Sub City is one of the 10 sub city under Addis Ababa City Administration and in this sub city there are 10 Weredas. The sub city is bounded on the north by Arada sub city, on south by Nifas Silk Lafeto sub city, on the east by Kirkos sub city and on the west by Kolfe Keranio sub city. Total area of Lideta sub city is 918.4 Sq.Km. The analysis was conducted from May 20- 30.2016 in Lideta Sub city-Addis Ababa. There is a total of 47,081 household in the sub city. 163 small and large industries available. Trade is the major economic activity and source of income for the population of Lideta sub city. They involve from micro to macro business types. Based on the information from FMHAC office in Lideta sub city there are 1,881 business organization

There were no accurate unemployment figures for the woreda. But is no doubt that a significant proportion of the population lives in poverty.

3.1 Study design

Institutional based descriptive cross sectional study design was used

3.2 Sample size and sampling procedures

Data for Disease under surveillances are captured form all health institution including private facilities. There are immediately and weekly reporting diseases. Immediately cases reporting through telephone. And every Monday all facilities bring to the sub city health office the weekly

base case report. There is surveillance focal person in every facilities, who are responsible for collection and reporting of cases under surveillance. at sub city level also there is focal person. Who aggregate all data in the Sub city and send to regional health bureau. The data for this surveillance analysis has taken form sub city data base. Three consecutive years of data was analyzed. Weekly summarized weekly report for three consecutive years was analyzed.

Three year (July, 2012 - June 2015) data of dysentery case was analysis. All dysentery cases treated in governmental and private health facilities and reported to the sub city in given period were included.

3.3 Data collection.

Data was officially request and receive from public health emergency management case team of Lideta sub city sub city. Three years surveillance data from weekly PHEM report was collected

3.4 Data quality control

In case of doubt and in consistence in figures additional explanation was consider from head of different unites and cross check was done with HMIS data and disease registration book.

3.5 Data processing

A descriptive statistics was performed to generate rates, frequencies, percentages, and mean, and result presenting by tables, graphs using Excel software.

3.6 Plan for dissemination of findings

Finally the report will be submitted to Lideta sub city health office and St, Paul's hospital Millennium medical college department of public health in soft and hard copy.

3.7 Ethical consideration

Letter from SPHMMC department of public health was submitted to Lideta sub city health office and .Therefore I had permission to collect secondary data from Lideta sub city health office.

4. Result

Table 5: Demographic Distribution in Lideta sub city, 2016

S.N	Demographic Indicators	Standard Demographic (%)	Estimated Population
1	Total population		246,803
2	Under 5 children's	7.16	17,671
3	< 3 year age group	4.12	10,168
4	6 – 59 months age group	10.81	26,679
5	< 15 yrs. age group	23.97	59,159

4.1 Dysentery case tends Analysis

According to our country surveillance case definition, dysentery case is the person with diarrhea with visible blood in stool. Based on this definition between July, 2012 and June 2015, a total of 2649 dysentery cases were reported in Lideta sub City. In 2013, 2014 and 2015 there was 1149, 853 and 629 case respectively with a mean 877 cases per year. The annual incidence ranged from 607 per 100,000 to 254 per 100,000 populations, with a mean of 404 per 100,000 as table below describes.

Table 6: Dysentery case from July, 2012 to June 2015, Lideta Sub city

2013	Case	2014	Case	2015	Case
July 12	72	July 13	72	July 14	32
August 12	88	August 13	62	August 14	37
September	94	September	50	September	62
October	133	October	65	October	45
November	145	November	92	November	67
December	92	December	61	December	43
January	94	January	70	January	34
February	59	February	61	February	46
March	95	March	73	March	50
April	101	April	82	April	66
May	113	May	95	May	76
June	63	June	70	June	71
Total	1149		871		629

Table 7: Prevalence of Dysentery from July 2012 to June, 2015 in Lideta Sub city

	2013	2014	2015
Dysentery case	1149	871	625
Total population	228383	233184	240890
Prevalence	0.005	0.003	0.002

The prevalence of dysentery in the Sub City has been in declining in 3 consecutive years.

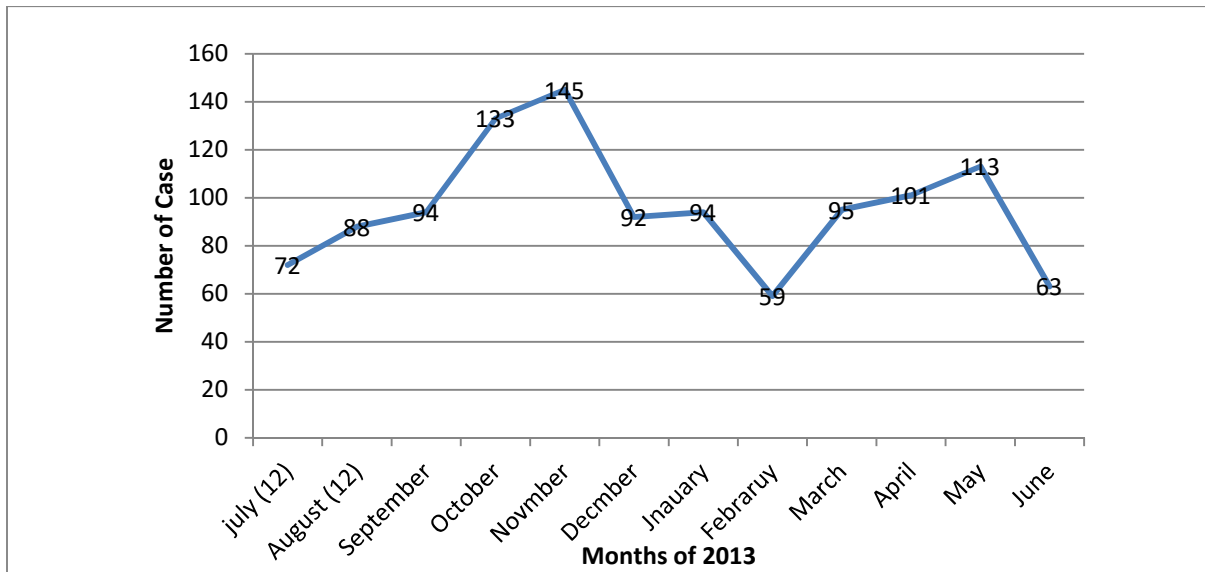


Figure 2: Trend of Dysentery for Year of July 2012 to June 2013 in Lideta Sub city

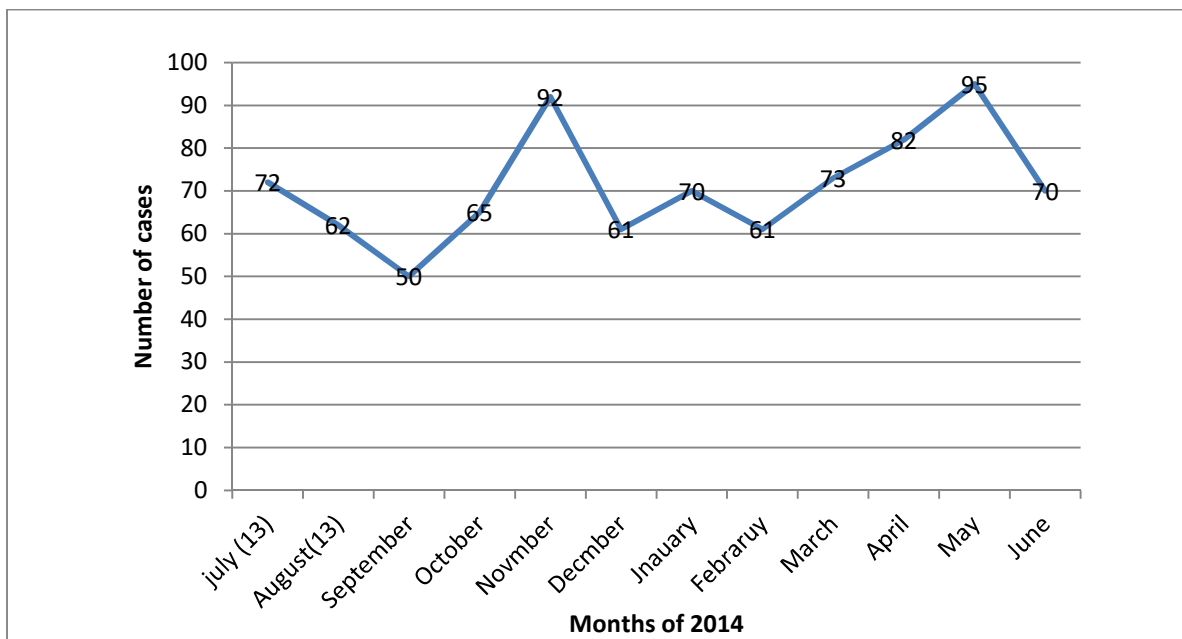


Figure 3: Trends of Dysentery fro year of July 2013 to June, 2014 in Lideta Sub city

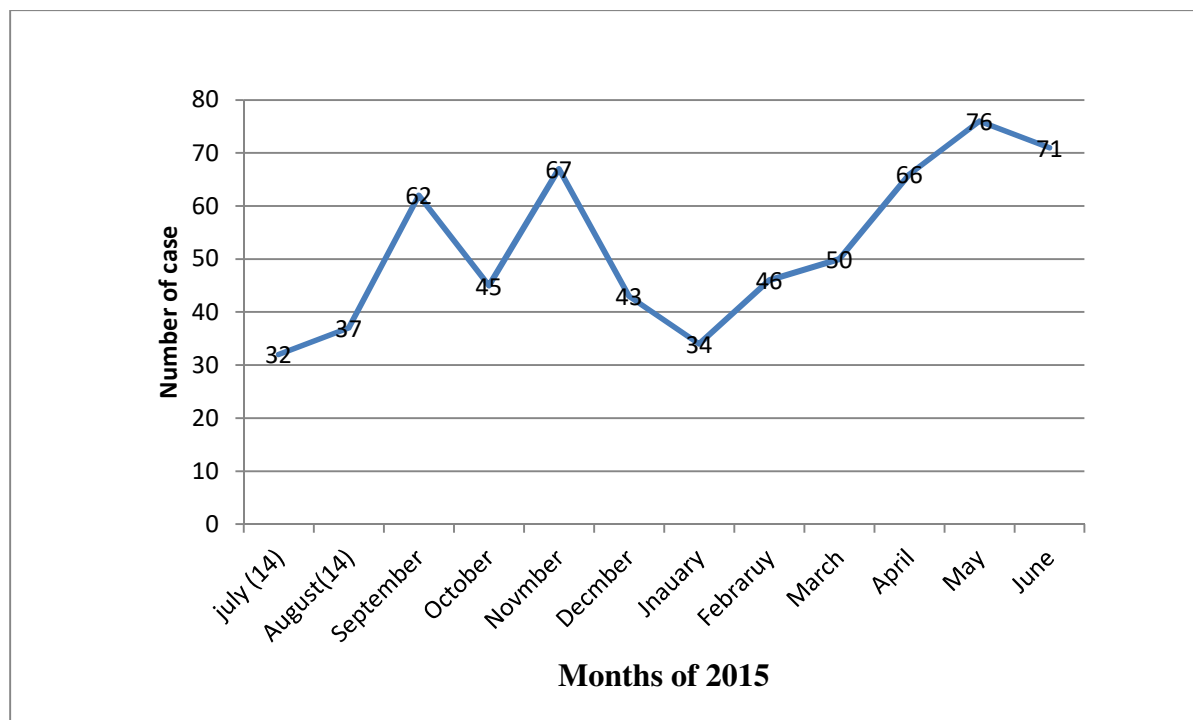


Figure 4: Trends of dysentery case from July 2014 to June 2015 in Lideta Sub city

As we can see from figure 2 up to 4 there are two pick in the month time in November and May. The prevalence of dysentery in the Sub City has been in declining in 3 consecutive years.

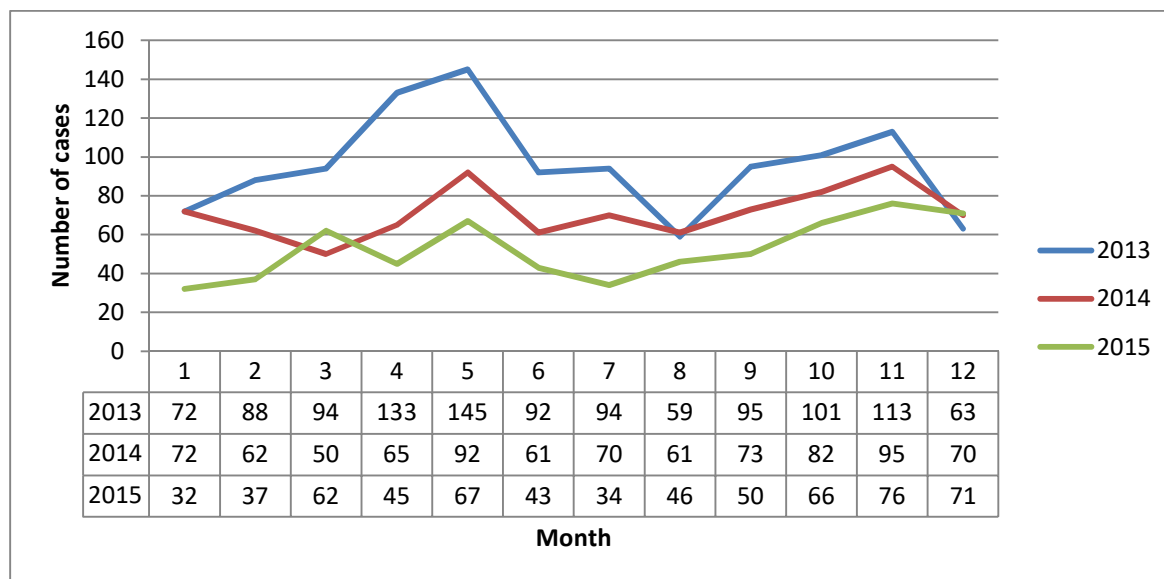


Figure 5: Trend of dysentery from 2013 to 2015, in Lideta Sub city

Totally dysentery case has been decreasing from 2013 to 2015 (figure 5)

Table 8: Dysentery case comparison between Sub cities in Addis Ababa, 2015

Rank	Sub city	Number of Case for Year 2015
1	kolfe	3963
2	Bole	3435
3	Addis Ketema	2462
4	kirkos	2172
5	Akaki Kality	2018
6	Nifas silk	1994
7	Gulele	1591
8	Lideta	911
9	Arada	780
10	Yeka	649

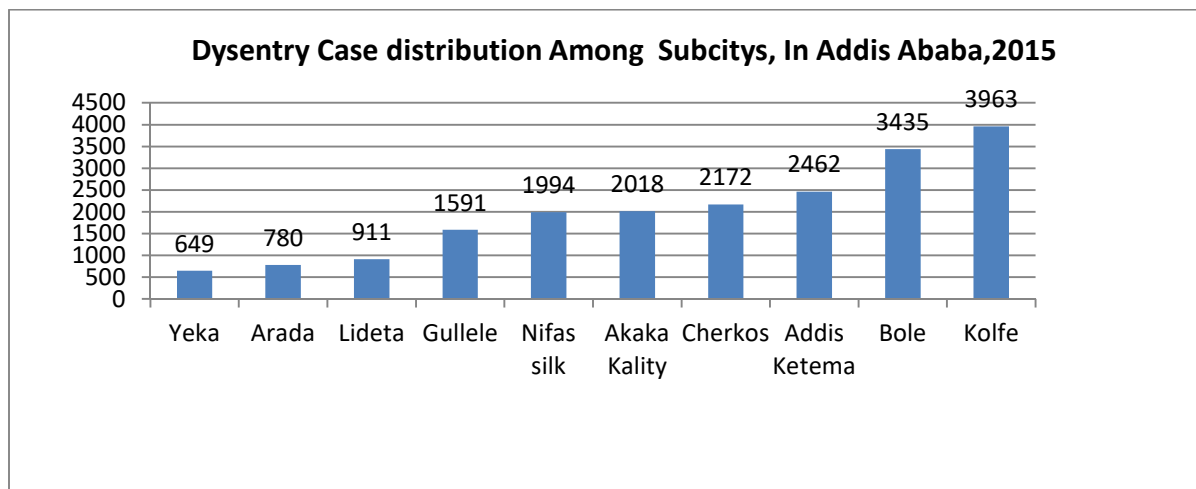


Figure 6: prevalence comparisons between Sub cities in Addis Ababa

The prevalence of dysentery Case in Lideta sub city is small when we compare with other sub city in Addis Ababa. The sub city has rank of 8th in the Addis Ababa City in 2014-2015.

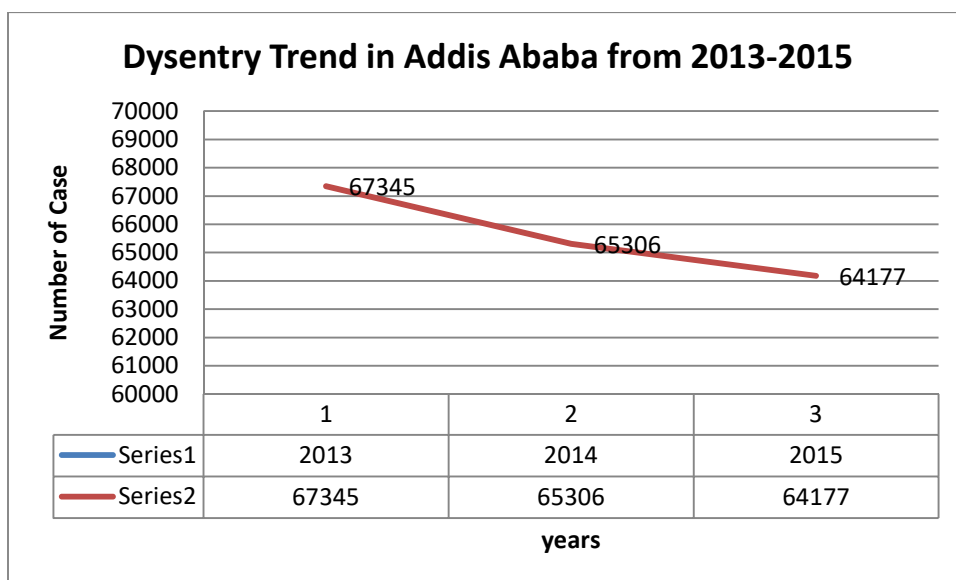


Figure 7: Dysentery trend in Addis Ababa City from 2013-2015

As we can see from the above figures trend of dysentery in Addis Ababa the same with Lideta Sub city. The same decline in trend has been observed in the Capital city in three consecutive years.

5. Discussion

This surveillance data analysis incorporates three year dysentery data and explains the trend and prevalence of dysentery in the sub city. But due to incomplete data the report has limitations on describing cases in place and person from surveillance data. And surveillance data has no sex, place and age information. This will make it impossible to analyze in terms of person. From figures 2, 3 and 4 we can understand that there is a reduction in the total cases of dysentery in the sub city. Seasonal peaked out points have been observed in the month of November and May in three consecutive years. This will have a relation with the amount of rain. In general, dysentery cases have been reducing from 2013 to 2015; for this change we can reason out many factors like health extension programs and demolishing of slum areas for renovation can be put as possible reasons for the declining of dysentery cases. Figures 7 tell us the position of Lideta sub city in Addis Ababa city, as we can see Lideta Sub city on 8th rank. The prevalence of dysentery in the sub city for three consecutive years is 0.49, 0.34 and 0.25. Action threshold level for dysentery cases is unusual increase in number of cases or doubling of the cases on subsequent weeks. As per our data collection and analysis there is no time which urges to action within three years data analysis.

The present surveillance data analysis not dealing with the prevalence of different causative agent of dysentery. But as far as my literature review most articles in our country work on prevalence rates of causative agents particularly. For example, *Shigella* species was also isolated from 34.6% of the patients who attended health facilities in Hawassa Town (10). Another related study conducted in Jimma also reported an isolation rate of 4.9% and 5.8% for *Salmonella* and *Shigella* species respectively (11). A study conducted in Gondar on children with diarrhea isolated *Salmonella* and *Shigella* species with prevalence of 5.2% and 5.2% respectively (12). Due to this it is difficult to compare the prevalence of dysentery of the study area with other studies. But the trend between Lideta Sub city and Addis Ababa City when compared the same decrement trend have been showing in three year data analysis.

Limitation

Descriptive analysis not exhaustively computed. Because reporting format not incorporate variables like sex, age and place.

6. Conclusion

Since Surveillance data not capture sex and place of case, this report has a limitation to write up descriptive report in time person and place. The incidence of was found to be high in month of November and May in three consecutive year. This seasonality trends correlated with the end and the beginning of rain season. This time is favorable for fly reproduction because moisture and hot happen together. The prevalence of dysentery Case in Lideta sub city is less when we compare with in Addis Ababa. The sub city has rank of 8th in the capital city in 2014-2015. In general dysentery case has been declining for three consecutive (2012-2015). This may be the result of Health extension program and demolition of slam area. On the other hand data archive in the sub city is poor. Health office staff especially surveillance focal person did not analyzed data for action and to take action accordingly.

7. Recommendation

- Health education on personal and environmental hygiene during the beginning and end of rain season by woreda health extension workers.
- The reporting format should including important variable like sex ,age and place of cases for further and detail analysis
- Surveillance data archives should improve by Sub city health office
- Ongoing data analysis should be done to monitor the disease trend and effectiveness of control program

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Annexes 2: Data collection form for dysentery case in Lideta Sub city

Dysentery case in Lideta sub city for year form July, 2012 to June, 2015 form surveillance data

Month	2013 Number of case		2014 Number of case		2015 Number of case
12-Jul		13-Jul		14-Jul	
12-Aug		13-Aug		14-Aug	
September		September		September	
October		October		October	
November		November		November	
December		December		December	
January		January		January	
February		February		February	
March		March		March	
April		April		April	
May		May		May	
June		June		June	
Total		Total		Total	

Chapter III: Evaluation of Measles Surveillance System in Lideta Sub city, 2017.

Abstract

Background: Measles has been one of the major killers among vaccine preventable diseases in children < 5 years of age, particularly in developing countries. Identifying and confirming suspected measles cases through surveillance allows to early detection of outbreak, to analysis of ongoing transmission in order to mount more effective vaccination measures and to estimation of the underlying true measles incidence based on the patterns in reported data. Therefore, evaluating the overall performance of the existing measles surveillance system will play an important role in identifying the gaps and to take corrective measures accordingly.

Objective: The objective of this surveillance evaluate system is to assess performance core function, supportive activities and system attribute on measles surveillance in Lideta Sub city, Addis Ababa.

Method: A cross-sectional descriptive study was conducted from February to March, 2017. Data was collected using both face to face interviews using structured questionnaire and observation has made by the principal investigator. Secondary data was reviewed. Then data was entered into computer and analyzed using Microsoft Excel sheet.

Result: In Lideta Sub city the expected measles case was 5 but reported suspected cases with blood specimen was 15. Out of 15 suspected cases, 5 Igm + was confirmed in 2016. The reporting rate is 100 % for the Sub city. Information use was very poor in all visited health facilities. There is lack of focal person in almost in all private health facilities. Understanding of case definition was satisfactory more in governmental health facilities than private. All respondents also agreed that the case definitions are simple and easy to understand and apply by all levels of health professionals.

Conclusion. Case definition and registration book are available in all visited health facilities but regarding data analysis and presentation 35% of visited health facilities only exercised. And trained focal person was 75 %. The weekly reporting rates of visited health facilities over the past 12 weeks prior to assessment were 91% (11/12) for health center, and 66% (8/12) for private clinic. Acceptability was 84% .Out of 15 observed reported forms checked for of content completeness it was 73% (11/15) were found complete. Representativeness Completeness in the Sub city is more than 80 % in 12 reporting week.

