Journal of Neonatal and Pediatric Medicine

Tadesse, et al., Neonat Pediatr Med 2018, 4:1
DOI: 10.4172/2572-4983.1000146

Research Article Open Access

Assessment of Neonatal Mortality in Women Who Gave Birth Recently: A Community Based Cross Sectional Study in Lume District of Oromia Region, Eastern Ethiopia

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Received date: Oct 23, 2017; **Accepted date**: Jan 02, 2018; **Published date**: Jan 09, 2018

Abstract

Introduction: Childhood mortality often used as a specific health indicator where child health programs were given low attention; especially neonatal health lacks adequate information in the study setup. This study aimed to assess neonatal mortality and factors affecting health care utilization.

Methods: A cross sectional study design was employed in Lume District using Multistage sampling technique. Five rural kebele (sub unit of administration) were selected using simple random sampling and systematic random sampling technique to select study population. Structured questionnaire used to collect data and analyzed by SPSS version 20.

Result: Nineteen neonatal death per one thousand live birth happened. Mothers who live in urban were two times sought health institution for delivery than rural mothers [AOR=1.9, 95% CI: (1.1, 4.0)]. Merchant mothers were three times more likely to seek professional help than daily laborer [AOR=3.0, 95% CI: (1.1, 14.5). Mothers who road was accessible were 2.8 times more likely to seek health institution for their neonate than non-road accessible mother [AOR=2.8, 95% CI: (1.2, 6.4). Neonatal sickness and neonatal death were negatively associated with mothers seeking health institution [AOR=0.02, 95% CI: (0.1, .02) and [AOR=0.07, 95% CI: (.01, .8) respectively.

Conclusion and recommendation: In this study it is learnt that neonatal mortality is low and institutional delivery was high. Road accessibility, residence, occupation of the mother, neonatal sickness, neonatal death and postnatal care were significantly associated with utilization of mother's modern health institution for last delivery.

Keywords: Antenatal care; Neonatal mortality; Institutional delivery; Prenatal care; Ethiopia

Abbreviation

ANC: Ante Natal Care; AOR: Adjusted Odds Ratio; COR: Crude Odds Ratio; CSA: Central Statistical Agency; EDHS: Ethiopian Demographic Health Survey; PNC: Prenatal care. MCH: Maternal and Child Health; WHO: World Health Organization

Introduction

Neonatal mortality is the death of live-born baby within 28 completed days of birth. The neonatal period carries a great risk of mortality [1]. Childhood mortality is often used as broad indicator of the social development or a specific indicator of health conditions of a country. However, child health programs were given low attention; especially neonatal health [1-3]. High-income countries have low neonatal mortality because they have high priority on neonatal health risk both in terms of mortality and morbidity. It has not been feasible to give these health issues the same priority in developing countries [4]. Child survival programs in developing countries are primarily focused on diseases like pneumonia, malaria, diarrhea and vaccine preventable diseases, especially those affecting children over one month of age. Similarly, motherhood programs have tended to focus on the health issues directly related to mothers, leaving neonatal issues un-addressed [5].

Neonatal mortality requires specific consideration in terms of public health programs and policies on a global scale. As the epidemiology, cause of death distribution and health intervention in neonates and older children are different, a specific approach primarily focused on managing neonates health risk should be undertaken to respond to neonatal mortality [6]. Neonatal mortalities may be directly linked to poor maternal health, inadequate care during pregnancy or delivery, poor hygiene and inappropriate management of complication during pregnancy, delivery and first critical hour after birth and lack of newborn care. These factors are partly determined by the status of women in a society, their nutritional status, early childbearing, parity, closely spaced pregnancies and harmful cultural practices during pregnancy and delivery [7]. Globally each year over 4 million neonates died within 28 days of birth. Every minute 20 children under 5 die, leading to 8 million deaths before they reach their fifth birth day due to the conditions which could be either avoided or treated [8-10]. Neonatal mortality accounts for two thirds of deaths of infants, and nearly two fifths of all deaths in under-five children [6]. Six countries (including Ethiopia) account for 50% of worldwide deaths in under five children [11].

Ethiopian demographic health survey 2011 shows that the neonatal mortality rate is 37 deaths per 1,000 live births. The achievement of Millennium Development Goals (MDGs) 4 and 5, which are Concerned with reduction of child and maternal mortality respectively have stagnated despite many efforts to achieve the goals [2].