1. Introduction

1. 1 Background

Measles is one of the most contagious infectious diseases in humans. It is a major contributor to child mortality worldwide and kills approximately 1-3 of every 1000 infected individuals, even in developed countries (1). Measles is still commonly transmitted (endemic or large outbreaks) worldwide, including some countries in Europe, Asia, the Pacific, and Africa. Each year: 267,000 measles cases reported, 146,000 estimated deaths, mostly children. Measles remains a leading cause of vaccine-preventable infant mortality. There has been a 75% decline in measles deaths from 2000-2013 (15.6 million deaths prevented) Measles can be a serious in all age groups. However, children younger than 5 years of age and adults older than 20 years of age are more likely to suffer from measles complications. Common measles complications include ear infections and diarrhea. Some people may suffer from severe complications, such as pneumonia (infection of the lungs) and encephalitis (swelling of the brain). They may need to be hospitalized and could die (2). Despite international recognition of the high burden of disease associated with measles and the existence for 40 years of a safe, effective, and inexpensive vaccine, measles remains the leading cause of vaccine-preventable childhood mortality(3).

By 2008 in the African Region, reported measles cases decreased by 93% and estimated measles mortality decreased by 92% compared with 2000. Since 2002, Ethiopia adopted these regional goals and strategies and has been taking important steps to control measles. The Africa Region as well as Ethiopia is working towards measles elimination by 2020(4). Case-based measles surveillance was initiated in Ethiopia in 2003. The number of reported suspected measles cases has increased through the years and this might be partly due to the increased sensitivity of the surveillance system, rather than a failure of the control efforts (5). One of the four important strategies to quickly identify cases and respond to suspect outbreaks involves case-based measles surveillance. In this system, each case is reported using an individual case-report form, and a blood specimen is obtained to test for measles immunoglobulin M (IgM). Measles case-based surveillance data is collected using the standard case based investigation form (4).

Measles case-based surveillance is part of the national PHEM system and a key component of the measles control program. It is a system whereby every suspected measles case should be detected, reported and undergo laboratory investigation (or the first five cases in the case of outbreaks).

Measles is an immediately reportable disease under the national PHEM system. The case should be investigated with serum specimen collection at first contact with the health worker, but within 28 days of rash onset (4)

Therefore, measles remain major public health concern in Ethiopia even though the routine and supplementing immunization activities were undergoing. In 2016 in Addis Ababa region there were 66 expected measles case but reported 312 suspected case with blood specimen, from this suspected cases 125 IgM + was confirmed. The same is true in Lideta Sub city expected measles case was 5 but reported Suspected cases with blood specimen was 15 from this suspected cases 5 IgM + was confirmed. Incidence rate (IR) for year of 2016 was 37.29 and 20.25 % for the region and for the Sub city respectively. But in year of 2015 IR there was 21.6 and 4.26 for Addis Ababa Region and for the Sub city respectively according to AARHB report. This may be the reason to have measles campaign in month of March, 2017 in Addis Ababa City Administration as well as in all over the country.

1.2 Statement of the problem

There has been a 75% decline in measles deaths from 2000-2013 (15.6 million deaths prevented). But still a measure public health concern in the world .Measles can be a serious in all age groups. However, children younger than 5years of age and adults older than 20 years of age are more likely to suffer from measles complications. Common measles complications include ear infections and diarrhea. Some people may suffer from severe complications, such as pneumonia (infection of the lungs) and encephalitis (swelling of the brain) (2).

Measles is targeted for elimination in six WHO regions. Ethiopia adopted the measles elimination goal.This commitment demand timely outbreak investigation, high coverage of routine and supplementary immunization and strong surveillance system. But no evaluation of measles surveillance system done before in Lideta Sub city .this will limit us not to identify gaps and forward to corrective measure for the system toward achieving the target.

1.3 Rationale of the evaluation

Evaluating of existing measles surveillance system is helpful to know the capacity or the strength of the system to detecting measles cases. Specially, now a day the incidence rate of measles has been increasing in Addis Ababa city administration as well as in the Lideta Sub city Sub city when we compare 2015 with 2016. There for, this evaluation report intended to assess the status of the surveillance system in Lideta Sub city and come out identified gaps. This helps in strengthen the system in general for measles surveillance in particular.

2. Literature review

Measles is one of the communicable diseases still causing preventable mortality and morbidity in the country. In 2001, countries in the World Health Organization (WHO) African Region began accelerated measles control activities to reduce measles deaths by half by 2005 compared to the estimated number of measles deaths in 1999. Implementation of the recommended strategies led to a 75% reduction in estimated measles mortality in the African Region by 2005. Following this progress, in 2006 the African Region adopted a goal to achieve 90% measles mortality reduction by 2010 compared with the estimate for 2000. By 2008 in the African Region, reported measles cases decreased 93% and estimated measles mortality decreased 92% compared with 2000. The strategies include improving routine vaccination coverage, providing a second opportunity for measles vaccination through supplementary immunization activities (SIAs), improving measles-case management, and establishing case-based measles surveillance. Since 2002, Ethiopia adopted these regional goals and strategies and has been taking important steps to control measles (4). When conducting surveillance evaluation we consider some attribute and core and supportive function of the system.

Simplicity: the simplicity of a public health surveillance system refers to both its structure and ease of operation. Surveillance systems should be as simple as possible while still meeting their objectives. **Data Quality:** Data quality reflects the completeness and validity of the data recorded in the public health surveillance system. **Acceptability:** Acceptability reflects the willingness of persons and organizations to participate in the surveillance system.

Flexibility: A flexible public health surveillance system can adapt to change of information needs or operating conditions with little additional time, personnel, or allocated funds. Flexible systems can accommodate, for example, new health-related events, changes in case definitions or technology, and variations in funding or reporting sources. In addition, systems that use standard data formats (e.g., in electronic data interchange) can be easily integrated with other systems and thus might be considered flexible. **Sensitivity:** The sensitivity of a surveillance system can be considered on two levels. First, at the level of case reporting, sensitivity refers to the proportion of cases of a disease (or other health-related event) detected by the surveillance system. Second, sensitivity can refer to the ability to detect outbreaks, including the ability to monitor changes in the number of cases over time. **Positive Predictive Value:** Predictive value positive (PVP) is the proportion of reported cases that actually have the health-related event under surveillance. **Representativeness:** A public health surveillance system that is representative accurately describes

the occurrence of a health-related event over time and its distribution in the population by place and person. Timeliness: Interval between the occurrence of an adverse health event and (I) the report of the event to the appropriate health agency, (ii) the identification by that agency of trends or outbreaks, for the implementation of prevention & control measures. Stability: Stability refers to the reliability (i.e., the ability to collect, manage, and provide data properly without failure) and availability (the ability to be operational when it is needed) of the public health surveillance system. Usefulness: How helpful the system is to public health staff in taking actions as a result of interpreting and analyzing its data. To be said useful, if it contributes to the prevention and control of adverse health-related events. Validity: Degree to which statistical information correctly describes the phenomena it was designed to measure. Completeness: proportion of all expected data reports that were actually submitted to the public health surveillance system. Specificity: Measure of how infrequently a system detects false positive health events, i.e., the number of individuals identified by the system as not being diseased or not having a risk factor, divided by the total number of all persons who do not have the disease or risk factor of interest. Accuracy: Degree to which a measurement or an estimate based on measurements represents the true value of the attribute that is being measured. Feasibility: Ease with which statistical information can be obtained from the agency. This includes the ease with which the existence of information can be ascertained, as well as the suitability of the form or medium through which the information can be accessed. The cost of the information may also be an aspect of accessibility for some users. Willingness of persons and organizations to participate in the surveillance system and it will be measured quantitatively through reviewing completeness of report forms for the past three months and timeliness of data reporting. Easy obtaining and ascertained and suitability of the form/medium which the report can access information from reporting agent (8). In addition to these core activities like: case definitions, case detection, registration, reporting, data analysis, interpretation, dissemination and epidemic preparedness and response were assessed. Supportive activities of the surveillance system in regard to supervision, training, information feedback, communication and financial support were assessed (9)

3. Objective

3.1 General objective

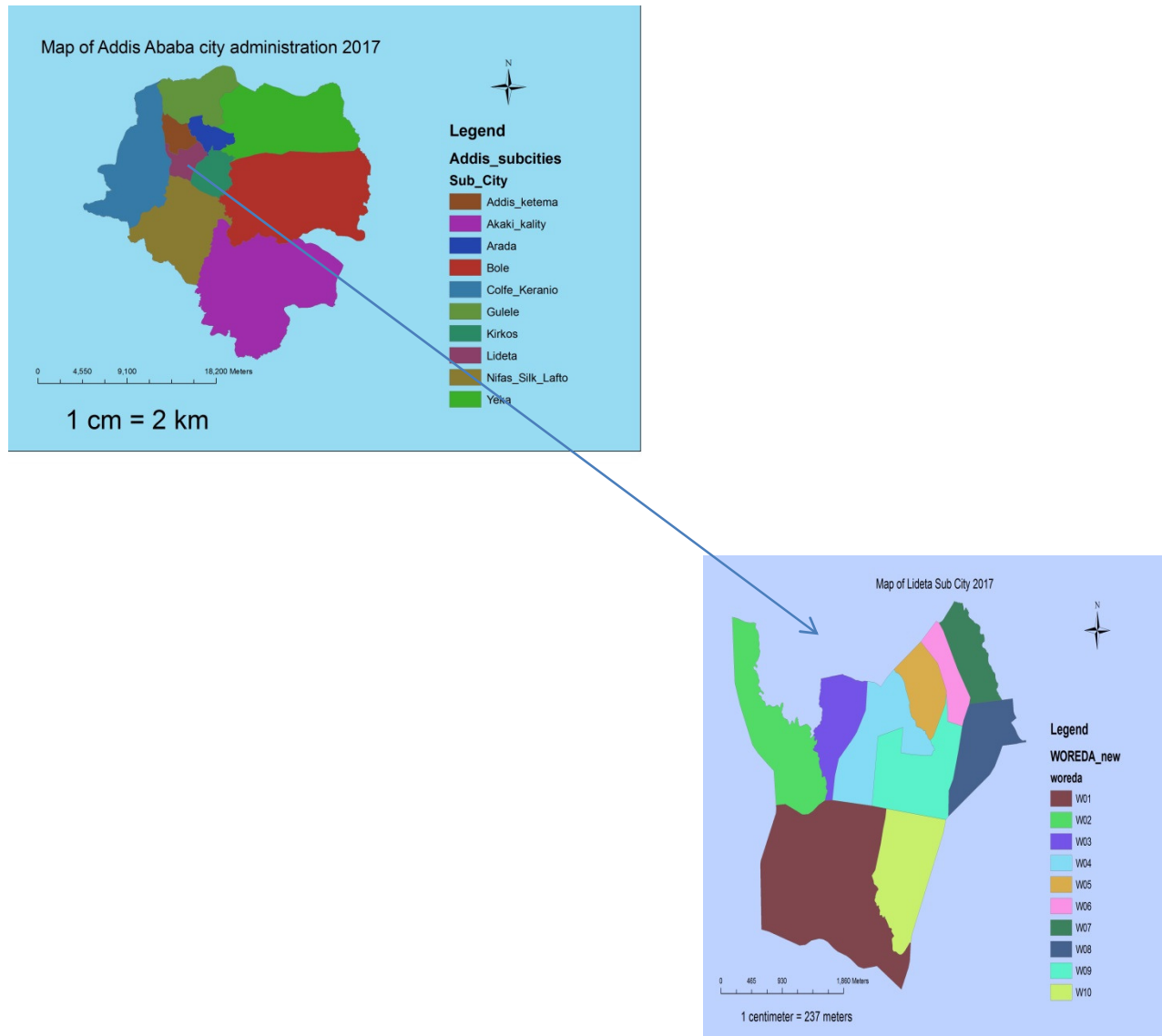
To evaluate the surveillance system of measles in Lideta Sub city, Addis Ababa, Ethiopia, 2017.

3.2. Specific objectives

- To describe the key system attribute of surveillance system
- To assess core function surveillance system
- To assess supportive function of surveillance system

4 Methods and Materials

4.1 Study area



Map 3: Map of study area for evaluation of surveillance system in Lideta Sub city

Source: Addis Ababa city Administration integrated land Management

Study Area

Surveillance system evaluation was conducted in Lideta sub city. Its population according to 2016/17 projection is 252,182. And under 5 populations are 18, 056. Lideta Sub City is one of the 10 sub city under Addis Ababa City Administration and in this sub city there are 10 Weredas. The sub city is bounded on the north by Arada sub city, on south by Nifas Silk Lafto sub city, on the east by Kirkos sub city and on the west by Kolfe Keranio sub city. There are six health centers, 57 Private health facilities in different level, 2 hospitals, 5 drug store and 24 pharmacies. Total area of Lideta sub city is 918.4 Sq.Km.

4.2 Study period

This study was conducted from January 2017 – June 2017

4.3 Study design

Descriptive cross-sectional study

4.4 Source population

All health facilities and health office found in Lideta Sub city are a source population in this evolution.

4.5 Study population

All health facilities and health offices participating and expected to participate in reporting weekly and immediately reportable diseases in Lideta Sub city for next level was our study population.

4.6 Sample size

The surveillance system evaluation included a total of 20 sample health institution. Sub city health offices; 6 governmental health facilities, 6 woreda health offices, and 7 private health facilities (one Hospital, 6 higher clinics).

4.7 Sampling Methods

All governmental health centers, 6 woreda health office and 7 private health facilities selected purposely. Therefore 6 Health center, 6 woreda health offices, 7 private health facilities and one Sub city health office was visited during evaluation. Selection of private health facilities was made by considering patients flow and type of specialty service given like pediatrics, orthopedic and

Nerology. Because those services has more opportunity to serve patients with measles and AFP mostly.

4.8 Data collection procedure

Data was collected using semi-structure questionnaire and observation of different documents, formats and reports which are used in day to day surveillance activities was made. All data was collected by principal evaluator. Assessment of Supportive, system attributes and core surveillance function was assessed. As a complementary on documents like Flow chart; Graphs, table, Maps, Guideline, Standard case definition, records of registration, feedback report, weekly report of 12 week (WHO Week of 40-52 of year 2016) and line list and registration was reviewed.

4.9 Data analysis.

Data was entered and analyzed using the Microsoft Excel and percentages and frequency was computed.

4.10 Data quality control

At the time of data collection data was checked for completeness and consistency by the principal investigator. In case of doubt in figures additional explanation was considered from focal persons of different office and crosscheck was done with different source

4.11 Ethical issue

Letter was written to Addis Ababa city administrative health office & Lideta Sub city health office from St. Paulo's millennium medical college. Then a letter from Lideta Sub city wrote to selected health facilities and health offices.

4.12 Result dissemination

The result of the evaluation will be given to SPHMMC, Department of public health through soft and also discussion will be made with Sub city Health office PHEM case team on findings

5. Result

System attributes of the surveillance system

The evaluation of the system attributes of the surveillance system involved assessment of the usefulness, simplicity, flexibility, quality of the data, acceptability, representativeness, timeliness, completeness, validity and stability of the surveillance system.

5.1 Usefulness

All respondent (100 %) in all visited facilities and health office are agreed that Surveillance is used for early detection of epidemics of diseases. This was a common understanding of all the respondents as the major use of the surveillance system. But there is limited understanding that the system is used for the assessment of the effectiveness of prevention and control programs. In general, even though clinician and officers are well understood regarding the usefulness surveillance, but they are not at position to work with the system to end up with the intended objective of surveillance system as expected from them and they don't update themselves with changes. 12/20 (60%) of experienced health professional are not familiar with a word PHEM. 85 % (17/20) says it use for detecting outbreak, and 95% (19/20) says it use for prevention work.

5.2 Simplicity

All visited health facilities (100%), woreda health office and Sub city health office agreed that the case definitions of measles for identification of suspected cases are easy to understand and possible to apply by all level health professional at all level. The route of data flow is clear and simple as it was set in the surveillance guideline and the reporting entities do not complain any problem in this regard. There was lack of reporting format in 2 private facilities.

The major problem mentioned here was lack of reporting means to the next higher bodies especially from the health facilities to woreda health office and from woreda health office to Sub city health office. Communication like telephone, internet, and fax were indicated as constraints. This has impacted on timeliness of the report. Concerning data management, data from the health facilities and woreda were sent to the Sub city health office in a paper form. However, transcribing the paper based data in to a data base has been started at Sub city health office. Time taking to report case based report, 80% (16/20) says its take <5 min, 20 % (4/20) says 5-10 min.

5.3 Flexibility

Flexibility tells us how much the system accommodate itself in to the new reform and how much flexible to accept when other newly health event happen without much difficulty, and the formats are assumed to be easy and comprehensive. But in general we can say that the system accommodated itself in to the new reform undertaken in the health system because we can take as example previously MDSR were incorporated in the existing system easily. 90% (18/20) of respondent said that easy add new health event. Even this day's scabies and maternal and perinatal death surveillance and response also added to the system.

5.4 The Quality of data

Quality of data in terms of completeness and timeliness was assessed on the register and formats. Based on this when we look the internal completeness of the data form 15 reviewed case based format 8 formats in the health facilities missed to fill variables like sex, age, date seen at health facility, address of the patient and vaccine status. In addition to this, number of cases recorded on the registry in health facilities had difference with reported case to the next higher (Sub city). Respondent at sub city level says that above 5 % data not clear and incomplete specially in case based reports missed some variables.

5.5 Acceptability.

Acceptability of the surveillance system assessed based on engagement of the reporting agents and active participation in case detection and reporting. In the Sub city the reporting rate of health facilities was 84% (48/57) as seen over 12 reporting weeks (3 Month). 9 health facilities are not involved in reporting.

5.6 Completeness

Randomly selected reporting forms from different epidemiological weeks checked for completeness. Out of 15 observed reported forms checked for of content completeness 73% (11/15) were found complete. The most incomplete variables are date of report, zero figures for zero-case, the person responsible for reporting. Representativeness Completeness in the Sub city is more than 80 % in 12 reporting week.

5.7 Timeliness

The reporting rates of the health facilities in the Sub city were found to be low it was 76.6% which is below recommended rate (80%). Practically I have seen how was timeliness of the reporting from health facilities to Sub city. Some facilities bring the report after the sub city aggregate and send the report to the next level. Timeliness is interval between the occurrence disease event and (I) the report of the diseases event to the appropriate health office , (ii) the identification of trend or outbreak the event by that office for the implementation of prevention & control measures

5.8 Positive Predictive value

The positive predictive value (PPV) or the proportion of cases reported by the system as a Sub city that actually have Igm (+) for measles case was 33.3% (5/15).

5.9 Sensitivity

Sensitivity of a surveillance system can be considered on two levels: - First at the level of *case* detection second, the ability of the system to detect *outbreaks*, including the ability to monitor changes in the number of cases over time. Since measles case definition easily understood by all level of health professional and also health extension works promote community case definition for the community, the system is sensitive for detecting of measles. But due to low information use in all facilities the system will less sensitive for detecting outbreak. Low sensitivity of measles case-based surveillance likely led to underestimates of annual measles incidence

5.10 Representativeness

All health institutions and community, through woreda PHEM and health extension are under the sub city's surveillance system. Except 4 organizational medium clinics in the sub city.

5.11 Stability

After rearrangement of all health facilities to report to their respective woreda PHEM and woreda PHEM to report to Sub city PHEM case team, the system is well established and organized better than before even though no budget allocated to the system.

5.2 Evaluation of Core activities of measles surveillance system

To describe the surveillance system of the Sub city we assessed the structure and the core activities of the surveillance system in the Sub city. The core activities of surveillance included: case definitions, case detection and registration, reporting, data analysis and result dissemination, and epidemic preparedness and response.

Case definition

Standard case definition

Any person with fever, Maculopapular generalized rash and cough, Coryza, or conjunctivitis.

Community case definition

Any person with fever and rash starts from face.

The cases definition of measles was available in all visited health facilities. Among 7 private health facilities, in 4 facilities case definition posters turnout and not visible due to renovation of rooms.

5.2.1 Case Detection and Registration

The clinical register also was found in all visited health facilities; but handling of these registers was poor. Specially in private health facilities. One of the private health facilities there is jumping in recording cases on OPD registration book. Some days gaps (Jumping) are observed during reviewing registration. In other private clinic (Connel medium clinic) there is four days card accumulation without registered on OPD registration book.

5.2.2 Communication and reporting system

The weekly reporting rates of visited health facilities over the past 12 weeks prior to assessment were 91% (11/12) for health center, and 66% (8/12) for private clinic. Report flow from woreda health office to Sub city health office not yet established until this report finalized. While the reporting rate of the Sub city to the regional health in 12 weeks period (WHO week 40-52 of 2016) prior to the assessment was 100% (12/12). All the reports were sent to the next level via telephone as per scheduled .Every Monday until 5 PM all health centers and private hospitals and clinics are expected to submitted weekly report to the Sub city and the Sub city report to the next level every Wednesday until 11 AM.

5.2.3 Data analysis and interpretation

In all visited health offices and health facilities, there was a responsible focal person for surveillance. However, Regarding data analysis and presentation 35% of visited health facilities only exercised. No health facilities analyzed and interpret data at their level and use for action or intervention. There is no data analysis for trends and magnitude or incidences for all cases including measles. But in woreda and Sub city health office analysis was performed which is account 35% form sampled reporting agent. Only 5% from samples reporting agent have computer. But 45 % of focal person have computer skill.

5.2.4 Epidemic response and preparedness assessment

All health centers experienced outbreaks in the previous years (AWD, 2016). There is rapid response team (RRT) in all health centers which composed of from different unit in the health center. But they don't have epidemic preparedness and response plans for their priority diseases. All facilities and Sub city health office do not have budget and stocks for emergency health event. Epidemic management committee and rapid response teams were activated only if there is recognized Event/epidemic/.They don't have regular scheduled for meeting and update themselves on status of preparedness and response on possible outbreak conditions based data collected and analyzed . In annual review meeting reporting PHEM report not included as one activity in the Sub city as well as in the health center.

5.3 Evaluation Support functions of Existing Measles Surveillance

5.3.1 Training

Trained focal person coverage was 75% in assessed health offices and governmental health facilities. All focal person working on surveillance units at least have taken short term training or workshops of 3-5 days by the regional health bureau and partners. Almost all private facilities don't have oriented focal person for Surveillance activities. But at least they have assigned person to report weekly reportable disease. But the person limited to reporting every Monday to Sub city. Periodically regional health bureau is giving training for private facilities but due to high turnover having trained focal person is impossible. Woreda PHEM officer has recruited and trained month ago before this study conducted. At health facilities, only the focal person assigned for surveillance was trained, but health care providers did not get orientation specially those are new.

5.3.2 Assessment of Supervision and feedback from higher level

Before 2016 Sub city PHEM offices were conduct active search in all health facilities in the Sub city including private health facilities. But now woreda PHEM offices are in postion to conduct active search in their woreda. The frequency of visiting facilities based on priority given to each facility which considers types of specialty service given by health facilities. For example like health facilities with pediatrics and neurology service visited 4 times per month.

Dissemination of the surveillance information to woreda health office and health facilities was 0 %. The current status of reportable diseases trends and incidence summary not distributed to health facilities. Supervision feedback also not documented and forwarded to reporting agent in the Sub city.

5.3.3 Availability of Surveillance Guidelines, Registers, and Forms

Almost there was no shortage of report form in all visited health facilities and health offices. But in one of private health facility no reporting format at time of visiting. Computer for data management were available at Sub city level. However, they all became very scarce when we go down. None of Woreda health office and health facilities have computer access for data collection and analysis. The PHEM/ surveillance units at the woreda and health facility level did not have communication ways- like telephone, internet and other facilities which dedicated to PHEM. Even at Sub city level there is shortage of transportation (vehicle) to conduct supportive supervision and active search regularly.