In Oromia regional state neonatal mortality is 40% which was almost similar to national mortality rate; this figure indicates there was high Mortality in the region. And also there was no any scientific documentation of the magnitude of neonatal mortality and associated factor in the study area. Considering this, the study intended to determine magnitude of neonatal mortality and associated factors, and level of service utilization to deal with the problem of neonatal morbidity in the study area.

Methods and Materials

Study area

The study was conducted in Lume District of East Shewa Zone in randomly selected Kebeles (sub-administrative unit) of the District found in the Great Rift Valley of Ethiopia. The total population profile of the district estimated about 107,080 from the projection of Ethiopian population and Housing Census 2007 [12]. From this women in child bearing age estimated to be 21,724 and expected deliveries estimated to 3,406 mothers in the study year.

Study design

A community based cross sectional study design was carried out from February to April, 2016 in randomly selected Kebeles of the study area.

Population and inclusion criteria

Source of population was mothers within childbearing age (15-49) living in the randomly selected kebeles of Lume District, East Shoa Zone out of which randomly selected Mothers, who gave birth within the last 12 months living in the sampled kebeles of Lume District, East Shoa Zone included in the study population.

Exclusion criteria

To maintain the homogeneity of the population in study mothers who did not gave birth in the District in the past one year prior to the survey were excluded. Mothers critically ill, mentally and physically not capable of being interviewed and those newborn died and under 15 days at the time of interview also excluded from the study.

Sample size determination

Sample size was calculated using the formula for a single population proportion by considering a prevalence of 37 neonatal deaths per 1000 from Ethiopian Demographic Health Survey Nationally done in Ethiopia (7), at 3 percent margin of error, 95 percent confidence interval (=05). The calculated sample size was 304. With the addition of 10% for possible non-response rate the final number became 334. Then multistage sampling technique was used to select respondents. First five rural kebeles were selected using simple random sampling and households in the selected kebeles were included by systematic sampling method and then all eligible women were included for the study.

Study variables

Variable of the interest was neonatal mortality while information was gathered on variables including socioeconomic factors, maternal and paternal factors, neonatal factor (sex, birth order, birth weight, and multiple gestations), prenatal (ANC service), delivery and essential newborn care, PNC service, sick neonate treatment.

The study used quantitative methods of extracting pertinent information to attain its objectives by structured questioners. Data collection done by eight grade 10 or 12 completed females, two from each selected kebeles, and two male nurse supervisors from were recruited and trained for two days by the principal investigator about the purpose of the study and on the skill of interviewing the subjects. Lists of mothers, who gave birth within the last 12 months were taken from the selected Kebele health posts and by doing systematic random sampling illegible mothers were identified for the study.

To assure the quality, the research questionnaire were prepared in English version and translated in to local language (Afaan Oromo) and back to English Language by expert professionals to keep its linguistic validation and the questionnaire assessed for its clarity, sequence, consistency and understandability for both interviewers and interviewees and for total time it takes for a single interview. Then after the necessary comments, feedbacks were incorporated in the final tool. And also to control the quality of the study, training was given to all data collectors and supervisors on the research objective and data collection technique.

The collected data was checked by the supervisor daily for completeness, inconsistencies, and cleanness and the principal investigator monitored the overall ac activity of data collection and handling. The information collected by comforting the respondents to the level possible to allow maximum concentration and interest on the study topic and participants were requested kindly to give honest responses during the interview. Any inaccuracy found during the process was corrected immediately.

The study used quantitative data to analyze and discuss the finding. Therefore, the quantitative data collected was entered and analyzed by SPSS version 20 using descriptive statistics after manually checking for completeness, missing, and errors.

The data analyzed from the basic description of outcome to the identification of statistically significant associations. First, the basic descriptive summaries of participant's characteristics and outcome of interest was computed. Accordingly, simple frequencies, measure of central tendencies and measure of dispersions were scrutinized. Second, bivariate analysis and multiple logistic models were used to show the relation. Finally, all explanatory variables that are significantly associated with the outcome variable in the bivariate analysis ($P<0.02$) were entered in to stepwise logistic regression model to identify independent predictor. Confidence interval of 95% was used to see the precision of the study and the level of significance was taken at $\alpha<0.05$.

The study was conducted after getting ethical clearance from Arsi University. Then a letter was secured to East shoa Zonal health bureau to gain support for the study. Then after, East shoa zonal health bureau write to Lume District health office. The objective of the study was explained at each level to obtain permission. Personal (oral) consent was also obtained from study participant after explaining the objective of study. They were also told that participation is voluntarily and all the data will be managed confidentially

Result

Socio-demographic characteristics of study population

From the total of 334 planned sample size, 312 (93.4%) women were interviewed for the survey; age at last birth of women show that, 68 (22%) were less than the age of 20 years, 188 (60%) between the age of 20 and 34and the remaining 56 (18%) were between the age of 35 and 49 with mean age of 25.95.

Variables		Frequency	Percent
Age at last birth	<20 y	68	22%
	20-34	188	60%
	>35	56	18%
Marital status	Married	309	99%
	Single	3	1%
Religion	Orthodox	264	85%
	Muslim	22	7%
	Protestant	23	7%
	Other	3	1%
Ethnic group	Oromo	248	79%
	Amhara	39	12%
	Other	25	8%
Women's education	Illiterate	73	23%
	Read and write	17	5%
	primary education (1-8)	213	68%
Father's education	Secondary education and above	9	3%
	Illiterate	52	17%
	Read and write	10	3%
	Primary (1-8)	236	76%
	Secondary and above	14	4%
Women's Work status	Employee	13	4%
	Merchant	10	3%
	Student	7	3%
	Housewife	172	55%
	Daily laborer	110	35%
Monthly income	Yes	63	20.20%
	No	249	79.80%
Place of residence	Urban	168	54%
	Rural	144	46%

Table 1: Selected Socio-demographic characteristics of respondents, Mojo, 2016.

Concerning marital status, 309 (99%) of the women were currently married and only 3 (1%) of women were single. With regard to religion 264 (85%) were Orthodox Christian while 22 (7%) and 23 (7%) were Muslims and protestant, respectively and the rest 3 (1.4%) were others.

The majority 248 (79%) belong to the Oromo ethnic group followed by Amhara 39 (12%). Among the interviewed mothers 213 (68%) have primary education and 9 (3%) were with secondary education and the rest 73 (23%) were with no formal education. By occupation 172 (55%) were housewife 110 (35%) were daily laborer, 10 (3%) are merchant and 13 (4%) are employee. With husband's education of the respondents' 236 (76%) were having primary education and 14 (4%) secondary education and the rest 62 (20%) has no education. From the total respondents 168 (54%) reside in urban and the rest is in rural 144 (46%) (Table 1).

Neonatal mortality, obstetric history and ANC experience of the respondents

From one thousand live births nineteen death of neonate was occurred in the study area (19/1000). For 92 (29%) mothers their first child, and 204 (65%) of them have 2 to 4 children and 16 (5%) have ≥5 children. Regarding the prenatal service utilization of respondents 309 (99%) have attended at least once ANC visit for the last pregnancy. Majority of women 205 (66%) visits the service 1-3 times and the rest visits 4 times and above through out there ANC visits 107 (34%) which similar to WHO recommendation. From the total women 167 (54%) starts ANC visit service at gestational age of 5-7 month and 137 (44%) <4 month (Table 2).

Variable		Frequency	Percent
Neonatal mortality	Yes	6	1.9
	No	306	98.1
	1	92	29%
Total No. of births	2-4	204	65%
	≥5	16	5%
Spacing for recent birth	<2 y	27	9%
	Missed	92	29%
	≥2 y	193	62%
At least one ANC visit	Yes	309	99%
	No	3	1%
Number of visits	1-3	205	66%
	4	104	33%
	5 and above	3	1%
Time of 1st ANC visit	<4 month	137	44%
	5-7 month	167	54%
	8 month and above	4	1%
	I don't know	4	1%
Age at last birth	<20 y	68	22%

	20-34	188	60%
	≥35	56	18%
Blood pressure measured (n-309)	Yes	303	98%
	No	6	2%
Weight measured	Yes	306	99%
	No	3	1%
TT vaccination	Yes	308	98.8
	No	4	1.2
Folic folate provided	Yes	182	58.3
	No	130	41.7
PNC 1	Yes	265	84.9
	No	47	15.1
PNC2	Yes	98	31.4
	No	214	68.8

Table 2: Neonatal mortality, Obstetric History and ANC& PNC Experience of the respondents, Mojo 2016.