5.3.4 Communication Facilities

Way of communication in the Sub city surveillance system based on paper work and done by runner. There is no means of communication like fax, internet and phone dedicated to surveillance work. The same is true in the Sub city health office. Weekly report from Sub city to regional health bureau transfer by personal Mobile Phone through SMS.

5.4. The Laboratory

The laboratory work for measles case also assessed in this study. Health facilities directly send suspected measles sample to EPHI laboratory unites. Surveillance focal person are responsible for collecting and transporting the sample to EPHI.EPHI responsible to test the specimen and inform the result to Addis Ababa City administration health bureau PHEM department. Because the study

conducted in Sub city level there is no laboratory which standalone, here we can't talk about the capacity and quality issues at this level. But Lab result for measles case not timely collected and documented. Out of 6 health center none of them have measles result file. All visited private health facilities don't have materials to send specimen to EPHI. When suspected measles case found in private the patient referred to governmental health center for sample collection. From visited governmental health one facility don't have logistic for collecting and transporting measles suspected sample. There is also limitation form surveillance focal person in collecting lab result from EPHI or AARHB timely. All assessed governmental health centers have refrigerator and guideline to collect and shipping samples for Measles to the EPHI national laboratories. 5 out of 6 health centers have transport media. Abenet health centers don't have media for transportation of suspected measles case specimen. Even though there is a delay in receiving measles result in timely, in all health facilities no archived measles result report found. The same is true in Sub city health office.

6. Discussion

The main goal of conducting public health surveillance is to assess the health status of a population, establish public health priorities, and reduce the burden of disease in a population by making appropriate public health actions. Measles is one of vaccine preventable disease which has a plan to eliminate by 2015 or 2020 [10]. To eliminate measles; the strategy includes improving routine vaccination coverage, providing a second opportunity vaccination through supplementary immunization activities (SIAs), improving case management, and establishing measles case-based surveillance [4].

The understanding level of usefulness of the surveillance system was the same with the evaluation made in western zone Tigray (7). All respondent agree on usefulness. Measles case definition posted in all governmental health facilities (100%) in the present evaluation but evaluations made in western zone Tigray it was 87.5% (7). All governmental health centers have trained surveillance focal person the same is true in evaluation in afar zone 3. it is better than the finding of evaluation in western Tigray which is only 50 % health facilities with trained focal person (7). No one of the sampled health facilities performed data analysis this result in line with the evaluation in Afar (6) but 33.3 % of health facilities perform data analysis in evaluation in Tigre region (7). Flexibility of the system is agreed in respondents in the present evaluation the same finding in Afar region but respondent in Tigray region not agree with this. Acceptability of the system in the present evaluation is better than evaluation done in Afar and Tigray (80 % and 63.6%) respectively (6, 7).

No written feedback at all form Sub city to woreda and health facility this finding in line with findings in Tigray region surveillance evaluation. Completeness of report in this evaluation is 93 % which is better than the finding in western Tigray surveillance system evaluation. Representativeness completeness in the sub city is more than expected (80%) present which is stated in national guideline.

When we look the Sub city reporting rate it was 100 % which is good performance when we compare with reporting rate in Afar region woredas which is 27.7% (6). This performance gap result from having communication facilities .Lideta Sub city located in the center of the Addis Ababa with access of transport and at least individual phone.

Practicing of data analysis was 35 % but evaluation in Afar was no one of the visited site were analyzed the collected data by time place and person (6).In both case it is very low. This may be lack of continuous training how to analyze and interpreted their surveillance data for action collected data for analysis, interpretation and to take public health actions.

There was no written feedback system from the Sub city to the Woreda and Woreda to the health Facility the same is true in Afar region evaluation (6) when we look data quality in case of content completeness there was missed variable in case based format. The clinical register also was found in all visited health facilities. The same is true in Tigary evaluation (7) but handling of these registers was poor in case of Lideta Sub city

The cases definition of measles was available in all visited health facilities but in Tigray region evaluation it was 87.5% of the visited health facilities (7).The difference may be due to short distance to access case definition from district health office.75 percent of the assessed health offices and health facilities have trained focal person but in Tigray region evaluation it was 50 % (7).

7. Limitation of the study

Since the Sub city surveillance evaluation was conducted by two residents by dividing health facilities found in the Sub city, this evaluation report will have less power to generalize the finding for Sub city surveillance system. We calculate the positive predictive value of the system at Sub city level because no data found in health facility level to calculate PPV for each health facilities. The other limitation was since most of private focal person are new staff, their understanding about PHEM were very limited due this the report unable to capturing their view about surveillance system from private sectors in detail

8. Conclusions

System attribute: engagement rate was 84%. Major reasons for poor engagement to the surveillance activities were poor means of communication and lack of feedback, lack of understanding of importance of the surveillance activities, and high turnover trained focal person in private health. Simplicity of the system was agreed by all interviewed agents.

The measles surveillance system is simple and flexible but it was (84 % engagement) accepted. The sub city reporting rate is 100 %. Positive predictive value was below expected value. Timeliness of health facilities was below the standard cutoff point (80%).

Core Function

There is lack of trained focal person almost in all private health facilities. No one of the visited health facilities were analyzed the collected data by time place and person. All respondents also agreed that the case definitions are simple and easy to understand and apply by all levels of health professionals. Among visited private health facilities in 57% of them case definition turnout and not visible due to renovation of rooms. No computer except in Sub city office. That is why information use in all visited health facilities was 35%.

Supportive function

Trained focal person coverage was 75% in the Sub city. There is Poor feedback mechanism to health facilities. All governmental health centers are in position to transport suspected measles case specimen to EPHI but the case not true in private health facilities. But there is a delay in lab result feedback and also there is poor archive in result documentation in all level. Computer skill and computer access is also decreased as go down to through the system.

9. Recommendation

- All health facilities at all level should incorporate in the system in the Sub city
- Timely feedback for all reporting agent from the sub city
- Support should be given by the sub city to health facilities on how to use information
- Proper lab result archives and feedback to all reporting agent by Sub city Health office
- PHEM should consider as one health program and budget should be allocated by the Sub city
- Governmental health facilities should consider computer for their surveillance unite.

10. Reference

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Table 9: Assessment of Availability of Surveillance register book, reporting format and documentation

	Institutions	Report Archive	Registration book	Reporting form
1	S/C health office	Yes	NA	Yes
2	W7 HC	Yes	Yes	Yes
3	W3 HC	Yes	Yes	Yes
4	W1 HC	Yes	Yes	Yes
5	W2 HC	Yes	Yes	Yes
6	W10 HC	Yes	Yes	Yes
7	W1 HC	Yes	Yes	Yes
8	W7 H/office	Yes	NA	Yes
9	W3 H/office	Yes	NA	Yes
10	W1 H/office	Yes	NA	Yes
11	W2 H/Office	Yes	NA	Yes
12	W10 H/office	Yes	NA	Yes
13	W1 HC/office	Yes	Yes	Yes
14	Abenet 2 Clinic	Yes	Yes	No
15	Dr abderham	No	Yes	Yes
16	United vision		Yes	Yes
17	Betsiad clinic	NO	Yes	Yes
18	Abenet 3 clinic	yes	Yes	Yes
19	Yodanos Hos	Yes	Yes	Yes
20	Mexico H clinic	Yes	Yes	Yes

Repot archived-----18/20 (90%)

Registration book ----- (100%)

Reporting format-----19/20 (95%)

Table 10: Data analysis, Computer, Computer skill and training assessment

	Institutions	Data analysis	Computer	Computer skill	Trained Focal person	Guideline
1	S/C health office	Yes	yes	yes	Yes	Yes
2	W7 HC	No	No	No	Yes	Yes
3	W3 HC	No	No	No	Yes	Yes
4	W1 HC	No	No	No	Yes	Yes
5	W2 HC	No	No	yes	Yes	Yes
6	W10 HC	No	No	Yes	Yes	Yes
7	W1 HC	No	No	No	Yes	Yes
8	W7 H/office	Yes	No	yes	Yes	NA
9	W3 H/office	Yes	No	yes	Yes	NA
10	W1 H/office	Yes	No	yes	Yes	NA
11	W2 H/office	Yes	No	yes	Yes	NA
12	W10 H/office	Yes	No	yes	Yes	NA
13	W1 H/ Office	Yes	No	yes	Yes	NA
14	Abenet 2 Clinic	No	No	No	No	Yes
15	Dr abedrham	No	No	No	Yes	Yes
16	United vision	No	No	No	No	Yes
17	Betsiad clinic	No	No	No	yes	Yes
18	Abenet 3 clinic	No	No	No	No	No
19	Yodanos Hos	No	No	No	No	No
20	Mexico H clinic	No	No	No	No	No

Data analysis -----7/20 (35%)

Computer accessibility----- 1/20 (5%)

Computer skill -----9/20 (45%)

Trained focal person -----15/20 (75%)

Table 11: Weekly reporting rate of health facilities in Lideta Sub city

Private Health facilities	Reporting rate per 12 wk.	Govt. Health facilities	Reporting rate per 12 wk.
Abenet 2 Clinic	8	W7 HC	10
Dr abedrham	9	W3 HC	11
United vision	8	W1 HC	12
Betsiad clinic	9	W2 HC	10
Abenet 3 clinic	9	W10 HC	12
Yodanos Hos	7	W1 HC	12
Mexico H clinic	8		
Average rate	8/12		11/12

Annexes 1: Questionnaire for surveillance system assessment

Questionnaire for assessment attributes of surveillance system for Sub City PHEM officer

Part I

I Usefulness:

Is the surveillance system help?

1. To detect outbreaks early on time to permit accurate diagnosis? ☐ Yes ☐ no
2. To estimate the magnitude of morbidity and mortality related to the diseases, including identification of factors associated with these diseases? ☐ Yes ☐ No
3. Permit assessment of the effect of prevention and control programs? ☐ Yes ☐ No
4. To estimate research intended to lead to prevention and control? ☐ Yes ☐ No

II. Simplicity:

1. Is the case definition of the priority diseases easy for case detection by all level health professionals? ☐ Yes ☐ No
2. The surveillance system allows all levels of professionals to fill data ☐ Yes ☐ No
3. Does the surveillance system help to record and report data on time? ☐ Yes ☐ No
4. Does the surveillance system have necessary information for investigation? ☐ Yes ☐ No
5. Does the surveillance system allow updating data on the cases? ☐ Yes ☐ No
6. How long it takes to fill the format? ☐ <5 minute ☐ 5 to 10 minute ☐ 10 to 15minut ☐ >15 minutes
7. How long does it take to have laboratory confirmation for measles case? -----

III. Flexibility

1. Can the current reporting formats be used for other newly occurring health event (disease) without much difficulty? ☐ Yes ☐ No
2. Did you think that any change in the existing procedure of case detection and reporting formats will be difficult to implement? ☐ Yes ☐ No,
3. Is the system easy to add new variables? ☐ Yes ☐ No
4. Is the surveillance system easy to integrate with other systems? ☐ Yes ☐ No
5. Is the surveillance system easy to add new disease on report? ☐ Yes ☐ No
6. Is the system easy to add new information technology? ☐ Yes ☐ No

IV. Data quality (Completeness of the reporting forms/and validity of the recorded data)

1. Are all reported forms Complete? ☐ Yes ☐ No
2. If answer for Q1 is No, how many unfilled spaces are in your 2008 EFY report? ----- 3. Percentage of unknown or blank responses to variables from the total reports of 2008 EFY report--

4. Percent of reports which are complete (that is with no blank or unknown responses) from the total reports -----
5. Is the recorded data clear to read and understand? ☐ Yes ☐ No
6. If answer for Q5 is No, how many records are not clear/are difficult to understand in 2008 EFY report? -----
7. Percent of records which are difficult to read/ understand. ----- **V.**

Acceptability

1. Do you think all the reporting agents accept and well engaged to the surveillance activities? ☐ Yes ☐ No
2. If yes, how many are active participants (of the expected)? -----
3. If No, what is the reason for their poor participation in the surveillance activity? A)
Lack of understanding of the relevance of the data to be collected
B) No feedback / or recognition given by the higher bodies for their contribution; i.e. no dissemination of the analysis data back to reporting facilities
C) Reporting formats are difficult to understand
D) Report formats are time consuming
E) Other: -----

4. Were all participants using the standard case definition to identify cases? ☐ Yes ☐ No
5. Were all the reporting agents send their report using the current and appropriate surveillance reporting format? ☐ Yes ☐ No
6. Were all the health professionals aware about the surveillance system? ☐ Yes ☐ No
7. Was all PHEM officers send report on time? ☐ Yes ☐ No

VI. Representativeness

1. was the surveillance system enabled to follow the health and health related events in the whole community? ☐ Yes ☐ No
2. If answer for Q1 is no, who do you think is well benefited by the surveillance system?

3. Are all the Socio demographic variables included in the surveillance reporting format?
☐ Yes ☐ No
4. If the answer for Q3 is No, which a) Sex--- b) age group-----C) Ethnic group----- d) religion----- is less represented?

VII. Timeliness

1. Are all woredas/health facilities reporting on time? ☐ Yes ☐ No
2. Percent of woredas that report on time. -----
3. Are all private clinics reporting on time? ☐ Yes ☐ No
4. Percent of private that report on time -----

Fill the table below

Weekly woredas reports received on time for 2008 EFY report by WHO epidemic week (July 2015—June, 2016) (to be field at Sub city health department)

VIII. Completeness (representativeness not continent)

1. Are all woredas reporting (including late report)? ☐ Yes ☐ No
2. Percent of woredas that send report of each week in 2008 EFY. -----
3. Are all private clinic and hospital reporting? ☐ Yes ☐ No
4. Percent of private that send report of each week in 2008 EFY. -----

Fill the table below

A). Total weekly reports received from health centers (including late reports, from July 2015—June, 2016) (for Sub city health desk

B). Total weekly completed reports received from private (including late reports. from July 2015—June, 2016) (for woreda health office)

IX. Stability

1. Was any new restructuring affected the procedures and activities of the surveillance of these diseases? ☐ Yes ☐ No
2. Was there lack of resources that interrupt the surveillance system? ☐ Yes ☐ No

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

Part II

A Communication and reporting system.

1. Which communication material did you have? ☐ E-mail ☐ wired phone ☐ mobile ☐ radio ☐ fax ☐ other-----

2. Did you have address of woreda PHEM officers? ☐ Yes ☐ No

3. How frequently are you communicating with the regional PHEM officers on emergencies and other daily activities? ☐ Daily ☐ weekly ☐ every 2 week ☐ monthly ☐ quarterly ☐ every 6 month ☐ yearly ☐ others-----

4. Did you have address of private surveillance focal person? ☐ Yes ☐ No

5. How frequently are you communicating with the woreda/health facility PHEM officers on emergencies and other daily activities? ☐ Daily ☐ weekly ☐ every 2 week ☐ monthly ☐ quarterly ☐ every 6 month ☐ yearly ☐ others-----

6. When are you expected to send weekly report to the Regional PHEM unit? ☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday ☐ Friday ☐ Saturday ☐ Sunday

7. When are you expected to receive weekly report from woredas /health facilities? ☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday ☐ Friday ☐ Saturday ☐ Sunday

8. How is the Sub city communicating the woreda/health facility PHEM officers in case of immediately reportable diseases? ☐ by e-mail ☐ by phone ☐ by fax ☐ regular weekly report ☐ others-----

9. Did you send summary or short report to the health centers head/administrative body /program leaders or other responsible organs on planning, prevention and control activities of disease at community level that have arisen through the surveillance system? ☐ Yes ☐ No

10. If answer for Q9 is yes to whom did you send? -----

11. If you faced any problems on communicating and reporting, list them-----

12. Mention the alternative solutions that you take to tackle the problems you above? -----

B. Assessment of availability of Surveillance Documentation, Registers, and Forms

1. Did you have National Guide line for PHEM? ☐ Yes ☐ No ☐ Not Applicable
2. Did you have standard case definition for all country priority diseases? ☐ Yes ☐ No ☐ Not Applicable
3. Was the case definition posted? ☐ Yes ☐ No
4. If answer for Q2 is No, for which disease(s) did you lack the case definition? -----

5. Did you have case reporting formats for out breaks? ☐ Yes ☐ No ☐ Not Applicable
6. Was there national manual for surveillance? ☐ Yes ☐ No ☐ Not Applicable
7. Was there guide line for specimen collection, handling and transportation to the next level? ☐ Yes ☐ No ☐ Not Applicable
8. Did you have line list for reporting outbreaks? ☐ Yes ☐ No ☐ Not Applicable
9. Did you face shortage of surveillance reporting and recording formats? ☐ Yes ☐ No
10. If answer for Q9 is yes, which form? -----

C. Data analysis, Computer skill and training assessment

1. Had you trained on surveillance system? ☐ Yes ☐ No
2. If answer for Q1 is yes a) For how long? -----
3. Did you give any onsite training / orientation about surveillance system for the wereda or health facility PHEM focal persons? ☐ Yes ☐ No
4. Was data compiled and registered? ☐ Yes ☐ No
5. Did you have computer on your office? ☐ Yes ☐ No
6. Did you have computer on your department (PHEM unit)? ☐ Yes ☐ No
7. What is the data entry and compilation instrument? ☐ Manual ☐ Computer ☐ other-----
8. Did you have computer skill on ☐ Ms word ☐ Ms excel ☐ MS power point ☐ Epi-info
9. Did you analyze data of the surveillance system? ☐ Yes ☐ No
10. If answer for Q9 is yes, did you describe data by ☐ time ☐ place ☐ person
11. Did you have denominators for data analysis? ☐ total population ☐ male ☐ female ☐ U5 12.
- Please indicate the frequency of your data analysis. ☐ Weekly ☐ every two week ☐ Monthly ☐ quarterly ☐ every 6 month ☐ annually ☐ No regular time
13. Did you notify the results of your analysis to the higher level PHEM? ☐ Yes ☐ No
14. Did you notify the results of your analysis to the lower level PHEM? ☐ Yes ☐ No

15. If answer for Q9 is No, what is the reason? ☐ lack of knowledge ☐ shortage of time do you to work load ☐ less attention given to data analysis ☐ shortage of materials ☐ analysis is not familiar activity in place ☐ negligence ☐ Other-----

D. Epidemic response and preparedness assessment

1. Did you have plan for epidemic response and preparedness? ☐ Yes ☐ No

2. Did you have emergency stocks of drugs and supplies? ☐ Yes ☐ No

3. If answer for Q2 is No, how did you control epidemics? -----

4. Had you experienced shortage of drugs, vaccines and supplies in 2008 EFY? ☐ Yes ☐ No

5. Was an epidemic management committee built in your office? ☐ Yes ☐ No ☐ Not Applicable 6.

Did the epidemic management committee have regularly scheduled meeting time? ☐ Yes

☐ No

7. Was Rapid response team built in your office? ☐ Yes ☐ No ☐ Not Applicable

8. Did the Rapid response team have regularly scheduled meeting time during epidemics? ☐

Yes ☐ No

9. Did you have case management protocol for epidemic prone diseases? ☐ Yes ☐ No ☐

Not Applicable

10. Did your PHEM have multisectoral emergency preparedness and response task force? ☐

Yes ☐ No ☐ Not Applicable

11. In what frequency did the task force meet during outbreaks? -----

12. Were partners working together with your office on emergencies? ☐ Yes ☐ No

13. If answer for Q12 is yes, what type of supports did they give to your office? -----

14. Was there a budget for epidemic response? ☐ Yes ☐ No

15. Who had the authority to mobilize the emergency finance? ☐ Sub city head ☐ Sub city health department ☐ experts ☐ other-----

16. Had you a car assigned for emergencies (PHEM)? ☐ Yes ☐ No ☐ not functional

17. If answer for Q16 is NO, how did you address emergencies? -----

18. Had you faced any Challenges on epidemic response and preparedness in 2008 EFY? ☐

Yes ☐ No

19. If answer for Q18 is yes,

- a) list the challenges-----

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

E. Outbreak investigation and case confirmation assessment

1. Had you investigated any outbreak in 2008 EFY? ☐ Yes ☐ No
2. Did you have outbreak investigation check list? ☐ Yes ☐ No
3. If answer for Q2 is No, how did you know possible factors for the outbreak? -----

4. Where was laboratory confirmation of cases done? ☐ Regional laboratory ☐ Hospital ☐ EPHI
☐ health center ☐ contracted private laboratory ☐ other-----
5. Who was responsible to investigate an outbreak? ☐ rapid response team ☐ HEW ☐ staffs of
woreda health office ☐ experts organized randomly ☐ health facility staffs ☐
other-----
6. If answer for Q1 is yes how many out breaks did you investigated in 2008 EFY? -----Fill
the table below
7. Had you faced any challenge in outbreak investigation in 2008 EFY? ☐ Yes ☐ No
8. If answer for Q7 is yes,
a) list the challenges-----

b) list the alternatives that you take to tackle the challenges.-----

F. Assessment of Supervision and feedback from higher level

1. Did you have supervision plan in 2008 EFY? ☐ Yes ☐ No
2. If answer for Q1 is No, how did you supervise? -----

3. If answer for Q1 is yes, did you supervise the woredas and health facilities? ☐ Yes ☐ No 4.
If answer for Q3 is No, what is the reason? -----

5. If answer for Q3 is yes, how many times did you supervise each woreda and health facilities in
2008 EFY? Woreda-----, Health facility-----
6. Had you reviewed about surveillance practice by higher level supervision ☐ Yes ☐ No

7. Did you have regular supervision checklist? ☐ Yes ☐ No

8. If answer for Q7 is No, how did you supervise the weredas and health facilities? -----

9. Were you supervised by higher level (regional) PHEM officers in 2008 EFY? ☐ Yes ☐ No

10. If answer for Q9 is yes, how many times in 2008 EFY? -----

11. Did you send feedback of your supervision to the weredas and health facilities commenting/indicating their strong and weak sides? ☐ Yes ☐ No

12. If answer for Q11 is No, why?-----

13. If answer for Q11 is yes, for how many weredas and health facilities did you send a feedback in 2008 EFY? Wereda----- health facilities-----

14. Had you received feedback from higher level supervisors in 2008 EFY? ☐ Yes ☐ No 15.

If answer for Q14 is yes, how many feedbacks did you received in 2008 EFY? -----

16. Had you faced any challenge on supervision and feedback in 2008 EFY? ☐ Yes ☐ No 17.

If answer for Q16 is yes,

a) list the challenges.-----

b) list the measures that you take to tackle the challenges.-----

Chapter IV: Community Health Profile Report.

Abstract

Health profile provides summary health information to support local authority members office and community partners to lead for health improvement. Data generated from health profile has very crucial role in priority setting, resource allocation, identifying gap of health event and future planning. This report will have an objective to describe the current health profile of Lideta sub city –Addis Ababa Accordingly; health profile compilation was conducted in Lideta sub city -Addis Ababa from May 2-6, 2016. Descriptive cross sectional study will be applied. Health and health related data was collected from health office, Education office, hygiene and sanitation and from health extension workers.

Cross sectional descriptive study design was used. Interview and standard check list were the main tools used to collect the sub city health profile from sub city health office, sub city administrative office, education office and other offices. Major health service indicators, service types and social infrastructure were incorporated in the report. Primary and secondary data was collected by using structured Questioner and formats. Data was compiled and analyzed manually and using Microsoft Excel.

1. Back ground information

A community health profile is a comprehensive compilation of information about a community. The data in a profile reflects the health of a given community from many different angles. A community can refer to a county, a locality within a county, a tribe, or a multi-county region. The information may include data already collected and published about a community or information collected by the organizations or individuals creating the profile (1).