ANC services received can range from measuring weight and blood pressure to provision of immunization, Iron tablet and family health counseling including danger signs for the mother and for their newborn. Three hundred six (99%) and 303 (98%) of women had received weight and blood pressure measurement, respectively. Ninety nine percent of women's comes for ANC visit were received TT vaccination and 182 (58.3%) were provided Iron folate during their visit.

Regarding to PNC majority of the respondents 85% of women, use PNC1 and 31.4% of women use PNC 2 and 3. Fifty two percent 52% of women use both PNC1 and PNC2.

The median age at last birth was 26 years, and 68 (22%) of women gave birth below the age of 20 years, 188 (60%) between the age of 20-34 years and the rest 56 (18%) at the age of ≥35 years. Moreover, delivery practice of respondents during the last delivery prior to the survey were 312 interviewed 262 (84%) had institutional delivery while 50 (16%) were home delivery.

Knowledge and practice of respondents on advantage of MCH services during the last deliver

Among the respondents only 156 (50%) were knowledgeable about the advantage of MCH services. More than half of the women who used the MCH services were knowledgeable about its advantage. One hundred fifty (37%) Respondents agree that any pregnant women could face pregnancy and delivery complications while only 94 (30%) of respondents know pregnancy related danger signs. Regarding the Knowledge of neonatal illness 34 (11%) of women expressed having some knowledge of newborn illness (Table 3).

Variables		Frequency	Percent
Knowledge of danger signs	Yes	94	30%
	No	218	70%
Sever head ach	Yes	49	15.70%
	No	263	84.30%
High blood pressure	No	1	0.30%
	Yes	311	99.70%
Blurring of vision	No	84	26.90%
	Yes	228	73.10%
Edema of face & hand	No	24	7.70%
	Yes	288	92.30%
Knowledge of childhood illness	Yes	34	11%
	No	278	89%
Knowledge of MCH services	Yes	156	50%
	No	156	50%
Knowledge of birth complication	Yes	115	37%
	No	197	63%
Prepared for food	Yes	310	99.40%
	No	2	0.60%
Prepared for money	Yes	243	77.90%
	No	69	22.10%
Plan for place of delivery	Yes	166	53.20%
	No	146	46.80%

Table 3: Knowledge and practice of respondents on advantage of MCH services during the last delivery, Mojo, Ethiopia, 2016.

Factors influencing utilization of maternal and child health services for delivery for last birth

Binary logistic regression analysis was done to see the associations between socio-demographic characteristics, Obstetric History and ANC & PNC Experience of mothers with utilization of mother's modern health institution for delivery. The results showed that residence, Road accessibility, occupation of the mother, neonatal sickness, neonatal death and postnatal care one by health professional were significantly associated with utilization of mother's modern health institution for delivery (Table 4).

Variables	Delivery place	COR 95% CI		AOR 95% CI
Residence				
Urban	154	13	3.6 (1.7, 7.3)	1.9 (1.1, 4.0)*
Rural	111	31	1	1
Occupation				
Employee	11	1	0.7 (.080, 5.60)	0.65 (.07, 5.9)

Merchant	6	4	4.9 (1.2, 19.7)	3.0 (1.1-14.5)*
Housewife	142	29	1.5 (0.7, 3.0)	1.5 (0.7, 3.2)
Daily laborer	96	13	1	1
Road accessibility				
Yes	235	34	4.9 (1.9, 8.6)	2.8 (1.2, 6.4)*
No	25	15	1	1
Marital status				
Married	258	48	0.37 (.03, 4.2)	0.4 (.02, 4.2)
Single	2	1	1	1
Educational status of mother				
Illiterate	57	16	0.8 (0.1, 4.6)	0.08 (0.04, 1.6)
Read and write	13	4	0 .9 (.1, 6.5)	0 .05 (.02, 1.3)
Primary education	184	27	0 .4 (.08, 2.3)	0.06 (.03, 1.1)
Secondary and above	6	2	1	1
Neonatal sickness			0.22 (0.1, .046)	0.20 (0.1, .023)*
Yes	23	15	1	1
Neonatal death				
Yes	2	4	0.1 (.02,.52)	0.07 (.01, 0.8)*
No	256	47	1	1
PNC1				
Yes	254	4	23 (7, 40)	23.5 (7, 55)*
No	11	40	1	1

Table 4: Factors influencing utilization of maternal and child health services for delivery for last birth, Mojo 2016.

Mothers who live in urban were two times sought health institution for delivery than rural mothers [OR (95% CI)=1.9 (1.1, 4.0)].