Health profile is about the health of people and about the conditions in which they live. Health profile provides summary health information to support local authority members office and community partners to lead for health improvement. Health profile gives snapshot overviews of health for each local health manager's then help them making decision and plan to improve local people health and reduce health inequalities, the profiles present a set of health indicators that show how the area compares to the national average. In addition; it is essential tool for change and thus must be a core element of local decision-making and strategic planning processes it can stimulate public interest and political commitment; and it can identify targets for the future and monitor progress towards them. Data generated from health profile has very crucial role in priority setting, resource allocation, identifying gap of health event and future planning.

Objective of this health profile compilation to display health and health related events and health determinants of Lideta sub city population and to identify health issues of public concern and the gaps then gives base line data for possible interventions and progress monitoring. It is very important for prioritizing key health and health related problems of the community at any level. It is basic for planning and for appropriate intervention. Stake holders of health and other concerned body will access evidence based information from well compiled health profile.

2. Objective

General objective

✓ To describe the current health profile of Lideta Sub city –Addis Ababa

Specific objective

- ✓ To explain key health service coverage of Lideta Sub city
- ✓ To identify the health service status of Lideta Sub city
- ✓ To identify Priority health problems of the Lideta Sub city
- ✓ To assess health human resources of Lideta Sub city
- ✓ To describe existing health infrastructure and education of Lideta Sub city
- ✓ To identify major health problem observed in the health care system

3. Method and material

Study area and period

The Study was conduct from May 2- 6.2016 in Lideta Sub city-Addis Ababa. Study design. Descriptive cross sectional study was applied be in Lideta sub city. Health and health related data was collected from health office, Education office, hygiene and sanitation and from health extension workers.

Study population

Health profile report will compiled for Lideta sub city population. According to 2008 EC projection total population is 246,803. Lideta Sub City is one of the 10 sub city under Addis Ababa City Administration and in this sub city there are 10 Weredas. The sub city is bounded on the north by Arada sub city, on south by Nifas Silk Lafeto sub city, on the east by Kirkos sub city and on the west by Kolfe Keranio sub city. Total area of Lideta sub city is 918.4 Sq.Km

Data collection

Structured questioners will be used to collect primary and secondary data. Interviews were conducted with relevant officers of the above specified departments based on needed data. Quantitative methods of data collection were applied to obtain information about health and its determinants. Different register book was also assessed. Spreads sheet/excel was used to analysis the data.

Plan for Data processing and Analysis

Spreads sheet/excel 2007 was used to analysis the data. Result was present in narrative, in tabulation, tables and graphs.

Plan for dissemination of findings

Finally the report was submitted to Lideta sub city heath office and St, Paul's hospital Millennium medical college department of public health.

Ethical consideration

Letter from SPHMMC department of public health was submitted to Lideta sub city health office and Lideta Sub city health office also gives me letters for respective woredas. .there for I had permission to collect secondary data from Lideta Sub city health office and health institutions in the sub city.

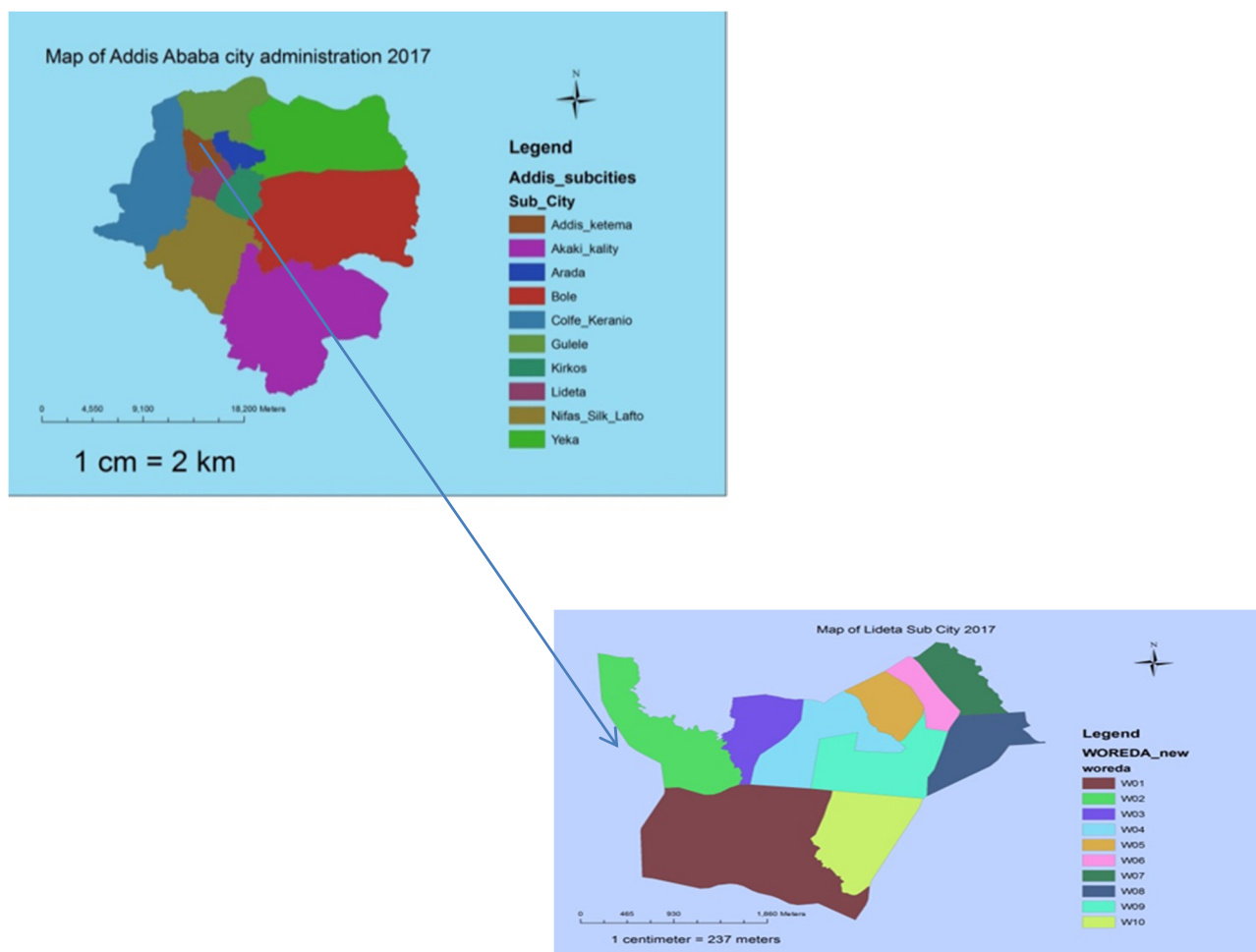
Study strength and Limitation

The implementation of HMIS in all health facilities was facilitate availability of data easily in some area of health service indictors .but due to improper handling of data by health office, health institution and other sectors and incomplete data aggregation has affect comprehensiveness of the report. However with maximum effort the work has done and health profile of the sub city complied.

4. Result

Geographic and political Administration characteristics

Addis Ababa City Administration is subdivided into 10 Sub City administrations. The sub city is headed by Main Executive body Lideta Sub city is one of the Sub city of Addis Ababa city administration. Lideta Sub City is one of the 10 sub city under Addis Ababa City Administration and in this sub city there are 10 Weredas. Woreda is the basic decentralized administrative unit and has an administrative council composed of elected members. The sub city is bounded on the north by Arada sub city, on south by Nifas Silk Lafeto sub city, on the east by Kerkos sub city and on the west by Kolfe Keranio sub city. Total area of Lideta sub city is 918.4 Sq.Km



Map 4: Map of study area for health profile report, Lideta Sub city,

Source: Addis Ababa city Administration integrated land Management

Demographic Information

Projections from the 1999 population and housing census estimate a total population of Lideta Sub City in 2008 ETC of 246,803. Which 127963 (52%) are female and 118839 (48%) are males.

Table 12: population proportion by age group of Lideta Sub city, 2016

S.no	Demographic Indicators	Standard Demographi c (%)	Estimated Population
1	Total population		246,803
2	Estimated households	4.1	60,196
3	Estimated live births	2.33	5,751
4	Surviving infants	2.24	5,528
5	Under 5 children's	7.16	17,671
6	< 3 year age group	4.12	10,168
7	6 – 59 months age group	10.81	26,679
8	< 15 yr age group	23.97	59,159
9	Women in reproductive age group (15 -49 years)	34.64	85,493
10	Total number of estimated pregnancies	2.33	5,751
11	Non-pregnant women in fertile age group	32.31	79,742

Socio- economic characteristics

There is a total of 47081 household in the Sub city .163 small up to large industries available. Trade is the major economic activity and source of income for the population of Lideta sub city. They involve from micro to macro business types. Based on the information I have got from FMHAC office of Lideta sub city there are a total 1881 business organization

There were no accurate unemployment figures for the woreda. But is no doubt that a significant proportion of the population live in poverty.

Education

Education has marked influence on the occurrence, spread of diseases and acceptability of health practices and utilization of modern health services.

Currently (2008) there are 29506 students in the sub city. There is 7453, 18118, and 3940 student in kinder garden, primary and secondary school in Sub city respectively .but still it is difficult to say about illiteracy and literate level of the total population.

Table 13: Number of education institution in Lideta Sub city, 2016

Type		Number
Kinder garden		39
Primary school		17
High School		3
TVT		7
College		1
University	Private	2
	Government	2

Health management system

The health system of the sub city lies within the umbrella of the national health system, which is decentralized and community- centered system with the aim of ensuring universal access to Primary health care services The sub city has six health centers with ratio of 1: 41133 health centers to population ratio and Health service coverage is above 100% with the ratio of 1:39,525and 1:3,040 health officers and nurse to population ratio respectively. All health centers governed by board which composed from woreda administration, woreda health office head , and health center Medical directors and one health professional from Health center.

Figure 8: Organizational structure of Lideta Sub city Health office, 2016

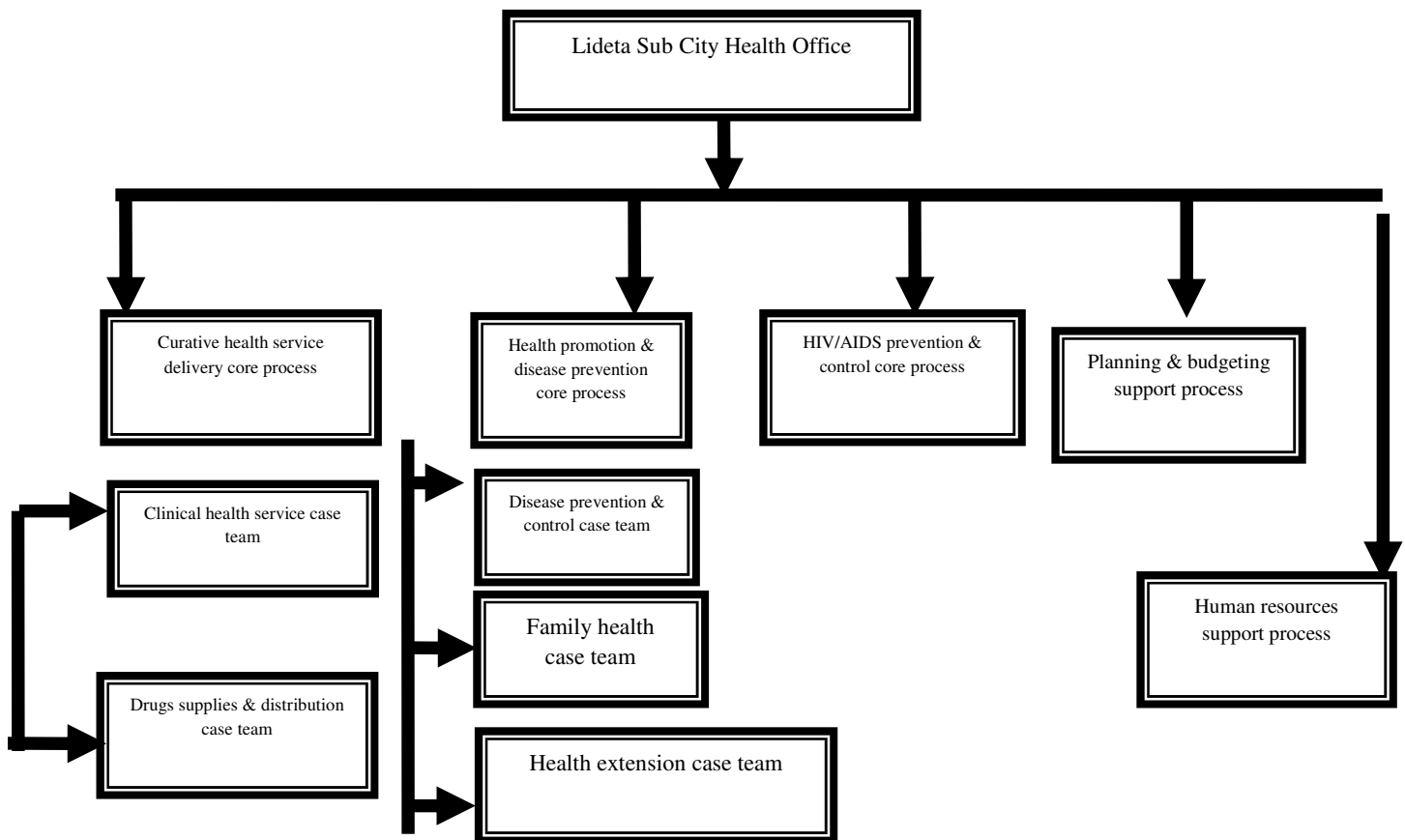


Table 14: Total health care personnel in Lideta Sub city health Office

S.No	Profession	Male	Female	Total
1	Clinical Nurse	38	141	179
2	Public Nurse	1	0	1
3	BSc Nurse	14	34	48
4	BSc in Midwives	5	0	5
5	Diploma in Midwives	5	33	38
6	Health Officer	23	28	51
7	Medical Laboratory Technologist	5	4	9
8	Laboratory Technician	8	14	22
9	Pharmacist	4	2	6
10	Pharmacy Technician	14	9	23
11	Environmental Health Professional	2	1	3
12	BSc in Health Education and Promotion	1	0	1
13	BA in Management	1	0	1
14	BA in Sociology	0	1	1
15	MPH	4	0	4
16	MSc in Maternal & Child Health	0	2	2
Total		125	269	394

The sub city has six health centers with ratio of 1: 41133 health centers to population ratio. Health service coverage is above 100%. Health officer to population ratio is 1:39,525 and nurse to population ratio is 1:3,040. At regional and national level health center to population ratio is 1:37193 and 1:25395 respectively. And at national level health officer to population ratio is 1:5027.

Health infrastructure

The sub city has totaled of six Governmental health centers, 65 all type private health facilities, two referral hospital (Black Lion and defense referral hospital)and six Youth Center also found in the sub city. The strategy one Health center in one woreda the sub city not yet achieved its goal.

Communication and utilities

None of the woreda population without electricity and water but interruption is common. All the 6 health centers has electric, telephone and water supply. Regarding transportation all health facilities has access to road. For internet accessibility, all facilities are supplied with CDMA and Computer to facilitate reporting system in the sub city but all health facilities CDMA not functional and E- HMIS is not functional

Table 15: Type of health Facilities in Lideta Sub city

Type	Number
Government	
Health Centers	6
Hospitals	3
Private	
Medium Clinics	9
Higher Clinics	12
Special Clinics	12
Hospitals	2
Drug Sore	5
Pharmacy	23
NGOs	
Hospitals	1
Organizationally	
Primary Clinics	19
Budget Allocation	

According to the sub city health office in 2008EC from 11,663,843 of health budget, only 5.1 million ETH birr has allocated for drug and medical supplies.

Table 16: Total budget allocation for year 2008 in Lideta Sub city Health office

Item	Amount in birr (2008 EC)
Recurrent budget	3,131,601
Capital budget	8,532,242
Total sector budget	11,663,843

Key health indicators Health Coverage.

In the sub city there are six health center to serve 246 830 people. According to 1: 40000 ration (one Health Center for 40000) the health coverage is 100%

Specialty service in health center has been started in 4 health center. Psychiatry, Dermatology, Ophthalmology Cervical Screening and Circumcision. Dermatology and ophthalmology service has been giving in Tekelhaimanot health center with a collaboration of Black Lion Hospital. Psychiatry service has giving in woreda 2 health centers with the collaboration of Amanuel Hospital Each specialty service has one day program per week. Those services are very important for the community as well as for health professional. Health professional in health center has got an opportunity to consult specialties. Not to Referral for those services has been reducing over crowdedness in referral health facilities and safe the patient from extra cost

Immunization Coverage.

As part of preventing and control vaccine-preventable diseases the Sub city health system delivering vaccination activities for surviving children. The Sub city average immunization coverage has been increasing constantly from year to year starting from 2005 through 2007. In 2005 the immunization coverage for measles 50%, Penta 52% and fully immunization was 39%. The immunization coverage increased to 58 for measles, 56% for Penta, 42% for fully immunized in 2007.

Table 17: Immunization coverage, Lideta Sub city 2007 EC

Antigen	Eligible(plane)	vaccinated	%
BCG	3929	2411	61
Penta3	4580	2602	56
Measles	4580	2678	58
Rota	4849	3075	63
PVC	4580	2534	55
Fully vaccinated	5571	2348	42

The Sub city Penta3 for year 2007 was 56% while the regional and national Penta 3, 100% and 94. % respectively for year 2007. The Sub city measles for year 2007 was 58% while the regional and national measles performance was, 100% and 90% respectively for year 2007. The Sub city fully vaccinated for year 2007 was 42% while the regional and national fully vaccinated performance were 100% and 86% respectively for year 2007.

Maternal Health Coverage.

In Lideta sub city there are 5613 eligible pregnant women in 2007. Among all pregnant women 3860 mothers received antenatal care service, 1840 attended their delivery by skilled birth personnel and 2955 receive postnatal care service.

Table 18: Performance on maternal and child health service

Indicator	Data from 2007 ETC
Contraceptive Acceptance Rate	8,136(20)
Number of women who received ANC	3,860(67%)
Number of women who received PMTCT	3,740
Total deliveries conducted by skilled attendant	1,840(32%)
Number of live births	1,840
Proportion of live births who received a dose of BCG	2,339
Number of children <1 yrs. receiving Penta valent immunization	2,602
Proportion of surviving infants vaccinated for measles	2,678
Number of children <5 yrs. treated for diarrhea at public HFs	3,417
Number of children <5 yrs. treated for pneumonia at public HFs	774
Number of patient seen in OPD	167,826

Table 19: ANC, PNC and delivery by skilled attendant birth, Lideta Sub city, 2007 EC

Service	Planned	Achieved	%
CAR	38868	8136	20
ANC One	3929	3871	98
ANC four	3929	2224	56
Skilled attendant	3929	1845	46
PNC	3929	2955	75

To evaluate the progress of contraceptive and other maternal health service in the sub city there is no backlog report. Report of the previous 3 years already was discarded. The Sub city contraceptive acceptance rate for year 2007 was 20% while the regional and national contraceptive acceptance rate, 33% and 69% respectively for year 2007. The Sub city skilled attendant for year 2007 was

46% while the regional and skilled delivery, 100% and 60.7% respectively for year 2007. The Sub city PNC for year 2007 was 75% while the regional and national PNC, 100% and 90 % respectively for year 2007.

Table 20: Contraceptives Utilization by methods, Lideta Sub city, 2007

Area	Pills	Depopro.	Implant	IUCD	Permanent
Lideta Sub city	1605	3521	2130	828	0

It is difficult to get statistics like IMR, MMR and U5MMR in Sub city level because those indicators are not recorded at health center level. Such indicators found at national level.

Table 21: Top Ten leading causes of outpatient Visit, Lideta Sub city, 2007

Rank	Diagnosis	Case Number	Percent
1	Acute febrile illness	38265	29.73
2	Acute Upper respiratory infection	13106	10.18
3	Dyspepsia	12911	10.03
4	Urinary tract infection	12623	9.81
5	Diarrhea (noon blood)	11248	8.74
6	Disease of muscular skeletal system	9827	7.64
7	Infection of skin	9452	7.34
8	Trauma (injury& fracture)	8078	6.28
9	Dental and Gum disease	6733	5.23
10	Typhoid fever	6450	5.01

From the above table Acute Upper respiratory infection is the leading morbidity case in the sub city. The second top causes Morbidity is acute febrile Illness (AFI). When the body is invaded by a foreign pathogen like a virus or bacteria, the immune system kicks in to gear and tries to fight the infection before it has a chance to spread. When this happen, the body's temperature is elevated to try to kill off the pathogen, and this result in what we call a fever. Due to many underline root

cause of febrile illness, AFI has a very public health implication. Having a large number of AFI without specific diagnosis is telling us about the low capacity of our diagnosis and treatment. From the above Table (21), 10 % of OPD patient turn to their home without knowing root cause of their illness and getting right treatment. The fibril may be malaria, Dengue, typhoid, Typhus, Influenza, and many. This lead to a complication like permanent disability, chronic ill and also deaths.

Top morbidity case at national level with rank of 1 up to 3 are, Acute Febrile illness (AFI) (9.21), Acute upper respiratory infection (9.21) and Pneumonia (8.41). In Lideta Sub city the two top morbidity causes are similar with the national.

Rank	Diagnosis	Case Number	Percent
1	Acute Upper respiratory infection	20057	28.2
2	Urinary tract infection	8411	11.8
3	Dyspepsia	7913	11.15
4	Acute febrile illness	6983	9.84
5	Disease of muscular skeletal system	5858	7.84
6	Diarrhea (noon blood)	5559	8.28
7	Infection of skin	5283	7.45
8	Dental and Gum disease	3808	5.49
9	Typhoid fever	3520	4.9
10	Trauma (injury& fracture)	3457	4.87

Figure 9: Ten Top cause of Morbidity among females in Lideta Sub city, 2016

Source: Lideta Sub city health office. HMIS data Base

In female population urinary truck infection occurred in second leading causes of Morbidity. It obvious to see high prevalence UTI in female due to many reasons .currently kidney failure prevalence has been rising in our country. This complication is the result of miss management of acute urinary truck and other acute kidney disease. Health education on causing factors to minimize the occurrence UTI and proper management of AUTI should taking in to consideration.

At national level Acute Febrile illness (AFI) (7.77), acute upper respiratory infection (7.76) and Pneumonia (6.1) are the three leading top morbidity cause among female.

Rank	Diagnosis	Case Number	Percent
1	Acute Upper respiratory infection	11635	47
2	Diarrhea (noon blood)	4747	19
3	Skin infection	2279	9.39
4	Pneumonia	1243	5.12
5	Helminthiasis	899	3.66
6	Other unspecified parasite	853	3.5
7	Unspecified diseases of eye	842	3.47
8	Acute febrile illness	834	3.4
9	Otitis	479	1.9
10	Trauma (injury& fracture)	470	1.9

Figure 10: Ten Top cause of morbidity among Under 5 in Lideta Sub city, 2016

Source: Lideta Sub city health office. HMIS database

Diarrhea (24.8) is leading cause at national level. Acute upper respiratory infection (13.7) also in third rank at national level among Under 5 communities

TB and HIV/AIDS

Tuberculosis

Tuberculosis disease one of public health problem in developing country including in Ethiopia. Lideta sub city has been giving Tb service in 6 health center. In all health facilities there are trained health workers and with full stock of drug and supplies.

Table 22: Tuberculosis outcome in Lideta Sub city for cohort 2006

Tb Categories	Out come						
	Rx Completed	Cured	Lost follow up	Death	Failure	Not evaluated	Move to MDR
POS	128	102	3	4	6	14	2
PNG	202	NA	7	12	4	13	1
Ep	265	NA	2	6	2	43	2

Form the above table we can understand that the number of not evaluated Tb case are large number. This is an indication poor quality in Tb program in the sub city. As to the program recommended no one left without evaluation at the end Rx completion.

Table 23: Tb outcome indicators (2006 cohort) in Lideta Sub city

S.N	TB indicators	%
1	Tuberculosis detection rate	100%
2	TB treatment completion rate	72%
3	Tuberculosis cure rate	75%
4	TB treatment success rate	83%
5	Total TB patients screened for HIV	100

Source: Lideta Sub city health office TB/HIV case team

At national level Tb cure rate and Tb treatment success rate were 92.1 and 77.9 respectively. Lideta Tb success rate is in good performance when we compare with national .but Tb cure rate is low performance comparing with national.

HIV/AIDS

In the sub city four health centers has been giving ART service. Current on ART in the sub city is 2927 and ever started client are 4637. For ART service VCT is an entry point. In the year 2007 total VCT tested was 10449 and among this 315 was positive. In HIV prevention and control activities in Youth center has been playing important role in the sub city. There are six Youth Center in the sub city which is accountable to Youth and Sport office of Lideta sub city. They give service like VCT counseling, Library, cafeteria, GYM and other sport games. Encouraging numbers of youth are using those centers. HIV prevention and control case team of the Lideta sub city work closely with Youth center. HPACO case teams give training on life skill, peer education, and distribute leaflet and condom for youth's thorough Youth center. But all Youth center are not on position to carry out their mission as intended this is due to lack of Man power especially health professional.

Nutrition intervention

There is no supplementary feeding program in the Sub city. But in specific health program like TB and HIV there is a provision of pulmpet for those of underweight patient by screening their BMI.

Hygiene and sanitation

Data on hygiene and sanitation is very unlikely to fund in well-organized manner especially at lower level. Waste disposal, safe water supply coverage and latrine coverage and other hygiene and sanitation indictors not avail at sub city level. With large gap in coverage and completeness, survey done by health extension workers on safe water supply and latrine coverage show that there are 20,019 common and 5664 private latrine in the sub city. There are 18046 private pipes and 3791 common pipes in the sub city. Even though there is no complied data on waste disposal and handling, it is obvious majority of the Sub city wordas slam area which are very rubbish and crowded.

5. Conclusion

Morbidity is acute febrile Illness (AFI) is the leading morbidity case in the sub city. Having a large number of AFI without specific diagnosis telling us about the low capacity of our diagnosis in terms of professional competence and diagnostics supplies. 10 % of OPD visitor turn to their home without knowing root cause of their illness and getting right treatment. Of course it is common problem at regional and for national level.

The implementation of E-HMIS in Sub city has been interrupted. In our HSDP, HMIS has been given a big emphasized-HMIS is a core millstone for all health programs activities of Monitoring and Evaluation. E-HMIS aim at networking all health facilities with sub city, regional health bureau and as well as with national. Its goal is creating decision capacity at all level. This decision need timely and complete data. No health center under the sub city working with CDMA as well as E-HMIS.

Data of pervious year not easily accessible and some data also discarded. Therefore, it is difficult to compare and to look and appreciate trend of service performance in the sub city. Particularly in maternal service area.

6. Recommendation

- Since there may be serious root cause beyond AFI cases, the sub city needs to assess its diagnosis capacity gap from care provider side and diagnostics equipment side. And further study needed for large number of AFI.
- Services which were in a good status during the study time should be improved and maintained like Tb detection and HIV screening for Tb patient.
- Services which were less than the target should be need improvements to achieve regional and national targets.
- E-HMIS in the sub city should be functional and CDMA should serve for the intended purpose in the sub city.
- All previous year report and summary performance data should keep in safe and ease accessible manner in each case team and officer in the Sub city and health facilities.

7. Reference

1. New Mexico Department Of Health Community Health Assessment And Planning Guidebook
2. Federal Democratic Republic of Ethiopia Ministry of health: Health and Health Related Indicators. Addis Ababa, Ethiopia; 2007 E.C

Annexes 2: Data collection form for health profile report

Health profile Assessment questioner

Date: ----- Interviewer: _____

Sub city _____

1. Geography site (including map, Boundary) _____

2. Political and Administrative Organization

No of woreda: _____

3. Population

Total population	Male	female	<5 years	<15 years	15_45 Yrs. female	Sex ratio

Education

4 Number of Primary school: _____

5 Number of Secondary school: _____

6 Number of Preparatory: _____

7 TVT: _____

8 College: government ----- private: -----

Health infrastructure

9 Governmental

Number of Hospital_____ Health center_____

10 Governmental

Higher Clinic _____Medium Clinic _____pharmacy_____

11 Health institutions to population ratio_____

12 Governmental Health Facilities with (Transport, Telecommunication, Power supply, water. Transportation_____ (%) Telecommunication_____ (%)

Electric power_____ (%) Water _____ (%)

13 Total budget allocations for year 2007 EC Birr_____use_____Return _____

14. Type of health professionals and Health staff to population ratio:

Ser. No.	Category	Number			Health staff to population ratio
		Male	Female	total	
1	Clinical Nurse				
2	Public Nurse				
3	BSc Nurse				
4	BSc in Midwives				
5	Diploma in Midwives				
6	Health Officer				
7	Medical Laboratory Technologist				
8	Laboratory Technician				
9	Pharmacist				
10	Pharmacy Technician				
11	Environmental Health Professional				
12	BSc in Health Education and Promotion				
13	BA in Management				
14	BA in Sociology				
15	MPH				
16	MSc in Maternal & Child Health				
Total					

15Health coverage Indicators

Indicator	2007EC performance	Percentage
Contraceptive Acceptance Rate		
Number of women who received ANC		
Number of women who received PMTCT		
Total deliveries conducted by skilled attendant		
Number of live births		
Proportion of live births who received a dose of BCG		

Number of children <5 yr treated for pneumonia at public HF's		
Number of patient seen in OPD		
Full immunized child		

Number of children <5 yrs treated for pneumonia at public HF's		
Number of patient seen in OPD		
Full immunized child		

Number of children <1yrs. receiving Penta3 immunization		
Proportion of surviving infants vaccinated for measles		
Number of children <5 yrs. treated for diarrhea at public HF's		

Tuberculosis

16 Total TB cases _____ PTB negative _____ PTB positive _____

Extra PTB _____

17 TB detection rate _____

18 TB treatment success rate (treatment completed) _____

19 TB cure rate _____

20 TB defaulter _____

21 Deaths on Tx _____

22. Ten Top leading causes of OPD

Serial no	disease	sex	
		Male	Female
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

HIV/AIDS

27 HIV positive screened for HIV _____

28 PLWHA (people living with HIV/AIDS) _____

29 VCT _____

30 PMTCT_____

31 Currently ART_____

32 PITC_____

33. Was there any disaster or outbreak in the sub city in the last one year? Yes/no

If yes list the disaster

34Anyoutbreaks.

35. What do you think the main problems of the the sub city in health area?

Chapter V – Scientific Manuscripts for Peer Reviewed Journals

5.1. Acute watery diarrhea Outbreak Investigation-Lideta Sub city, Addis Ababa, Ethiopia, 2016

Authors: N. Aklilu

Ethiopian Field Epidemiology and Laboratory Training Program, Resident.

Abstract:

Background

Vibrio cholera is one of causative agent which causes of AWD. AWD is transmitted by the fecal-oral route. A dose of more than one million organisms is usually needed to cause illness. On June 8, 2016, Addis Ababa health bureau announce acute watery diarrhea outbreak in kolfe Sub city. The first case notification was from Kolife Sub city and the first CTC was established in Mikile Land health center. The outbreak has spread to ten Sub city within a week. The purpose of this outbreak investigation is to control the spread of the diseases and prevention of its occurrence by identifying potential risk factors for AWD.

Methods:

Using unmatched case control design, Case-patients were identified from CTC (institutional base) which are admitted at CTC on the date of collection. The controls were selected on the same date from nearby woredas (community base).1:2 (case: control) ratio was applied. Structured questionnaire was used. A variable with p- value < 0.2 in bivariable were used to in the multivariable logistic regression to determine best explain factors of (AWD) by calculating odds ratios (ORs) with 95% confidence intervals (CIs).

Result

AWD cases were notified from week 23, the number was increased from week 23 to reach a peak in week 27 before dropping sharply in week 34. The mean age of case 40 and controls was 32 years (range: 11 - 90 years for cases and 14 – 85 for controls). In multivariable logistic regression, raw meat OR 4.1, CI (1.38-12.7), Vegetable OR = 13.7; CI (4.2-44.3) and common tap water OR = 13.6; 95% CI (4.22 – 44.0).were significantly associated with risk for AWD. Drinking treated water OR 0.117, CI (0.04 – 0.341) appeared as a protective factors.

Conclusions:

This case-control study identified three risk factors independently associated with the spread of the 2017 AWD outbreak in Lideta Sub City in Addis Ababa City Administration. These factors were, eating vegetable; eating raw meat and using common Tap water are statistically significant. More than 72% of Vegetable eaters were ill, and approximately 72% of these cases could have been prevented if vegetables had been cleaned properly.

Key Words: AWD outbreak, Lideta Sub city

1. Introduction

Vibrio cholera is one of causative agent which causes of AWD. AWD is transmitted by the fecal-oral route. A dose of more than one million organisms is usually needed to cause illness. AWD is transmitted almost exclusively by contaminated water or food. The incubation period is usually 1 to 3 days but can range from several hours to 5 days. Symptoms usually last 2 to 3 days, although in some patients they can continue up to 5 days (1). AWD epidemics often start at the end of the dry season or at the rainy season, when water sources are limited. This pushes people to accumulate at the fewer water sources available and increasing risks of contamination and transmission. Furthermore, the salinity can increase during the dry season and favors the growth of vibrio. Heavy rains can also provoke the emergence of AWD. Flooding of contaminated water from sewage systems, latrines or septic tanks may contaminate wells or water pipe (2). The global burden of cholera/AWD remains high. Sub-Saharan Africa accounts for the majority of this burden. Approximately 1.3 billion people are at risk for cholera in endemic countries. An estimated 2.86 million cholera cases occur annually in endemic countries. Among these cases, there are an estimated 95,000 deaths. There are twenty-three endemic countries that have over 10 million persons at risk. Ethiopia is one of a country among five countries with highest number of people at risk for cholera (2)

Addis Ababa health bureau declared Acute Watery Diarrhea outbreak in kolfe Sub city on June 8, 2016. In the Meanwhile team has been formulated by incorporating different stockholders like UNICEF, WHO and JSI and Federal Ministry of health. The first case notification was from Kolfe Sub city. The first AWD TC was established in Mikileland health center in the same sub city. On June 10 two cases (one female and one male) were reported by Sub city Health office and admitted

in mikileland AWD TC. The outbreak has spread to ten Sub city within a weak. The Minister of Health (MOH) and Addis Ababa health bureau put in place a rapid response team. The team came up with a series of prevention and control measures to stop the propagation of the outbreak like: 1) AWD surveillance and treatment capacity at existing health facilities; 2) establishing AWD treatment centers (CTC) 3) providing health education on general hygiene, improvement of sanitation, tracing case, disinfecting case's house and conducting surveillance, outbreak investigation is carried out by field epidemiology residents. The onset of the rainy season as of June is favorable for spread of the outbreak in all corner of the city.

The global burden of cholera remains high. Sub-Saharan Africa accounts for the majority of this burden. Approximately 1.3 billion people are at risk for cholera in endemic countries. An estimated 2.86 million cholera cases occur annually in endemic countries. Among these cases, there are an estimated 95,000 deaths. Ethiopia is one of a country among five countries with highest number of people at risk for cholera (2)

Acute watery diarrhea (AWD) is often fatal without appropriate treatment. June is the starting rainy season in Ethiopia. This heavy rain can also provoke the emergence of AWD. Flooding of contaminated water from sewage systems, latrines or septic tanks may contaminate water pipe.

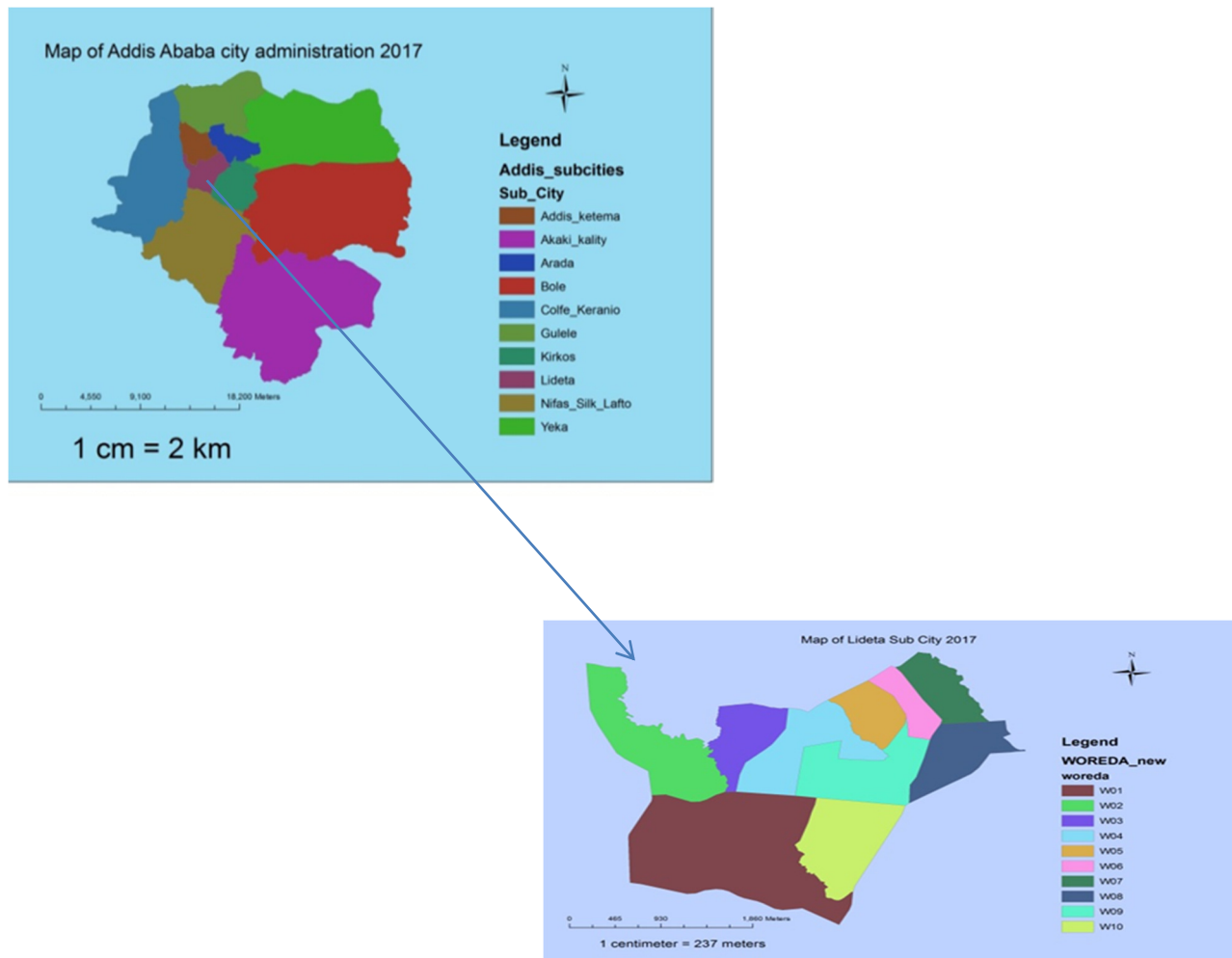
Since in Addis Ababa, the capital city of Ethiopia, there are large number population movement (in and out). Due to this, there will be a potential of further spread to other part of the country. Apart losing of human life, AWD will bring a large miss in tourism, air and land transport, import and export trade and. In general AWD distracting socio economy of the country unless prompt control measures is not taken.

Outbreak investigation is important for identifying positional source of infection before it's going to worse and losing much human life and distracting socio economy of our country. Beside the efforts carried out by different stockholders to reducing case fatality of AWD through effective case management, investigating risk factors which enhance the spread of AWD outbreak is mandatory. Otherwise the consequence will be lead losing many lives. This information will be used to refine ongoing AWD outbreak control intervention with a view to stopping transmission. Then our intervention effort would be strategic and cost-effective and also give a clue for health programmer and police makers to prevent and control future AWD outbreak in the area. Once the AWD outbreak is clinically verified, vehicles of transmission must be investigated so that appropriate control measures can be taken.

2. Method

2.1 Study area and period

AWD outbreak investigation was conducted in Lideta sub city. The sub city total population according to 2016/17 projection is 246,803. Lideta Sub City is one of the 10 sub city under Addis Ababa City Administration and in this sub city there are 10 Weredas. The sub city is bounded on the north by Arada sub city, on south by Nefas Silk Lafeto sub city, on the east by Kerkos sub city and on the west by Kolfe Keranio sub city. Total area of Lideta sub city is 918.4 Sq.Km. AWD outbreak investigations was conducted from July 1-5, 2016.



Map 5: Map of study area for AWD outbreak investigation Lideta Sub city, 2016

Source: Addis Ababa city Administration integrated land Management

3. Result

An increase in acute severe diarrhea cases in adults was noted in late April, 2016. On June 8 2016, the first AWD case was confirmed. At that time, AWD control campaigns were launched by Addis Ababa city administration .As part of control activities, two AWD treatment sites were established in each Sub city. The first AWD T-center was in kolfe Sub city, where the outbreak was first noticed. At the same time outbreak investigation lunched in all Sub cities. As part of this effort a case - control study was conducted in Lideta Sub city. In the present case -control study we enrolled 50 cases and 100 unmatched controls .response rate was 100%.

3.1 Descriptive result

AWD cases were notified from (WHO week 23, 2016. The number increased exponentially from week 23 to reach a peak in week 27 before dropping sharply in week 34. Only one case was notified in week 42 (October 17 – 23).

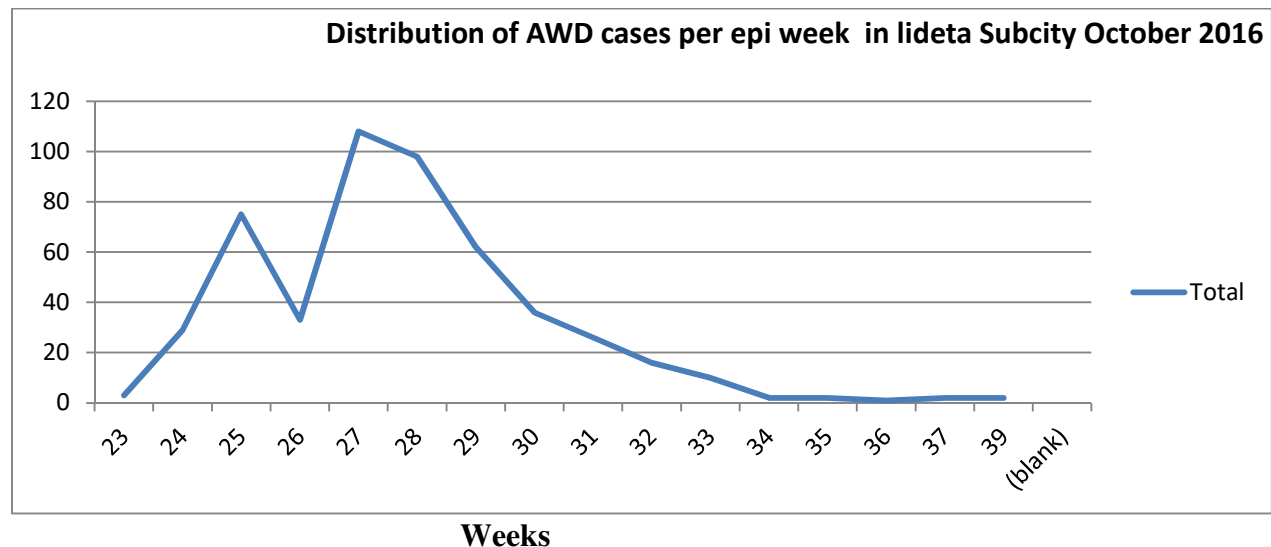
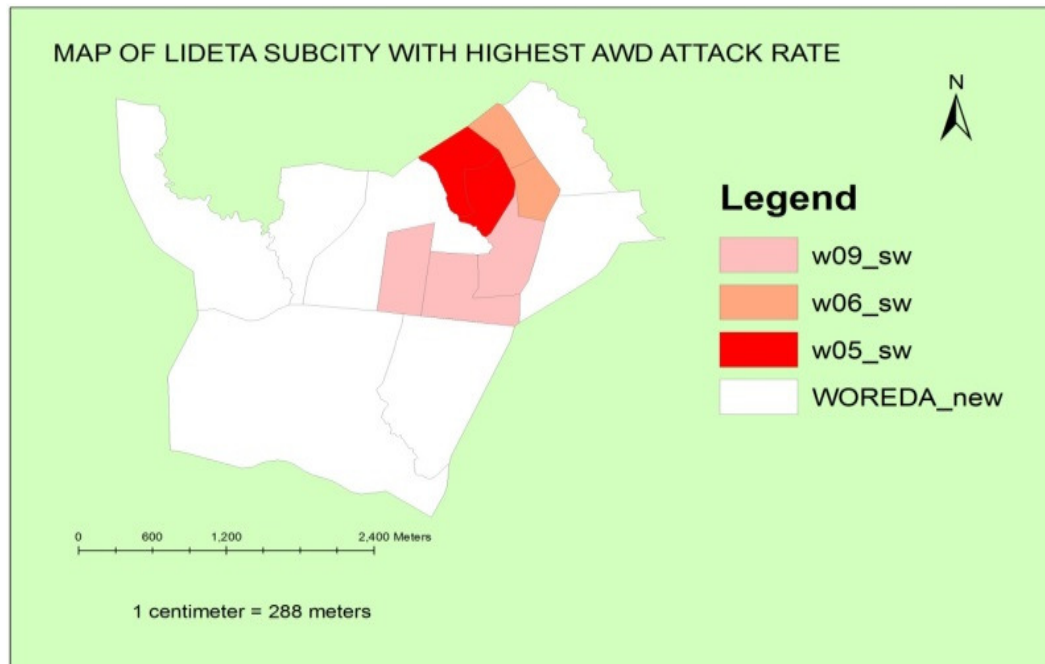


Figure 11: Epi curve of AWD outbreak, Lideta Sub city, 2016

There were 2 peaks overall: week 25 and week 27. The number of cases steadily declined thereafter, and, by the end of week 39, the outbreak was nearing its end.

All sub cities in Addis Ababa City administration were affected by the outbreak. Most notified cases were from Lideta Sub city Region 282 (53%). Next to Lideta, kolfe Sub city patient were the highest number 48 (9%) which served in Lideta Sub city AWD-TC. There was also 10 and 1 AWD

case from Oromia and SNNPR treated in Lideta AWD-TC respectively. Woreda 6, 9 and 5 record highest attack rate 4.6, 3.01 and 2.79 respectively in Lideta Sub city.



Map 6: Woreda with highest attack rate in Lideta Sub City, 2016

The most affected age group was 15-24 age groups(57%) followed by 44+age group (38%) and the 5-14 age group (4%). Men were more affected by the outbreak than women. Out of 505 notified cases, 305 (60%) were men and 200 (40%) were women

Table 24: Distribution of AWD case and attack rate per 1000 population in Lideta Sub city,2016.