Mother occupation was significantly associated with utilization of maternal and child health service. Merchant mothers were three times more likely to seek professional help than daily laborer [OR (95% CI)=3.0 (1.1-14.5).

Road accessibility was positively associated with seeking modern health care. Mothers where in the road accessible was 2.8 times more likely to seek health institution for their neonate than non-road accessible mother [OR (95% CI)=2.8 (1.2, 6.4).

Neonatal sickness and neonatal death were negatively associated with mothers seeking health institution [OR (95% CI)=0.20 (0.1, 0.023) and [OR (95% CI)=0.07 (0.01, 0.8) respectively.

Post natal care given by health professional were significantly associated with health institution OR (95% CI)=23.5 (7,55).

Discussion

One of our objectives of the study is tried to identify prevalence of neonatal mortality in Lume District. This study revealed that from one thousand live births nineteen death of neonate was occurred (19/1000), while the Ethiopian Demographic Health Survey (EDHS) 2011 shows that, the neonatal mortality rate is 37 deaths per 1,000 [2]. This variation could be due to increased pre-natal and facility delivery utilization service in Lume District. Regarding the prenatal service utilization of respondents, in this study, 309 (99%) have attended at least once for the last pregnancy and; 175 (56%) have received ANC services during their visit. While a study done in Metekel Zone, Northwest Ethiopia showed that, from the total 1038 respondents five hundred seventeen (49.8%) of the respondents had at least one antenatal care visit during the pregnancy of their last delivery [12]. Additional study done in Mizan-Aman town, South West Ethiopia showed that, from the total 339 respondents 225 (74%) had ANC follow up at least once for the last pregnancy. This finds shows that women are in Lume District have good prenatal service utilization [13].

On this research finding, 68 (22%) of women gave birth below the age of 20 years, 188 (60%) between the age of 20-34 years and the rest 56 (18%) at the age of ≥35 years. A research done in Swaziland showed that, women aged 35–39 with the proportions of 98.8% attained ANC and Delivered at this age interval. This shows that women's living in Lume District exercise child birth practice early [14].

In this study majority of women 205 (66%) visits the service 1-3 times and 104 (33%) visits 4 times throughout there ANC visits, while a research done in Duna District, Hadya zone showed that, from 245 ANC users 56.8% of women had less than four ANC services and the remained 43.2% of participants only had four or more ANC visits during their last pregnancy, which showed that women's living in Lume District has less ANC service follow up during their pregnancy period [15].

From this research finding, among the respondents only 156 (50%) were knowledgeable about the advantage of MCH services. More than half of the women who used the MCH services were knowledgeable about its advantage. A research done in Kaduna state, in Nigeria reveled that, Among the sample of 647 respondents, 72.6% of men and only 35.9% of women had received formal education about it but knowledge of maternal health was very low. In a three point scale (poor, fair, good), only 3.1% of men and 1.2% of women had good knowledge of maternal health. This shows that Lume District Women's have good knowledge and positive attitude towards MCH service [16].

With regards to the service provided during the ANC follow up period, this study showed that 306 (99%) and 303 (98%) of women had received weight and blood pressure measurement, respectively, similar finding was seen in a research done in Mizan-Aman town, South west Ethiopia showing that 301 (98.4%) and 300 (98.4%) of women received both blood pressure and weight measurement respectively, but additional measures such as laboratory examination was performed and height was measured, danger signs and fetal movement were assessed as mentioned in Mizan-Amantown, South west Ethiopia. This shows that there is limited number of service during ANC service in Lume Town [13].

In case of PNC utilization, in this research 124 (39.4%) had PNC as comparing this result with a research done in Dembecha District, Northwest Ethiopia; Post Natal Care service utilizations was 276 (34.8%) from 788 total respondents; the finding of this research study is higher and it could be due to good ANC follow up of the women's in Lume District [17].

In this study more than half of the respondents interviewed 262 (84%) were having institutional delivery. This result is lower as compared to a research done in in Biharamulo district, Tanzania: which showed that from 598 participants 334 (56%) delivered in a health facility [18]. Additional research done in Kometa Sub-Locality, Mizan-Aman Town, Southwest Ethiopia, showed that nearly two-third of respondents 139 (66.50%) delivered at health facility and nearly one-third of the respondents 70 (33.50%) delivered at home which shows higher result as compared to this study [13]. This could be due to less awareness about use of institutional delivery service in Lume District in additional to socio-cultural difference between these communities.