Woreda	Number of case	Population	Attack rate (%) per
			1000
1	12	18,685	0.64223
2	31	12,774	2.4268
3	32	20,583	1.55468
4	30	22,096	1.35771
5	87	31,104	2.79707
6	17	3,625	4.68966
7	44	27,375	1.60731
8	6	9,950	0.60302
9	11	3,643	3.01949
10	12	16,421	0.73077

Case fatality

If left untreated, severe AWD has a CFR of about 50%. However, if AWD patients receive prompt and high quality treatment, all AWD patients should survive. Thus, for AWD, the CFR is used as a measure of the quality of care since timely and appropriate treatment should prevent death. Therefore, a generally accepted bench mark for quality of care is a CFR of <1%. The Case Fatality Rate (CFR) in this outbreak was 0.59. One death in the community and 2 deaths in AWD TC were recorded.

The mean age for cases was 40 and controls were 32 years (range: 11 - 90 years for cases and 14 – 85 for controls). All case-patients experienced acute watery diarrhea and half of the case-patients presented with severe dehydration (which requiring intravenous fluids. A majority of case-patients reported nausea and vomiting (82%).Treatment consisted of oral fluids; doxycycline, and an intravenous fluid were given to case. All the case-patients received oral fluids. 30% of cases and 72% of controls were used household tap water source for drinking. And more than 20% of cases and 97 % of control shared latrine with other neighbor. 24% of case and 73% of control used treated water.10% of case and 70 % of control have private toilet

Table 25: Clinical presentation of AWD case in Lideta Sub city, June, 2016

	Frequency	Percent
Watery diarrhea	11	22
Watery diarrhea & Vomiting	39	78
Total	50	100

Among case subjects 78 % are present with watery diarrhea and vomiting. Only 11% are compelling watery diarrhea

3.2 Analytic result

In Bivariable logistic regression, exposure significantly associated with AWD included, eating raw meat odd ratio 4.373; (CI) 2.117- 9.031, vegetable OR =8.4, (CI) 4.04-19.22, eating outside home OR 2.7; (CI) 1.325 -5.520, common Tap water OR 9.97; (CI) 4.328-22.159, using common toilet OR 8.273; (CI) 3.739-18.304 were all significantly associated with AWD. No significant associations were observed between AWD and holy water [OR 00.28. [0.13- 7.13], Roasted meat (OR= 1.35, CI= [0.635 – 2.90] and the hygiene related factors like washing hands before eating 0.85 [0.257 - 1.053] P=0.069 with 95 % confidence interval

Whereas washing hands after toilet (OR=0.265; 95% CI [0.120-0.582], drinking treated water (OR=0.117, 95% CI [0.053-0.256] and having private toilet (OR= 0.10 [0.045-0.231] p=0.000) are protective for AWD

Variable in the final multivariable logistic regression model included, Vegetable OR = 13.7; CI (4.24 - 44.3), common tap water OR = 13.6; 95% CI (4.22 – 44.0) and raw meat OR= 4.19, CI (1.38- 12.7) were significantly associated with risk for AWD. Drinking treated water with OR= 0.117, CI (0.04 – 0.341) appeared to be protective factors. Private toilet did not emerge as a significant protective factor when added to the model after adjusting

Environmental observation

Most of the sub city residents live in slum area some are along dirty River. The general hygiene in the sub city was poor. There were stagnant water and open defecation almost everywhere due to renovation. Children were playing on open defecation filed. Latrines were poorly maintained most of them have leakage. River is used as defecation site specially for homeless peoples and considerable amount of toilets connected to those rivers. There are some ground facts that the city administration water supplies could have been unsafe. Because, during filed work it is custom to observe leaking pipes throughout the Sub city. This creating opportunities for the introduction of human fecal and other pathogenic into the water system before the water reached household's taps. In addition to this water from sources not adequately chlorinated to sustain effective chlorine residual levels throughout the water distribution system. Some water taps and stored water were tested for Chlorine residual level in the sub city and found that it was (.02) which is below the standard level (0.2-0.5)

4. Discussion

Food and drink exposure like raw meat, vegetable, using common tap, were significantly associated with AWD outbreak in Lideta Sub city. This result in line with epidemiological evidence from Zambia showed that contaminated food was a major vehicle of transmission of cholera during an outbreak in particular consuming raw vegetable has association with AWD (8). Using Common tap water for drinking also has significant association with the disease. This result from poor sanitation due to insufficient access to clean water and also cross contamination during using common water tap. This result also in line with results found in study in Guji, Bale and east Shewa zones of Oromia (9). Hand washing after toilet no association with AWD, in contrast to this result study in Afar identified hand washing after toilet as protective of AWD and age from 15-44 are more affected group the same is true in Afar investigation (13)

In one or other way water is the major source of transmission since all eating item supposed to clean by water. The above associated risk factors mentioned are supposed to contact with water in any menas.in connection with this, there are some ground facts that the city administration water supplies unsafe. Because, during filed work(environmental observation) it is custom to observe leaking pipes throughout the Sub city .This creating opportunities for the introduction of fecal into the water system before the water reached household's taps. Second, water from improved sources has not been adequately chlorinated to sustain effective chlorine residual levels throughout the

distribution system. Investigations of cholera outbreaks in Sierra Leone showed that pathogenic microbes entered piped water networks through cross-contamination with sewer pipe (12).

The other evidence from environmental observation was during testing for stored household drinking water and some institution water taps the result show that water from sources not has been adequately chlorinated to sustain effective chlorine residual levels throughout the distribution system. Study in Sierra Leone stored drinking water was tested in 76 control households; of these, 30 samples (40%) showed the presence of free chlorine residual. Testing of four public water sources in the study area showed no evidence of chlorination (12).

In response to the outbreak, water, sanitation, and hygiene (WASH) works has been done by the government and partners included educating the public about household chlorination and distributing chlorine tablets throughout the Sub city.

5. Conclusion

This community and Treatment center-based, case-control study identified 3 risk factors associated with the spread of the 2016 AWD outbreak in Lideta Sub city, Addis Ababa. These factors were, eating vegetable, common tap water, and eating raw meat. Data from woreda-specific attack rates also suggest an increase in AWD cases in the densely populated woreda of the town. The highest attack rate was recorded in woreda 9 but large number of case recorded in woreda 5, which is densely populated woreda. 80% cases and 29% of controls had used common tap for drinking. This may be an indirect measure of poor hygienic practices caused by lack of water. More than 72% of Vegetable eaters were ill, and approximately 72% of these cases could have been prevented if vegetables had been cleaned and cooked properly.

6. Study Limitation

Since suspected case and “healthy” control has taken without Laboratory test control selection bias will affect the result in some level. To minimize the effect of bias investigator screen the control groups if they have any sign of AWD and cases selected those are clinical confirmed by clinician and admitted at AWD TC

7. Recommendations:

Immediate Action

- Eating vegetable and raw meat become major risk factor, therefore to stop the propagation of the outbreak intensive public message should distribute for the community not eat raw meat and vegetable by Sub city health office

For finding from environmental observation

In Long Run

- Pipe with leakage should replace by AA city Administration water and sewerage Authority
- Correction measure on toilet which connected with river by woreda health office .
- Household Water supply coverage should increase by AA city administration to minimize common tapes because one way of cross contamination

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Thesis Report

Chapter VI: Magnitude and factors of Early Sexual Initiation among preparatory School Student in Addis Ababa, Ethiopia 2017.

Summery

Introduction: Adolescence is time of transition from childhood to adulthood, characterized by significant Physiological, psychological and social changes & it is times of rapid growth, exploration and risk taking which provide them the opportunity to test their skills and abilities to discover who they are. Being a student by itself has positive and negative opportunity. With increasing school enrolment, sexual maturation and initiation are increasingly likely to occur while young people are still attending school.

Objectives The objective of the study is to assess the magnitude and its predictors of early sexual initiation among governmental and private preparatory school student in Addis Ababa Ethiopia.

Methodology: A cross- sectional school based study was conducted on a sample of 454 preparatory schools in Addis Ababa. Random Cluster sampling technique was applied to select the study participants. A pretested self-administered structured questionnaire was used to collect data. A bi-variable and multivariable analysis was used. Odds ratio with 95% confidence interval was estimated to identify predictors of early sexual initiation using multivariable logistic regression analysis.

Result:

The result showed 23.3% of the students reported having practiced early sexual intercourse. The results of multivariable model revealed that early sexual initiation was positively associated with discusses on reproductive health issues with family AOR= 8.8(4-18.6), Parents awareness about where student passed their free time Adjusted OR=2.8(1.5-5.5), Parents awareness who are their child friends AOR= 3.1(1.7-5.7) were positively associated with early sexual initiation. Similarly Exposure to pornographic material AOR=2.5(1.14-4.1), alcohol AOR= 5.6(2.7-9.38).Night or Day party AOR=3.9(2.1-7.3) were found to be positively associated with early sexual initiation in multivariable analysis with P-value < 0.05.

Conclusions

Magnitude of early sex initiation was 23.3%. Parents awareness where their child passed free time and who are their children friends, Exposure to pornographic, attending parties were found to be significantly associated with early sexual. Discussions on Rh issues with family and alcohol use were found to be the factors of early sexual initiation according to the study. Factors to ward parents, which have positives association with early sex need further study which triangulate the data from parent and student.

1 Introduction

1.1 Background

Globally, the birth rate among adolescent girls aged 15 to 19 has declined from 59 births per 1,000 girls in 1990 to 51 births in 2015 (1). And complications linked to pregnancy and childbirth is the second cause of death for 15-19-year-old girls. 11% of all births worldwide are to girls aged 15 to 19 years, and the vast majority is in low- and middle-income countries (2). In 2016 there are 49 births per 1000 girls aged 15 to 19 per year. Around 1 in 6 persons in the world is an adolescent: that is 1.2 billion people aged 10 to 19. An estimated 1.3 million adolescents died in 2015, mostly from preventable or treatable causes(3). Adolescent childbearing remains high in sub-Saharan Africa, at 116 births per 1,000 adolescent girls in 2015. This region has made the least progress since 1990, in both relative terms and absolute numbers (1).

Women ages 15-19 in Ethiopia have begun childbearing are 13 %: 10 percent have had a live birth, and 2 percent were pregnant with their first child at the time of 2016 EDHS interview. The proportion of women age 15-19 who have begun childbearing rises rapidly with age, from 2 percent among women age 15 to 28 percent among those age 19. Teenage childbearing is more common in rural than in urban areas (15 versus 5 percent, respectively) and in Addis Ababa it is 3 percent according to EDHS report 2016 (4)

While the positive impact of schools on the health and health behavior of young people is profound. It is also important to note that schooling can have some unanticipated negative consequences, particularly in terms of sexual exposure and behavior. It advertently increases the opportunity to engage in some practices outside the immediate oversight and protection of parents and other caregivers, including sexual experimentation, substance use and other risk behaviors. Schooling can also increase the exposure of adolescents to sexual coercion, bullying, and violence, among others, in the school environment(2). Adolescents who initiate sex at young ages are more likely than those who do not to have multiple and concurrent partners, engage in unprotected sexual intercourse and acquire STIs, including HIV(5).

Adolescent childbearing can have harmful consequences for the health of both adolescent girls and the children they bear. Early childbearing also reflects broader forms of social and economic marginalization of girls. Intensified efforts are urgently needed to delay childbearing and prevent

unintended pregnancies among this vulnerable age group. One part of the solution is increasing their opportunities to go to school and eventually engage in paid employment(1)

Incorporate universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programs put as one of the specific targets of the health Sustainable Development Goal (SDG 3) by year 2030 (3).

In Ethiopia to improve the health of this population group, the government has built different frameworks during the past fifteen years. These include the National Youth Policy (2004), Revised Family Law (1998), Youth Development Package (2010), Abortion Law (2005) and others. In addition to this to provide guidance for implementing the new national HSTP pertaining reproductive health issues, currently National Reproductive Health Strategy for the years 2016-2020 has developed with list of Strategic interventions like Supporting Minister of education to integrate comprehensive life skills, family life and sexuality education into school curricula emphasizing gender norms and rights; train and improve teacher skills on diversified interactive methods and practice with new skills (assertive communication) (6).

1.2 Statement of the problem

Initiating sexual activity is a natural transition, made nearly by all humans. Nevertheless, it is not the occurrence of this transition but its timing and the circumstances under which it occurs that has significant implications as a major public health concern all over the world. Early entry to sexual initiation has very important implications for the sexual and reproductive health of youths(7).

Early sexual intercourse can have serious consequences. The sooner that young people begin having sex, the longer they are exposed to the risk of an unwanted pregnancy or of contracting a sexually transmitted infection (8). Practicing sexual intercourse before the age of 18 years has a lot of health problems such as getting infected with human immune deficiency virus, unwanted pregnancy, other sexually transmitted diseases and fistula because girls before the age of 18 years may not be physiologically ready to practice sexual intercourse and give birth(9) Teenage mothers have difficulty completing school; therefore, their economic and career opportunities are restricted, and their likelihood of living in poverty is relatively high(10).

In our country as well as in other countries many articles come out with the magnitude and predictors of early sex initiation in their respective study area. As far as my literature review concerned many articles in our country are not considered private school student. And also predictors to ward parent/family not incorporated and assessed. Therefore, this cross sectional study tries to identify predictors of early sex initiation among private and governmental preparatory school students considering those gaps.

1.3 Significance of the study

Within this context, understanding factors that may predispose young boys and girls to early sexual activity can aid in the designing and implementing effective SRH programs. which is formulated based on the explored factors can prevent consequences of adolescent early sexual intercourse such as STI, HIV/AIDS, unwanted pregnancy and its secondary effect like induced abortion, teenage pregnancy, school dropouts, morbidity and mortality among preparatory school student. In addition to this the current raise up of HIV / AID incidence in our country makes this study very worth.

2. Literature Review

2.1 Magnitude of early sex initiation

Accordingly EDHS 2011 report among women age 25-49, 29 percent first had sexual intercourse before age 15, 62 percent before age 18, and rural women somewhat early in sex initiation than urban. In general median age at first sexual intercourse was 16.6 (11). Study in Addis Ababa the magnitude of early sexual intercourse was 25.3%(12). The mean age at first intercourse for women was 17.6 as reported in United state (13). The prevalence of early sexual initiation among Ambo University undergraduate regular students were 20.4 as studied in 2016 (14). Study in west Gojam zone the mean age at first sexual intercourse was 16.48 and 15.89 for males and Female respectively(15) An analysis of data from the National Youth Risk Behavior Survey in USA found that 12% of students reported having sex before age 14 (16).

2.2 predictors of early sex initiation

2.2.1 Parent – child communication

A high level of perceived parental monitoring was the factor most strongly associated with reduced odds of adolescent sexual activity among males as reported in study in Burkina Faso, Malawi, Ghana and Uganda. And Communication with parents was positively associated with sexual activity among Malawian males and Ugandan females (17). In addition, study in Nairobi males who reported not having a guardian had greater odds of sexual debut than those who reported that their parents or guardians always knew about their activities (18).

Female adolescents reporting high parental monitoring and parental discipline were less likely to transition to first sex as studied in Kenya (19). In contrast to those findings, a high level of parental monitoring was associated with greater odds of making the transition to early sex among females living in non-slum areas and among younger females in Kenya (20). A study in Ethiopia also showed that students who had parental supervision were 80% less likely to start early sexual initiation compared to those who did not have parental supervision (21).

Study in USA adolescents reporting greater parental disapproval and limits on their television were less likely to initiate sex. In the other way Adolescents who reported more sexual communication with

parents were more likely to initiate oral sex. Results for vaginal intercourse were similar to those for oral sex(22). Study in Peru Results show having a mother with less than complete secondary education has positive association with early sex initiation (23). Study in Dire Dawa students who use condom during their first sexual intercourse were 1.9 times more likely to have odds of communication about sexual and reproductive health issues with parent than those who do not use condom (24). In other study in Deber Markos, students who ever had sexual intercourse were more likely to communicate on SRH issues with their parents than those who never had had sexual intercourse(25). When we see the topics discussing during child-parent communication, study in Ghana revealed that Sexual abstinence, menstruation and HIV/AIDS were the most frequently discussed topic during parent –child communication but condom and other contraceptive use were hardly discussed (26). Studies on determinants of sexual initiation among youths in north East Ethiopia showed that, less parental communication and connectedness were identified as a predictor of early sexual initiation(27). An intervention delivered to mid-adolescents in combination with a parent–adolescent sexual-risk communication intervention increased HIV/ AIDS knowledge, condom-use skills, and self-efficacy and had a marginal effect on consistent condom use (28).

2.2.2 Peer pressure

Study in Kenya showed that transition to first sex is predicated by peer behavior(29). The females and those who were less influenced by external pressure were more protected against pre-marital sexual debut than their counterparts as reported from eastern Ethiopia (30).

2.2.3 Substance

A study in Addis Ababa drug was the strongest predictor of early sexual initiation(12). The same is true in Peru drinking alcohol have positive association with early sex initiation(23). Early sexual initiation was also positively associated with alcohol and Kchat (32). Female and male students who consumed alcohol were 7 times and 2.8 times more likely to be at risk respectively than those who did not consume alcohol as reported in Jima town study (31). Study done in New York revealed that alcohol/drug use was almost 4 times more likely among those who had early versus later sex(33). Study done in Ghanaian adolescent shows that tobacco use, drunkenness and other drug use were all found to increase the likelihood of engaging in sex as well as having one or multiple sexual partners(34).

2.2.4 Performance

Study in Peru being average in school 1.4 times more likely to engage in early sex initiation(23) .Study in east Ethiopia, respondents who perceived themselves to have low self-educational rank were almost 2-times more likely to engage in pre-marital sexual intercourse compared to those who perceived themselves to have top rank (30).

2.2.5 Exposure to media

Study in Gojam, watching pornographic movies were found to be significantly associated with premarital sexual practices (15). A qualitative study in Iran, the participants mentioned that in recent years the expanded access to satellite channels have increased premarital sexual relationships. They believed that some youth and parents were affected by the foreigner's culture, and found no problem with free relationships before marriage. The participants stated that the internet facilitates friendships between girls and boys through dialogue and social networks such as the Face book(35). Naturally adolescence is period that is characterized by intense information seeking. But because of lack of readily available information about sexuality, they use media as sexual super peer which encourages them to be sexually active (36). A study done in Zimbabwe on factors underlying early sexual initiation among adolescents showed that, media played a significant role in shaping adolescents' sexual activity. Films, pornographic books and novels, and internet have been recognized as underlying factors to early sexual debut among adolescents(37).

2.2.6 Family living status

. In contrast study in Peru show that family wealth has positive association with early sex imitation (23). Pre-marital sexual debut was more common among adolescents who received higher pocket money per month but family wealth index has no association(30).

2.2.7 Altitude of sex and knowledge about RH

Study in Gamo Gofa zone, Ethiopia ,early sexual initiation was also positively associated with being not having comprehensive knowledge on HIV/AIDS(32).. Study done on Age at first sex and its associated factors among youth in Dese- Ethiopia showed that, approval having sex “while I am teenager would just be doing what everybody else is doing” was significantly associated with sexual debut at early age (27).

3. Objective

3.1 General objective.

To assess the magnitude and predictors of early sex initiation among preparatory school student in Addis Ababa, Ethiopia.2017

3.2 Specific objectives

- To measure the magnitude of early sexual initiation among preparatory school student in Addis Ababa.
- To identify factors of early sexual initiation among preparatory school students in Addis Ababa.

4. Methods and Materials

4.1 Study area

The study was conducted in government and private preparatory school found in Addis Ababa City Administration. Addis Ababa is the capital city of the Federal Democratic Republic of Ethiopia. The Addis Ababa city has 10 Sub-cities and 117 Woreda with estimated population of 3,433,999. From this total population age group 10-19 populations are account (16.6%) of the total population. which is estimated to be 572,333. Totally there are 65 Governmental, 149 Private and 1 Public Preparatory School.

4.2 Study design

A cross sectional school based study

4.3 Study period

Data collection was conducted in November, 2017

4.4 Source population

All regular preparatory school students who are attending class in 2017 Academic year of Ethiopia in Addis Ababa city Administration was the study population.

4.5 Study Unite

Regular preparatory Students who are attending class in 2017 academic year of Ethiopia in selected school was considered as study participants.

4.5.1 Inclusion Criteria:

Regular student who are attending a class of 2017/18 academic year during data collection period

4.5.2 Exclusion Criteria:

Regular student who are attending a class of 2017/18 academic year and who are married.

4.6 Sample size determination

Objective 1

Prevalence of early sexual practice among adolescents 25.3% studied in Addis Ababa in 2015(12) was taken as prevalence

Therefore ,

The sample size was determined by using single population proportion formula by taking $z=1.96$ confidence limits of the survey result (with 95% level of certainty), W =margin of error (5%), P =proportion of early sexual practice among adolescents 25.3% (12). nonresponse rate=10%, design effect of 1.5, the Total sample size were 478.

$$n = \frac{Z_{\alpha/2}^2 P (1-P)}{d^2} = \frac{(1.96)^2 * (0.253 * 0.747)}{(0.05)^2} = 290$$

Where, n is the sample size.

P = proportion of early sexual practice among adolescents 25.3% (12)

d = Margin of error of 0.05.

$Z_{\alpha/2}$ = Critical value at 95 % level of significance

Sample size for Objective 2

To estimate sample size based on factors the following double population proportion formula was used.

$$n = \frac{(1+r)^2 [z_{\alpha/2} + z_{\beta}]^2}{r(\ln OR)^2 p(1-p)} \text{-----(38)}$$

Where : “OR” will be the odds of engaged in early sex initiation with different factors and $Z_{\alpha/2}=1.96$ at 95% level of significance, $Z_{\beta}=0.84$ for 80% power of the test, the sample size for each group with different determinant group will be calculated and compare with the single population formula, and the maximum sample output was taken to be the sample size

Table 26: Sample size determination using double population proportion formula

Factors	Early sex initiation		Ratio	CI	OR	power	Sample size		Total sample size
							Exposed	Unexposed	
Attending Night/day club(12)	(10.2)	(46.4)	1	95%	7.63	80	29	29	58
	Unexposed	Exposed							FleissW/CC
Peer pressure(21)	(11.4)	(26.8)	1	95%	2.84	80	115	115	250
	Unexposed	Exposed							FleissW/CC
Use Drug(12)	(16.03)	(73)	1	95%	13.8	80	15	15	30
	Unexposed	Exposed							FleissW/CC

Prevalence of early sexual practice among adolescents 25.3% studied in Addis Ababa in 2015(12) gives us the highest sample size (290). Accordingly after considering 10% non-response rate and 1.5 design effects the minimum sample size was 478.

$$290 * 1.5 * 10\% = 478$$

4.7 Sampling Procedure

Cluster random sampling method was used for the selection of study participants. AA city Administration has 10 Sub cities. Each Sub city was considered as a cluster. Three cluster Sub city was selected by simple random sampling method. Again 6 schools (one private and one governmental school) from 3 sub city were selected by simple random sampling methods. After total the number of student registered for 2017-18 academic year were obtained, proportional sample size was allocated for each selected cluster school so as to give the total sample size. Finally students from selected school who are attending class on the date of data collection and volunteer to be part of the study was asked to fill the questionnaires

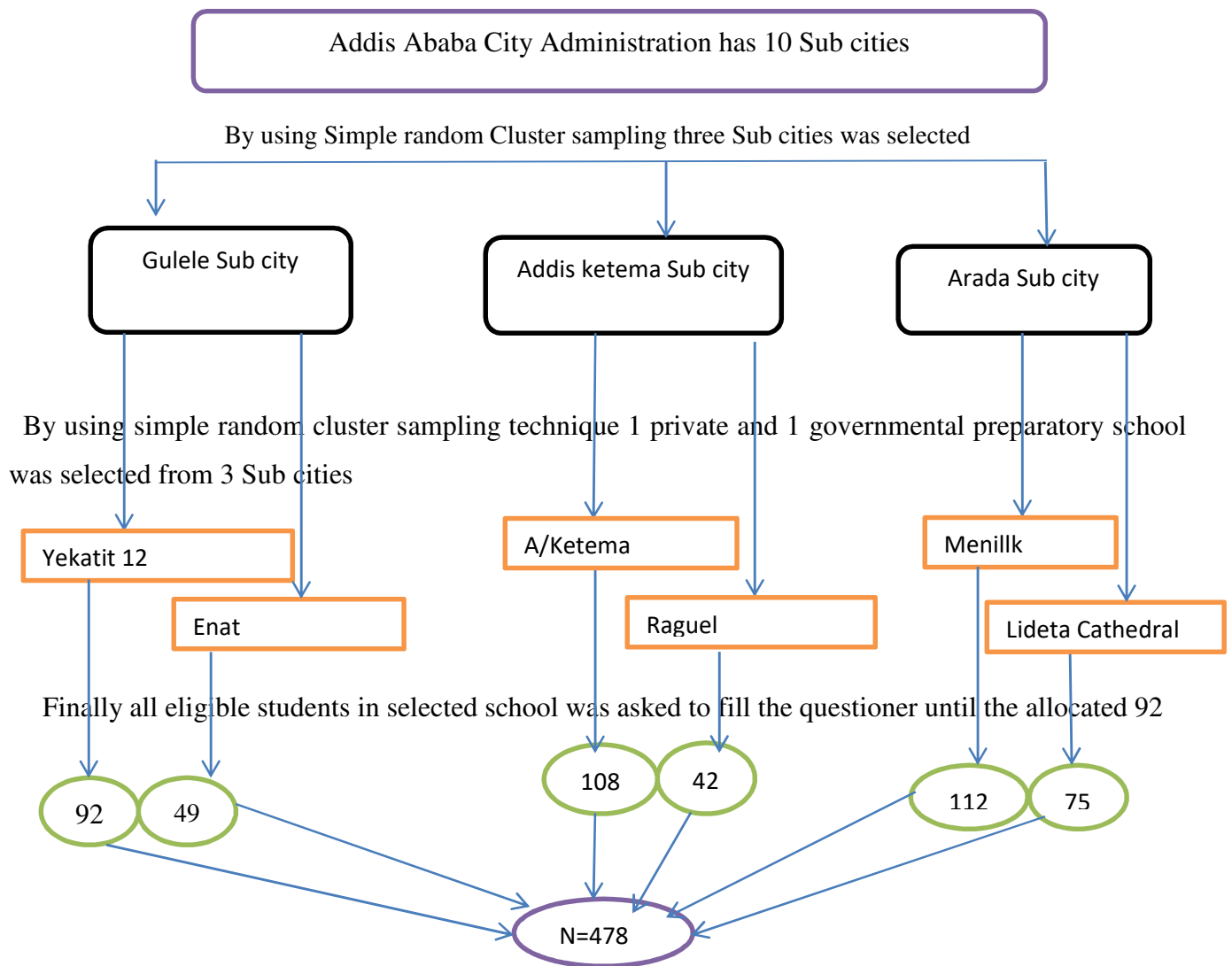


Figure 12: Sampling procedure for study of assessing predictors associated with early sex initiation among government and private preparatory school student in Addis Ababa, November, 2017.

4.8 Data collection tools and procedures

After obtaining ethical clearance from St Paul hospital Millennium Medical college and before beginning the data collection, the study subjects were identified accordingly to sampling procedure and all respondents were asked to provide verbal consent prior to taking part in the study. A pre-tested self-administered structured questionnaire was used to collect data. The tool was adapted from tools used to assess early sexual initiation used by different studies (12,16, 21). The questionnaire were developed in English and then translated into local language Amharic. Trained data collection facilitator was gave research information and study objectives for study participant, assured their willingness and supervise the data collection process by checking completeness of the required type of data.

4.9 Data quality management

Pre- test was carried out before the starting of the data collection to make further adjustments. Based on the findings from pre taste modification on the process of the data collection and on questionnaire was carried out. Per test was conducted in nearby Sub- City with 5% of the sample size. At the time of data collection data was checked for completeness and consistency by the principal investigator. Appropriately completed questionnaires were coded. Data cleaning was done by running frequencies of each variable to check for accuracy, outliers, and consistencies.

4.10 Data analysis procedures

The data was entered by using Epi - Info and exported in to SPSS version 20. Then data was cleaned for inconsistencies and missing value and analyze using SPSS version 20. Bi-variable analysis was computed to describe some important characteristics of study subjects.. The data was expressed in percentages, graphs, means and standard deviations. Then Bi-variable analysis technique was computed to see the crude association between the independent variables and the dependent variable. Variables with P-value < 0.2 in bi-variable analysis were entered to multivariate analysis. Multivariable analyses were computed to evaluate effect of each variable with early sex initiation using binary logistic regression. The degree of association between independent and dependent variables were assessed using odds ratio with 95% confidence interval.

4.11 Variables

➤ Dependent Variables

- Engaging in early sexual initiation

➤ Independent variables

Individual factors

- Age
- Sex
- Perceived School performance
- Perceived family wealth
- Perceived parent monitoring

Family Factors

- Parent Education
- Parent jobs
- Parent –Child communication on reproductive health

Context factors

- Exposure to pornographic film.
- Substance (alcohol, chat, drug ,smoking)
- Attending day/night club
- Adolescent living arrangement
- Peer pressure
- Having friends who had engaged in sexual behaviors
- Having pocket money

4.12. Operational definitions

Early sexual initiation: In this study, is defined as experience of sexual intercourse before the age of 18 year (39).

Context factors: in this study, is defined as factors other than individual and family like environment, circumstance, exposure and setting

Perceived School performance. In this study, is defined as what a Student thinks about their school performance and a rank gives for them.

Perceived family wealth .In this study, is defined as what a student thinks about their family wealth level and a status gives for their family.

Perceived parent monitoring level. In this study, is defined as what a student thinks about level of family monitoring on them.

Exposure to pornographic film. In this study, is defined as watching pornographic film without considering any frequency.

Substance (alcohol, chat, drug, and smoking. In this study, is defined as exposed to substance without considering any frequency.

Attending day/night club. In this study, is defined as attending club without considering any frequency.

Having pocket money. In this study, is defined as receiving money form family without considering any amount and frequency

4.13 Ethical consideration

Ethical clearance for the proposed study was obtained from St, Paulo's Hospital Millennium Medical collage research ethical review board and also supporting letter was obtained from Addis Ababa Education bureau after the approval of research proposal. Before administration of questionnaire, the respondents was informed about the objective and purpose of the study and informed consent was taken from each respondent also they was informed about their right not to participate in the study and interruption at any time. No personal identifiers were used on data collection form. The recorded data will not access by a third person except the principal investigator, and will be kept confidentially and anonymous. There was an explanation for study participant that no risk will be incurred because of their involvement, no personal benefits to their participation in this study and that the information they provided can contribute to the future better development of SRH program

4.14 Dissemination of results

The result of the study will be given to SPHMMC department of public health for partial fulfillment of the requirements for the degree of Masters of Public Health in Field Epidemiology, for organizations, stakeholders, partners who are engaged in school reproductive health and also for school community through Addis Ababa city administration education bureau then their plane, program and activities on RH rely on evidence based public health. And also effort will be made to publish the findings to access others as well.

5. Result

5.1 Socio demographic characteristics of respondents

Out of the total 478 preparatory student sample, 454 participated in this study and making the response rate 95%. The median age of respondents was 17.9 years, range 15-23 years. Forty three percent of respondents were males. 68 % and 48 % of respondents have a father and mother with secondary and above education level respectively. According to students perceive of their school performance 90% of them were between very good and good rank. 47% and 83% of respondents' mothers and fathers have job. 46% of respondent's parents are separated. Regarding family living standard 79% of respondents perceived that their family living status is medium. 66.5% of respondents have permanent pocket money (Table 2)

Table 27: Socio demographic characteristics of respondent among preparatory student, Addis Ababa, November, 2017

	Characteristics	(N=454)	%
Sex			
	Male	195	42
	Female	259	58
Age in years			
	15-17	142	31
	18-19	285	63
	20-23	27	6
Mother's job			
	Yes	213	47
	No	241	53
Father's job			
	Yes	380	84
	No	74	26
Father's education level			
	Illiterate	26	6
	Primary	119	26
	Secondary and above	309	68
Mother's education level			
	Illiterate	53	11
	Primary	181	41
	Secondary and above	220	48
Perceived school performance of the student			
	Excellent	29	6
	Very good	182	40
	Good	243	54
Perceived living standard of their village			
	Rich	31	7
	Medium	348	77
	poor	75	16
Perceived wealth status of family			
	Rich	24	5
	Medium	359	79
	poor	71	16
Permanent pocket money			
	Yes	302	66
	No	152	34

5.2 Parent –child communication and Substance and other environmental factors description

Among respondents who are perceived their parent monitoring is moderate 23% of engaged in early sexual practices. But student perceived their parent monitoring as highly 65 % of them engaged in early sex. One hundred eighty nine (41.6%) reported ever watched pornographic materials. Regarding substance use, eight percent of students have used kchat and shisha. In relation to alcohol conception, 40% of youth were drunken alcohol in their life time. 35% of sexually active student at early age report

that agrees with having sex while I am teenager would just be doing what everybody else is doing. 69(65%) of student who reported their family monitoring level was as high were engaged in early sex. From student who was active in sex 60% of them were engaged in early sex. Among respondents participated in the study, one hundred ninety six (43%) comprising 88 (45%) males and 108 (55%) females reported ever visiting night club or day party. Of those 66 (62%) of them were started sex at age of below 18. Among study participants 99 (22%) respondents report that they were encouraged by peers to be engaged in sex, of those 33% of them were engaged in early sex. Respondents were asked about parental monitoring, 89 (19.6%) reported that their parents knew where they passed their free time. In addition, 138 (30%) of the respondents said that their parents knew with whom are they when they are out of home or who are their friends. (Table 3)

Table 28: parent- child communication, substance and other environmental factors among preparatory student, Addis Ababa, November, 2017

Characteristics	Early		Not early	
	(N=106)	%	(N=348)	%
Perceived parent monitoring level				
Highly	69	65	134	38
Moderate	24	22.6	195	56
Low	13	12.4	19	6
Discussion with family on SRH				
Yes	93	87.7	183	53
No	13	12.3	165	47
Does Parents knows where a student passed free time				
Yes	36	40	53	15
No	70	60	295	85
Does parents know who are their child friends				
Yes	49	46	89	25
No	57	54	259	75
Ever Exposure to pornographic material				
Yes	63	59.4	122	35
No	43	40.6	226	65
Ever visit Night/ Day party				
Yes	66	62.2	130	37
No	40	37.8	218	63
Ever drink alcohol				
Yes	63	59.4	122	35
No	43	40.6	226	65
Close friends sexual practice				
Noon of them	29	27.4	123	35
Most of them	24	22.6	37	11
All of them	5	4.7	8	2
Don't know	48	45.3	180	52
Encouraged by peers to be engaged				
Yes	33	31	66	19
No	73	69	282	81
Teenager should have sex				
Strongly disagree	36	34	139	40
disagree	33	31	129	37
Not sure	21	20	42	12
Agree	16	15	38	11

5.3 About Student's sexual behavior

From a total 454 surveyed preparatory student who have ever had sexual debut, 106 (23.3%) preparatory student start sexual intercourse before 18 years. The median age of sexual initiation in our finding was 16 years with the minimum age 12 and maximum age 19 and with $SD \pm 1.22$. 58% of males and 42% of females reported early sexual initiation.

Sexual debut were initiated with casual 30% followed by 29% with girl or boyfriend. 26% of participant initiated their first sex with class mate. Among female student those are engaged in early sexual practice 81% of them their first sexual partner was older than them. 28.3% female and 23.5% male were not use condom in their last sex. Furthermore 59% of sexual actives student were not use any type of contraceptive method at all.

Regarding reasons for first sexual intercourse, among Student who were sexually active at early age (less than 18 years) the main reasons for them to engage in sex at the first time were love for 41%, followed by curiosity for 24% student. Regarding reasons to delay sexual initiation by student who were not sexually active the main reason for their abstinence were school first 102(29.3%), not old enough 96 (27.5%), religious value against it 63(18%) and fear of pregnancy 37(10.6%), followed by not emotionally ready to do for 7% of Student. Not emotionally ready to do it and fear of pregnancy/disease were accountable for 21.4 and 6.1% respectively. Twenty eight percent, sixteen and twenty six percent of student had history of sexual intercourse after watching pornography, using substance and alcohol respectively. The majority of the student 90 (85%) had their first sexual intercourse between the ages of 15 and 17 years. (Table 4)

Table 29: sexual behavior of among preparatory student in Addis Ababa, November, 2017

Characteristics		(N=296)	%
Ever had sex			
	Yes	106	23.3
	No	348	76.6
Age at first intercourse			
	10-14 years	16	15
	15-17 years	90	85
Age of first sex partner			
	Younger than me	17	16
	Equal	35	33
	Older than me	54	51
Relationship with first sex partner			
	Fiancé	12	11
	Boy/girl friend	31	29
	Causal	33	32
	Classmate	28	26
	Relatives	2	2
Reason for first sex			
	Alcohol	12	11
	To do what my friends do	6	5
	Marriage	1	0.9
	For money	4	4
	Curiosity	18	17
	For love	43	40
	Peer influence	3	3
	It's my age I have to do	13	12.
	Cheated	1	0.9
	Due to film	5	5
Condom at last sex			
	Yes	53	50
	No	53	50
	Don't remember		
Used FP method at first sex			
	Yes	45	36
	No	61	64
Sex after alcohol			
	Yes	32	30
	No	74	70
Sex after Substance			
	Yes	21	20
	No	85	80
Sex after sex film			
	Yes	35	33
	No	71	67

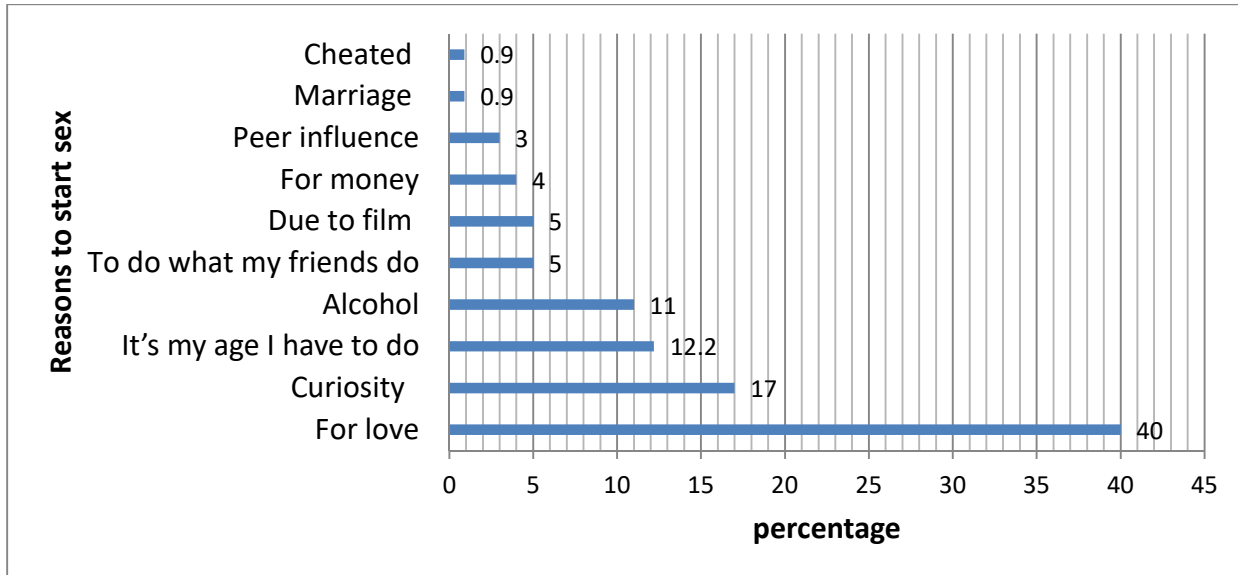


Figure 13: reason to start sex by preparatory school student Addis Ababa, 2017

5.4 Predictors of Early Sexual Initiation.

5.4.1 Bi-variable analysis

School type, age, father job, father education, and parent living arrangement, with whom student living and the living standard of student's village were not significantly associated with early sexual initiation. But Sex, Mother job, Mother education, school performance, perceived family wealth, pocket money, peer pressure, having friends who had sex, perceived parent monitoring level, parent-child discussion on RH were associated with sexual debut at early age. Similarly, family awareness about where their child passed their free time and their friends, pornographic, alcohol attending day/night club and chat have showed were associated with early sexual initiation in Bi-variable analysis with $p < 0.2$).

Being male Crude OR 2.7(1.4-3.5), Mother with job Crude OR 4.13 (2.2-6.6), Illiterate mother Crude OR 1.3(0.67-2.7), Pocket money Crude OR 1.36 (0.8-2.2), Pressure from pair Crude OR 0.5(0.31-0.8),

Parent monitoring level(high) Crude OR 3.8(1.68-8.7), Parent –child communication on RH issues (no) Crude OR 0.15 (0.08-0.28),Parent know where their child passed their free time Cured OR 10(6.5-17.7), Parent know who are their child friends Cured OR 0.40(0.2-0.62), drink alcohol cured OR 2.71(1.7-4.2), Pornographic material cured OR 2.76(1.7-4.3) ,Visit Night/ Day party Cured OR 2.71(1.7-4.2) were significantly associated with sexual debut at early age and were found to have P-value < 0.2 in which this variables were taken to multivariable analysis.(Table 5)

5.4.2 Multivariate analysis.

The results of multivariable model revealed that early sexual initiation was positively associated with discusses on Rh issues with family Adjusted OR= 8.8(4-18.6), Does Parents knows where student passed free time Adjusted OR=2.8(1.5-5.5) parents know their child friends has positive association with early sex AOR= 3.1(1.7-5.7) were significantly associated with early sexual initiation. Similarly Exposure to pornographic material Adjusted OR=2.5(1.14-4.1), alcohol Adjusted OR= 5.6(2.7-9.38), Night/ Day party Adjusted OR=3.9(2.1-7.3) were found to be positively associated with early sexual initiation in multivariable analysis with P-value < 0.05. But Sex, Mother education,, School performance, Perceived family wealth status, having sexual active friend and perceived parent monitoring level had no significantly association with early sexual debut.(Table 5).

Table 30: Bi variable and Multivariable for determinants of early sexual initiation among preparatory student in Addis Ababa, November, 2017

Explanatory variables	Early Sexual Initiation		COR(95% CI)	AOR(95% CI)
	Yes(106)	No (348)		
Sex				
Male	62(58 %)	133(38%)	2.7(1.4-3.54)*	1.7(0.8-3.7)***
Female	44(42%)	215(62%)	1	1
Mother's job				
Yes	77(27%)	136(62%)	4.13(2.5-6.6)*	1.2(0.92-1.2)***
No	29(73%)	212(38%)	1	1
Mother's education level				
Illiterate	12 (11.3%)	41(12%)	1.3(0.67-2.7)*	0.7(0.2-2.6)***
Primary	31(29.3%)	150(43%)	1.94(1.19-3.1)*	2.1(0.9-4.7)***
Secondary and above	63 (59.4%)	157(45%)	1	1
Perceived school performance of the student				
Very good	40(37.7%)	142(41%)	0.9(0.35-2.4)*	0.9(0.08-10)***
Good	52(49%)	175(50%)	0.87(0.34-2.2)*	0.5(0.7-3.8)***
poor	5 (4.7%)	8(2%)	0.26(0.06-0.9)*	0.8(0.12-6.3)***
Excellent	6(5.6%)	23(7%)	1	1
Perceived wealth status of family				
Medium	79 (76%)	280(80%)	1.7(0.7-4.2)*	2.5(0.09-65)***
Lower	19 (14%)	52(15%)	1.7(0.6-4.7)*	4.0(0.17-92)***
Highest	8 (7%)	16 (5%)	1	1
Permanent pocket money				
No	30 (28%)	122 35	1.36(0.8-2.2)*	0.53(0.2-1.2)***
Yes	76 (72%)	226 65	1	1
Pressure from pairs to do sex				
Yes	33 (31%)	66 (19%)	0.5(0.31-0.8)*	0.4(0.1-1.06)***
No	73 (69%)	284 (81%)	1	1
Number of friends who had sex				
Most of them	24 (23%)	37 (11%)	0.36(0.18-0.6)*	1.8(0.77-4.4)***
All of them	5 (5%)	8 (2%)	0.37(0.15-1.2)*	0.4(0.14-1.3)***
Don't know	48 (45%)	180 (52 %)	0.88(0.52-1.4)*	0.4(0.04-4.2)***
Noon of them	29 (27%)	123 (35%)	1	1
Having sex while I am teenager would just be doing what everybody else is doing				
Disagree	33 (31%)	129 (37%)	1.01(0.59-1.7)*	0.23(0.0-1.2)***
Not sure	21 (20%)	42 (12%)	0.51(0.27-0.9)*	0.5(0.01-2.7)***
Agree	16 (15%)	28(11%)	0.46(0.2-0.9)*	0.8(0.0-4.14)***
Strongly disagree	36 (34%)	139 (40%)	1	1
Perceived Parent monitoring level				
High	24 (23%)	134 (39%)	3.8(1.6-8.7)*	1.7(0.4-7.6)***
Moderate	69 (65%)	195 (56%)	1.9(0.9-4.1)*	1.2(0.3-4.8)***
Low	13 (12%)	19 (5%)	1	1
Have you ever discusses on Rh with family				
Yes	93 (89%)	183 (42%)	6.4(3.4-11.9)*	8.8(4.2- 18.6)**
No	13 (11%)	165 (58%)	1	1

Tables continue...

Parents knows where you passed free time				
Yes	36 (34%)	53(15%)	2.8(1.7-4.7)*	2.8(1.5- 5.5)**
No	70(66%)	295 (85%)	1	1
Does parents know who are your friends				
Yes	49 (56%)	89(81%)	2.5(1.59-3.9)*	3.1(1.7- 5.7)**
No	57 (44%)	259(19%)	1	1
Ever Exposure to pornographic material				
Yes	63 (59%)	122 (35%)	2.71(1.7-4.2)*	2.1(1.1- 4.1)**
No	43 (41%)	226 (65%)	1	1
Ever drink alcohol				
Yes	63 (63%)	122 (46%)	2.71(1.7-4.2)*	5(2.7-9- 38)**
No	43 (37%)	226 (54%)	1	1
Ever visit Night/ Day party				
Yes	66 (39%)	130(11%)	2.76(1.7-4.3)*	3.9(2.2- 7.3)**
No	40 (61%)	218 (89%)	1	1
Chawing kchat				
Yes	10 (9%)	5 (1%)	0.1(0.04-0.4)*	3.(0.36-26.4)***
No	96 (91%)	343 (99%)	1	

* is p- value <0.2, ** is P- value<0.05, *** is p- value >0.05)

6. Discussion.

The magnitude of early sexual initiation among preparatory student in this study was 23.3%. To the contrary, this finding is relatively lower compared to other prior study findings in Addis Ababa with the prevalence of early sexual initiation of 25.3% (12) but it is higher than a study conducted in Ambo university undergraduate regular students which result with the prevalence of 20.4 as studied in 2016 (14). The difference may be explained by the present study include private preparatory student which is perceived as early sex initiation may not common as governmental school. This study also supports this perception because among respondents of this study 32 (20%) from private and 74 (25 %) from governmental school are engaged in early sex initiation. This difference in prevalence may explain by; private school in this study govern by church administration this may have same influences not to engaged in early sex or in other way even those are already engaged may hesitate to report their sex behavior truly than other government school. Other explanation, the difference in prevalence between Ambo University and the present study will be; since university student almost they are on rank of above average school performance, this may help them to delay in sexual engagement. Study in Peru support this, being average in school 1.4 times more likely to engage in early sex initiation (23). Our study also showed that the mean and median age at first sex of the respondent were, 16.05(SD=1.22) and 16 years respectively. This result in agreement with other study in Addis Ababa in the same study setting which report the mean age at first sexual initiation was 16.03(SD 1.34) (12).