With regards to obstetric danger signs, in this study one hundred fifty (37%) Respondents agree that any pregnant women could face pregnancy and delivery complications while only 94 (30%) of respondents know pregnancy related danger signs. A research done in Debrheberhan city reveled that, out of the 632 respondents, 374 (75.9%) reported that they had got information about obstetric danger sign during pregnancy while 228 (61%) know the specific obstetric danger signs. this shows that women's in this study has less knowledge about the Danger sign of obstetrics [19].

From this research finding, 49 (15.7%) of the respondents know that severe headache is one of the danger sign of pregnancy, 84 (27%) knows that blurring of vision as one sign, edema of the body 24 (7.7%). A study done in DebrheBerhan city showed that, from the 374 (75.9%) of the respondents who have knowledge on danger sign of pregnancy, 116 (31%) mentioned edema of the body and 104 (27.8%) blurring of vision and persistent headache. This shows that women's living in Lume District have less knowledge in that headache, blurring of vision, and edema of the body as signs of obstetric complication during pregnancy [19].

In case of birth preparedness, in this research finding it is revealed that, 310 (99.4%) have knowledge on preparation of food, 243 (74%) on preparation of money and 166 (53.25) on preparation plan of delivery place. A descriptive research done inMekele Northern Ethiopia; shows that , out of 220 respondents 17 (11%) of the respondents have been practiced or currently practicing in preparing identify birth place and assistance, items needed for safe delivery, transportation plan, and saving money as an element of birth preparedness , respectively. This shows that women's' in Lume District have good knowledge and birth preparation practice [20].

In this study findings it is mentioned that, residence, Road accessibility, occupation of the mother, neonatal sickness, neonatal death and postnatal care were significantly associated with utilization of mother's modern health institution for delivery. A research done in Dodota District in Oromoya region of Ethiopia reveled that, Urban residence, educational level of mothers, pregnancy related health problems and decision made by husbands or relatives showed significant positive association with utilization of institutional delivery services [21], and also another additional research done in GobaDistrict, Ethiopia, showed that As compared to rural residents, urban residents were 3.6 times more likely to deliver on health facility, Anti Natal Care visit during last pregnancy and maternal education level had positive significant associations with institutional delivery service utilization [22]. This shows that urban residence and occupation of the mother has positive significant association with utilization of institutional delivery service.

Conclusion

In this study Neonate morality rate is found to be less that is 19 deaths per 1000 live birth as compared to EDHS 2011 of Ethiopia. Road accessibility, residence, occupation of the mother, neonatal sickness, neonatal death and postnatal care were significantly associated with utilization of mother's modern health institution for last delivery [23].

Less ANC follow-up visit were (33%) observed in the study area and this was far to meet requirement of WHO. With regards to institutional delivery in this finding was (84%) above the National target of 80%. Further, PNC practice among study subjects was high in the first visit but very less in second and third visits.

Recommendation

In this study it is learnt that institutional delivery was high. This could be achieved due to high ANC utilization. Therefore, it is recommended that efforts should be made to sustain ANC utilization in the study area. Not only this but also, additional service should be added at time of their visit and pregnant women's be communicated via telephone or other communication channels in order to decrease drop out cases from the ANC follow up and PNC.

It needs to improve community awareness about the importance of early PNC strengthen referral linkage to HEWs for early PNC home visit services for maternal related health care.

Acknowledgment

Author would like to express their gratitude to Arsi University for financial support. Our special gratitude also goes to study area local administrative health office, health post facility workers for their assistant and cooperation at the time of data collection. Furthermore, we would like to express our deep appreciation towards Arsi Zonal Health Department and Family Guidance Association of Ethiopian (FGAE) for their usual unlimited technical and materials support.

Author Contribution

ST participated in the design of the research project, data entry, analysis, preparation and write up manuscript; LT participated in the analysis of data and AF worked on the manuscript preparation, write up and appraisal. All authors read and approved the final manuscript.

Ethical Approval

This research was approved by Ethical Review Committee of Arsi University. Letter of permission was obtained from counties of East Showa administrative and health department offices. At the end, we obtained permission from five Kebeles (Sub Administrative Units which were site for data collection) administrations offices. In addition, all of the study participants were informed about the purpose of the study and finally their oral consent were obtained before interview. The respondents were notified that they have the right to refuse or terminate at any point of the interview. The information provided by each respondent was kept confidential.

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