Regarding age, the mean age at first sexual intercourse for this study was 14.1 and 16 for females and male respectively. This result was lower than study in west Gojam zone which was 16.48 and 16.89 for males and Female respectively (15) this may explain by, respecting for community norms about remaining virgin until marriage more strong among rural than urban youths (40). The same will be true between West Gojam and Addis Ababa youth. Therefore age at first sex for west Gojam zone student a little bit higher than Addis Ababa Student.

Regarding parent student communication 60.8% student reported to have ever discussed on sexual and reproductive health topics with either of their biological parents during their life time.

This finding was relatively larger than the finding of the study done in Addis Ababa, Ethiopia that only 31% of respondents reported to ever have discussed with their parent (41). This difference may be

attributable to the difference in the study population that the study done in Addis Ababa information collected from youth outside school while for the current study information collected from school student people. In addition active student may have more closed supervision from their parent for their success of school performance and parent may focus on discussing on Rh issues with their child. Similarly, Multivariable analysis shows that Student who had history of discussion with their parents about reproductive health were 8 times higher than those who had no history of discussion to engage in Sexual debut at early age.

In agreement to this result study conducted in among Malawian and Ugandan adolescent shows that such communication associated with elevated odds of having had sex early (2.2 and 1.5, respectively) (17)

In case of the present study the elevated odds will explain by, families who discuss with their child on RH issues will result from lack of confidence on their child, Possibly this may be due to their perceived greater vulnerability of their children or the discussion could be after parents had learned that such activity had occurred.

A total of 89 (19%) of all respondents and 36 (34%) of student who had early sexual intercourse at the time of study living with parents knows where their free times passed. Multivariable analysis shows that student living with parents knows where their free times passed were 2.8 times more likely to engage in early sexual initiation.

Multivariable analysis shows that student living with parents know who are their friends were 3.1 times more likely to engage in early sexual initiation. The degree of parent figures knew about what they did with their free time and who their friends were indirectly tell us the level of parent monitoring. The possible explanation for this result will be the same with the above explanation which stated for association between Rh discussion and early sex. The same is true here parent may perceive greater vulnerability of their children this result in highly monitoring/following of their children where they passed their free time and who are their friends as well. Among student who perceived that their parent monitoring as high, 65 % of them were engaged in early sex.

In agreement to this result a high level of parental monitoring was associated with greater odds of making the transition to early sex among females living in non-slum areas and among younger females in Kenya (20).

But, this result is inconsistent with the study which conducted in four Africa countries that reported students who are their parent don't knew about what they did with their free time and who their friends were, the greater the likelihood that they had had sex (17).

Multivariable analysis shows students who watched pornographic materials were 2.1 times more likely to engage in early sexual initiation. The same association observed in study conducted in Addis Ababa among governmental preparatory school and among youths in Addis Ababa the odd to engage in early sexual initiation among pornographic viewers were 2.8 (12) and 7.27(41) to engage in early sexual initiation respectively.

A total of 185 (40%) of all respondents and 63 (59%) of them who had early sexual intercourse at the time of study had consumed alcohol. Students who consumed alcohol were found 5 times more likely to report early sexual intercourse compared to students who didn't visit. But study conducted in Addis Ababa (2014) among youth the odd of alcohol use was two times higher among youths sexually active at early age (Adjusted OR=2.48), which is less odd than the present study (41). In Similar way study in Addis Ababa (2014) identified that alcohol use had no association with early sexual initiation (12). The elevate odd of the present study will explained by time variation, alcohol production and promotion which is motivate young generation to use alcohol has been increasing with in this four years.

Among study participants 196 (43%) of reported that they visited nigh/day club, from this 66 (33%) of them had had early sexual initiation and students who visit night/day club were found 3.9 times more likely to report early sexual intercourse compared to students who didn't visit. This result in agreement with a study conducted in Addis Ababa that reported students who attend night/day club were 4 times more likely to engaged in early sexual activity than who didn't watch (12). The present result slightly lower than a study in East Ethiopia Jigjiga university students which were 5.9 times more likely to engaged in sexual activities among who attend night club (42). This difference explains by, University student are far from family control night club will be suitable for sex negotiation and practice.

7. Strength and limitation of the study

7.1 Strength

- The study incorporate both private and government preparatory school student

7.2 Limitation

- The topics has social desirability due to this under reporting of their actual experience can't be ruled out and under prevalence will be reported
- This study was based on cross-sectional data, which implies that the direction of causal relationships cannot always be determined
- Parent behaviors on their child not reported from themselves. Student self-report on perceived parenting behaviors make the report not inclusive.
- The study excluded married student from study, this may under the prevalence report

.

8. Conclusion

In conclusion, this study has revealed that some factors associated with early sexual initiation among preparatory students in Addis Ababa. The result showed high prevalence of early sex initiation among preparatory student. Discusses on Rh issues with family, Does Parents knows where student passed free time, Does parents know their child friends were significantly associated with early sexual initiation. Similarly Exposure to pornographic material alcohol, Night/ Day party were found to be significantly associated with early sexual initiation in multivariable analysis with P-value < 0.05.

Parent – child discussion on reproductive issues was the strongest predictor of early sexual initiation following alcohol use among preparatory student in Addis Ababa. Parent supervision on their child about what is going on out of school time also has positive association with the dependent variables. But the positive association between parent close supervision and early sex initiation may have the message to recall the proverbial “closing the doors after the animals have left”. That mean parent stated their control after their child had started sex debut But, since we rely on student self-report data on perceived parenting supervision, findings should not be interpreted as conclusive evidence. This finding should enrich through a research which triangulate the data from parent and student.

9. Recommendation

At School level

- Enforce the Medias how to alcohol advertisement will be conducted without stimulating young generation by education bureau
- Organize celebrates/carnivals in school in periodical time by school. This can give a chance for student to refresh and express them. This minimized the frequency and need of attending nigh/day club and using alcohol.
- Increase the students' awareness about the impact of early sexual initiation through formal and informal education and students clubs by schools

At policy maker level

- This day children exposed to uncensored information which is beyond the control of parents or guardians. Therefore government should work on censoring pornographic web sites not to access by young generation by Ministry of information

At Researcher level

- Data triangulation from parent reporting and student reporting should be used in future research to overcome biases resulting from single report data collection and also needs to be clarified through combinations of qualitative and quantitative research.

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Annexes 3: Research information

Good Morning/Afternoon, My name is _____. I am a trained data collection facilitator for the research, in title “Assessment of factories associated with early sex initiation in Addis Ababa “. This is being conducted by Aklilu Negash who is a Master of public health in Filed Epidemiology student in St Paul’s Hospital Millennium Medical Collage. I am going to give a questionnaire which contains some very personal questions that some people find it difficult to answer. Your responses are completely confidential. You are not expected write to your name on these questionnaires. You don’t have to answer any question that you do not want to answer, and you may end to participate in the study any time you want. However your honest response to this questions will help us to better understand the magnitude and associated factor of early sexual initiation in preparatory student. We would greatly appreciate your participation in filling this questionnaire. It will take about 15-20 minutes and there is no benefit or payment that you get for your participation in this study. But your honest &genuine response to each question will play a major role in the attainment of the objective of the study. You can leave any questions unanswered or withdraw from responding for any reasons you may not need to mention. Filling questioner will start when you express your willingness only and participation is totally based on voluntarily.

We thank you in advance

Annexes 4: Consent form

I have read and understand the information provided to me. Therefore, my signature below indicates that I have decided to participate in the study voluntarily.

Subject's Name _____

Subject's Signature: _____ Date: _____

Investigator's/data collector Signature: _____ Date: _____

If you have any question you can contact the principal investigator at any time by using the following address:

Name of the Principal Investigator (PI): Aklilu Negash

Mobile Phone number: 0911635589, E-mail akliluph036@gmail.com

Annexes 5: English version questionnaires

Code _____

SECTION 1: Demographic characteristics			
NO	Questions	Alternative responses	Skip
01	Ownership type of your school	1. private 2. Governmental	
02	Age (how old are you?)	_____year	
03	Sex (observed sex)	1. Male 2. Female	
04	Does your mother have jobs currently?	1. Yes 2. No	
05	Does your father have jobs currently	1. Yes 2. No	
06	Education level of your mother	1. Illiterate 2. Primary (1-8) 3. Secondary 4. College diploma 5. University degree	
07	Educational level of your father	1. Illiterate 2. Primary (1-8) 3. Secondary 4. College diploma 5. University degree	
08	What is your perceived school performance	1. Excellent 2. Very good 3. Good 4. poor	

Section 2

Living Arrangement and family condition			
NO	Questions	Alternative responses	Skip to
09	Does your both parent living together	1. Yes 2. No	
10	With whom you are living	1. Father 2. Mother 3. Both(father and Mother) 4. Relatives 5. Rental house and alone 6. Other	
11	What is your perceived living standard of your village	1. Rich 2. Medium 3. Poor	

12	What is your perceived wealth status of your family?	1. Highest 2. Medium 3. Lower 4. Very low	
13	Do you provide pocket money from your family?	1. Yes 2. No	

Section 3

Peer pressure and attitude of youth towards sexual debut			
No	Questions	Alternative responses	Skip to
14	Have you ever encountered pressure from your friends to have sexual intercourse?	1. Yes 2. No	
15	How many of your friends who are not married have had sexual intercourse?	1. None of them 2. Most of them 3. All of them 4. Don't know	
16	Having sex while I'm a teenager would just be doing what everybody else is doing.	1. Strongly disagree 2. Disagree 3. Not sure 4. Agree 5. Strongly agree	

Section 4

Section 4: parents- child communication on sexual issues			
No	Questions	Alternative responses	Skip
17	What is your perceived level of parent monitoring about you	1. Highly 2. Moderate 3. Low	
18	Have you ever discussed with Your parents about SRH?	1. Yes 2. No	
19	Does your parent knows where you pass your free time	1. Yes 2. No	
20	Does your parent to know who are your fiends	1. Yes 2. No	

Section 5:

Viewing Pornographic Materials. Substance and alcohol			
No	Questions	Alternative responses	Skip
21	Have you ever viewed/read/see Pornographic material?	1. Yes 2. No	
22	What substance s have you used? (multiple responses)	1. Chat 2. Hashish 3. Cigarate 4. Other..... 5. I did not use any	
23	Have you ever drunk Alcoholic beverages like (woine, Beer, and Arke .Other) in your life?	1. Yes 2. No	
24	Did you attend day or night club	1. Yes 2. No	

Section 6: About Student's sexual behavior

No	Questions	Alternative responses	Skip to
25	Have you ever had sexual intercourse?	1. Yes 2. No 	35
26	How old were you when you had sexual intercourse for the very first time?	Age: _____ years	
27	How old your first sex partner	1. Younger than me 2. Equal to me 3. Older than me	
28	At the time you had first sexual Intercourse, what was your relationship with your partner?	1. Fiancé 2. Girlfriend/Boyfriend 3. Casual person 4. Class mate 5. Relatives 6. Others specify.....	
29	What are the factors that encouraged you for the first sex? (you can answer more than one)	1. Forced sex/rape 2. Marriage 3. For money/ to support myself and my family 4. Curiosity 5. just for love 6. peer influence 7. I wanted to/ because of my age 8. cheated/ False premises 9. After sex Films 10. I have drunk alcohol 11. Getting gifts 12. because my friends have sex partner 13. Other reasons.....	
30	At the time you had first sexual intercourse; did you or your partner use any contraceptive method?	1. Yes 2. No 3. Don't remember	
31	How often you use condom during sex	1. Always 2. Sometimes 3. Never at all	
32	Have you ever tried practicing sex after What you have seen from movies?	1. Yes 2. No	
33	Have you ever practiced sexual intercourse after using a substance?	1. Yes 2. No	
34	Did you have sex when you are drinking Alcohol?	1. Yes 2. No	
35	Are there reasons why you have not chosen to have sexual intercourse?	1. I am not emotionally ready for it 2. I don't want the risk of pregnancy 3. I haven't met anyone I want to do it with 4. Fear of disease 5. My religious values are against it 6. My parent's values are against it 7. Am not old enough 8. School first 9. Others.....	

36	Did you use condom on your last sex	1. Yes 2. No 3. Not remember	
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Annexes 7: Amharic version Consent form

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Annexes 8: Amharic version research questionnaire

የተማሪዎች የስነ ተዋልዱ ጤና ግንዛቤ የዳሰሳ መጠይቅ
በቅድሚያ ስለ ትብብርሽ/ህ በጣም እናመሰግናለን

□□□ □□□□ አጠቃላይ የዴሞግራፊክ መረጃ መጠይቅ

ተ.ቁ	ጥያቄ	ምርጫ	
01	የምትማርበት ትምህርት ቤት የግል ወይስ የመንግስት ነው	1. የግል 2. የመንግስት	
02	ዕድሜህ/ሽ ስንት ነው	-----ዓመት	
03	ጾታ	3. ወንድ 4. ሴት	
04	ወላጅ እናትህ/ሽ ስራ አላቸው	1. አዎ 2. የለም	
05	ወላጅ አባትህ/ሽ ስራ አላቸው	1. አዎ 2. የለም	
06	የወላጅ እናትሽ የትምህርት ደረጃ	1. ያልተማሩ 2. የመጀመሪያ ደረጃ 3. ሁለተኛ 4. ኮሌጅ ዲፕሎማ 5. ዩኒቨርሲቲ	
07	የወላጅ አባትህ/ሽ የትምህርት ደረጃ	1. ያልተማሩ 2. የመጀመሪያ ደረጃ 3. ሁለተኛ 4. ኮሌጅ ዲፕሎማ 5. ዩኒቨርሲቲ	
08	የትምህትህ/ሽ አፈጻጸም(ውጤት) ባንት/ቼ መመዘኛ	1. እጅግ በጣም ጥሩ 2. በጣም ጥሩ 3. ጥሩ 4. ደካማ	

ክፍል ሁለት: የአኗኗርና የቤተሰብ ሁኔታ የሚዳስስ መጠይቅ

ተ.ቁ	ጥያቄ	ምርጫ	
09	እናት ና አባትህ/ሽ አንድ ላይ ነው የሚኖሩት	1. አዎ 2. የለም ተለያይተዋል	
10	ከ ማን ጋር ነው የምትኖረው/የምትኖረው	1. ከአባት 2. ከእናት 3. ከአባትና ከእናት 4. ከዘመድ 5. ለብቻዬ በክራይ ቤት 6. ሌላ.....	
11	የምትኖርበት/የምትኖረበት አካባቢ የኑሮ ደረጃ በአንተ/በአንቺ ግምት	1. በኑሮ ሀብታም ስፈር 2. በኑሮ መካከለኛ ስፈር 3. በኑሮ ዝቅተኛ ስፈር	
12	የቤተሰባቹ የኖሮ ደረጃ ባንተ/ባንቺ ግምት	1. ከፍተኛ 2. መካከለኛ 3. ዝቅተኛ 4. በጣም ዝቅተኛ	

13	ከ ወላጆችህ/ቼሽ የኪስ ገንዘብ ይሰጥህል/ይሰጥሻል	1. አዎ 2. የለም	
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ክፍል 3 :የጓደኛ ተጽህኖ በተመለከተ

ተ.ቁ	ጥያቄ	ምርጫ	
14	የግብረሰጋ ግንኙነት እንድታደርግ/እንድታደርገኪ ከጓደኞችህ/ሽ ግፊት /ተፅዕኖ/ ወይም ማበረታታህ አጋጥሞሻል/አጋጥሞአል?	1. አዎ 2. የለም	
15	ከጓደኞችህ/ሽ ውስጥ ምን ያህሉ ክጋብቻ በፊት ግብረሰጋ ግንኙነት አድርገዋል?	1. ማንም የለም 2. አብዛኛዎቹ 3. ሁሉም 4. አላውቅም	
16	ተማሪዎች በ አፍላ ወጣትነት ወቅት ግብረሰጋ ግንኙነት ማደረጋቸው ማንኛውም ሰው የሚያደርገው ስለሆነ እንደ ችግር መቆጠር የለበትም	1. በጣም አልስማማም 2. አልስማማም 3. እርግጠኛ አይደለሁም 4. እስማማለሁ 5. በጣም እስማማለሁ	

ክፍል አራት: በ ስነ ተዋልዶ ጤና ዙሪያ ተማሪና ቤተሰብ የሚያደርጉት ወይይት በተመለከተ

ተ.ቁ	ጥያቄ	ምርጫ	
17	ወላጆችህ/ችሽ ባአንተ/ባአንቺ ላይ የሚያደርጉት ቁጥጥር መጠን ባአንተ/በአንቺ ግምት	1. ከፍተኛ 2. መካከለኛ 3. ዝቅተኛ	
18	ከቤተሰብህ/ሽ ጋር ስለ ስነ ጾታና ስነ ተዋልዶ(ስለ የወር አበባ፣ስለ ወሲብ፣ስለ አልተፈለገ እርግዝና ና የመሳሰሉት ተወያይተህ/ሽ ታውቃለህ/ቂአነሽ	1. አዎ 2. የለም	
19	ወላጆችህ/ወላጆቹስ በዕረፍት ጊዜህ/ሽ የት እንደምታሳልፍ/ፊ ያውቃሉ/ይከታተላሉ	1. አዎ 2. የለም	
20	ወላጆችህ/ወላጆቹስ ጓደኞችህ/ጓደኞችሽ እነማን እንደሆኑ ያውቃሉ	1. አዎ 2. የለም	

ክፍል አምስት ወሲባዊ ይዘት ላለቸው የመገናኛው ጤቶች (ጋዜጦች፣ ፊልሞች፣ መፅሐፍት፣ ሽራዊቶችን ይመለከታል)

ተ.ቁ	ጥያቄ	ምርጫ	
21	ወሲብ ቀስቃሽ የሆኑ የመገናኛው ጤቶችን አይተህ/ሽ ታውቃለህ/ቂአለሽ ?	1. አዎ 2. አይቺ አላቅም	
22	የትኛውን ሱስ የሚያስይዙ ነገሮችን ተጠቅመክ/ተጠቅመሽ ታውቃለህ/ታውቂለሽ? (ከአንድ በላይ መልስ ይቻላል)	1. ጫት 2. ሽሻ 3. ሲጋራ 4. ሌላ ካለ 5. ምንም ተጠቅሜ አላውቅም	

23	የአልኮል አይነቶችን እንደ (ወይን፣ቢራ/ድራፍት፣ጠላ እና አረቄ) የመሳሰሉትን በህይወት ዘመንህ/ሽ ጠጥተህ/ሽ ታውቃለህ/ቂአለሽ?	1. አዎ 2. የለም ጠጥቼ አላቅም	
24	የቀን ወይም የማታ ክለብ ሄደህ/ሄደሽ ትዝናናለህ/ትዝናናለሽ	1. አዎ 2. የለም ሄጅ አላቅም	

ክፍል ስድስት :-የተማሪዎች ስነ ተዋልዶ ባህሪ □□□□□ መጠይቅ

ተ.ቁ	ጥያቄ	ምርጫ	ዝላል
25	የግብረ ስጋ ግንኙነት አድርገህ/ሽ ታውቃለህ/ቂአለሽ	1. አዎ 2. የለም አድርጌ አላውቅም →	35
26	ለመጀመሪያ ጊዜ ግብረ ስጋ ግንኙነት ስታደርግ/ጊ ስንት አመትህ/ሽ ነበር?	ዓመት	
27	ለመጀመሪያ ጊዜ ግብረ ስጋ ግንኙነት የተገናኘህው/የተገናኘሽው ሰው ዕድሜ	1. ከኔ እድሜ ያንሳል 2. በእድሜ እኩል ነን 3. ከኔ እድሜ ይበልጣል	
28	የመጀመሪያ ግብረ ስጋ ግንኙነት ከፈጸማቸው ሰው ጋር ግንኙነታችሁ ምን ነበረ?	1. እጮኛ 2. ጓደኛ 3. ባጋጣሚ የተዋወቅነው ሰው 4. የክፍል ጓደኛ 5. ዘመድ 6. ሌላ ካለ.....	
29	በመጀመሪያ ጊዜ ግብረ ስጋ ግንኙነት እንድታደርግ/ጊ ምክንያት የሆነህ/ሽ ምንድን ነው?	1. ተደፍራ/ተገድጀ 2. ጋብቻ 3. ገንዘብ ለማግኘት 4. ለማወቅ/ለመሞከር ስለፈለኩኝ 5. ለ ፍቅር ብዬ 6. ፍቅረኛዬ ስለ ገፋፋኝ/ችኝ 7. እድሜዬ ስለደረሰ ፈልጌ 8. ተሽውጀ/ተታልዬ 9. በማያቸውፊልሞችተገፋፍቼ 10. አልኮል ወስጄ ስለነበር 11. ስጦታ ስለተሰጠኝ 12. ጓደኞቼ ስለአደረጉ እኔም ማደረግ ስለፈለኩኝ 13. ሌላ ካለ ይገለጽ.....	
30	ግብረ ስጋ ግንኙነት ወቅት ፍቅረኛህ/ፍቅረኛሽ ወይም አንተ/አንቺ ወሊድ መቆጣጠሪያ ተጠቅማችሁ ነበር?	1. አዎ ተጠቅመናል 2. አልተጠቀምን	
31	ግብረ ስጋ ግንኙነት ስታደርግ ወይም ስተደርጊ ኮንዶም የመጠቀም ልምድህ/ልምድሽ	1. ሁሌ 2. አልፎአልፎ 3. አልጠቀምም	
32	ወሲባዊ ይዘት ያላቸውን የመገናኛ ውጤቶች ከተመለከትክ/ሽ በኋላ በተግባር ፈፅመሽው/ሽው ታውቃለህ/ታውቂለሽ?	1. አዎ 2. አልፈፀምኩም	

33	ሺሻ/ዕጽ/ጫት ከተጠቀምክ/ ከተጠቀምሽ በኋላ በዚህ የተነሳ የግብረሰጋ ግንኙነት አድርገህ/አድረገሽ ታውቃለህ/ታውቄለሽ?	1. አዎ 2. የለም	
34	አልኮል ከጠጣህ/ከጠጣሽ በኋላ በዚህ ምክኒያት ግብረ ሰጋ ግንኙነት አድርገህ/አድረገሽ ታውቃለህ/ታውቄለሽ?	1. አዎ 2. አድርጌ አላውቅም	
35	ለምን ግብረሰጋ ግንኙነት እንዳላደረግህ/ሽ ልትገልጽልኝ/ጨልኝ ትችላለህ/ዩ አለሽ ?	1. አይምርዬን አላዘጋጀሁትም 2. እርግዝና መከሰትን ስለምፈራ 3. የምፈልገውን ሰው ስላላገኝ 4. በሽታ ስለምፈራ 5. ሃይማኖቴ ስለማይፈቅድ 6. በቤተሰብ ቁጥጥር ስለአለ 7. ዕድሜዬ ገና ስለሆነ 8. ለትምህርቴ ቅዳሜያ ስለመሰጥ 9. ሌላ ካለ ግለጽ.....	
36	በመጨረሻው የግብር ስጋ ግንኙነት ወቅት ከንደም ተጠቅመላል/ተጠቅመሻል	1. አዎ ተጠቅሟለሁ 2. አልተጠቀምኩም 3. ግብር ስጋ ግንኙነት አድረጌ አላቅም	

