

Assessment of Facility Based Maternal and Neonatal Mortality in Western Ethiopia

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Abstract

Background: Maternal and neonatal mortality remain a major problem in developing countries. Facility-based maternal death review is a process to investigate and identify causes mainly clinical and systemic which lead to maternal deaths in the health facilities and to take appropriate corrective measures to prevent future such deaths.

Objective: To assess the prevalence of maternal and neonatal death and identify preventable causes of maternal deaths in selected Hospitals of Wollega Zones.

Methodology: Institutional based cross-sectional study was conducted. Documents and chart reviews were conducted using a standardized checklist. Maternal and neonatal deaths that occurred during 2014-2016 were included. Ethical clearance was obtained from the Institutional Health Research Ethics Review Committee of Wollega University. Data was entered and analyzed using SPSS version 20 statistical packages for windows.

Result: Sixty-nine (69) maternal deaths and 182 neonatal deaths occurred in five hospitals in the last three years from 2014-2016. The most common cause of maternal death was hemorrhage 36 (52.2), sepsis 23 (33.3), delay in health-seeking 20 (29%), and lack of transportation 19 (27.5%). The majority of the deceased were referral cases 54 (78.3%) and Most of them were admitted with complications 51 (73.9%). Majority of the neonatal death happened within 24 hours 100 (54.9). The majority of the deceased newborn were admitted with a diagnosis of prematurity 56 (30.8) followed by sepsis 42 (23.1%). Lack of materials in Neonatal Intensive Care Units was the major cause of neonatal death.

Conclusion and Recommendation: Mothers and newborn were dying of preventable causes like hemorrhage, sepsis, lack of partograph utilization, and lack of facilities in the Neonatal Intensive Care Unit. Therefore, Health professionals should focus on and manage emergencies like hemorrhage, sepsis and should utilize partograph for all laboring mothers as per the guideline, and also they should counsel and promote individual birth plan to reduce delays in seeking health facility. Health facilities should equip the Neonatal Intensive Care Unit with all necessary drugs and materials..

Keywords: Health facility; Maternal mortality; Maternal death review; Neonatal death

Abbreviations/Acronyms: ANC: Antenatal Care; CSA: Central Statistical Agency; EDHS: Ethiopian Demographic Health Survey; ELBW: Extremely Low Birth Weight; FMOH: Federal Ministry of Health; GA: Gestational Age; KMC: Kangaroo Mother Care; IRERC: Institutional Research and Ethical Review Committee; NGT: Naso Gastric Tube; NICU: Neonatal Intensive Care Unit; SPSS: Statistical Package for Social Sciences; VLBW: Very Low Birth Weight; WHO: World Health Organization

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Introduction

Maternal mortality is the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration of pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental causes which are unacceptably high in developing countries including Ethiopia [1,2]. The lifetime risk of maternal death in Ethiopia is 1 in 52 women [2].

Investing in maternal health is a political and social imperative, as well as a cost-effective investment in strong health systems overall. Maternal and neonatal death review is paramount to identify preventable causes of maternal and neonatal death. Maternal death review has two forms, facility-based maternal death review, and community based maternal death review. Facility-based maternal death review is a process to investigate and identify causes mainly clinical and systemic which lead to maternal deaths in the health facilities and to take appropriate corrective measures to prevent future such deaths [1,2].

Maternal and neonatal death review is not for finger-pointing or punishment but to learn from preventable maternal death and improve Obstetric care for the future. Each maternal death has a story to tell and can provide indications on practical ways of addressing its causes and determinants [3].

In Sweden 51 out of 73 maternal deaths were due to suboptimal care. These are delay in consultation or referral 49, appropriate care but too late care 24, miscommunication between providers 11 and limited use of resources 5 [3]. In the study of Eastern India, fifty maternal deaths occurred in tertiary hospitals in one year of which 88% of the deceased women were referred from institutions. Seventy-six percent of deaths caused by direct obstetric causes highly contributed by 30% by hypertensive disorder, 14% by hemorrhage, sepsis 14%, and septic abortion and obstructed labor contributed 8% for maternal death [4].

The major direct causes of the reported deaths were: 22 cases of hemorrhage (38%), 15 cases of anemia (26%), 8 cases of sepsis (14%), 6 cases of eclampsia (10%), 4 cases of obstructed labor (7%), and 2 cases that could not be diagnosed with available information (4%), delay in seeking care, delay in reaching care facility and delay in receiving adequate care contributed for these deaths of mothers [5]. Previous studies indicated that the majority of maternal deaths happened during the postpartum period [6-8], due to the poor quality of obstetric care services [9].

Virtually all (99%) newborn deaths occur in low-and middle-income countries. Every year nearly 41% of all under-five child deaths are among newborn infants, babies in their first 28 days of life. Three-quarters of all newborn deaths occur in the first week of life. It is especially in Africa and South Asia that the least progress in reducing neonatal deaths has been made [2].

Globally complications from prematurity are the leading cause of neonatal death accounting for thirty-five percent of their death. Neonatal infections, intrapartum complications, and congenital malformations are a significant cause of neonatal death by

23%,23%, and 9% respectively [10] in which the median age of death was 3 days [11]. Previous studies revealed that there is neonatal mortality due to lack of eternal feeding, gestational age <28 weeks (very preterm), and APGAR score of <7 at 10 minutes [12-14].

As the study done in the Eastern part of Ethiopia at Kersa Health and Demographic surveillance indicated bacterial sepsis is the leading cause accounting for 31.2% followed by birth asphyxia and perinatal respiratory distress 28.2% and prematurity which is 17.3% [15].

The leading cause of neonatal death was prematurity and its complications which accounted for 59.3% of the deaths and the remaining cause that happened by infection and neurologic diseases [16].

A study done in Gonder University Hospital to assess neonatal mortality revealed 23.1% of neonatal death. Thirty-six percent of these neonatal deaths occurred before the first day of their life. Studies identified that Prematurity, Meningitis, Hemorrhagic diseases, hyaline membrane diseases, and neonatal sepsis were identified causes for these neonatal deaths [17,18]. In the University of Gondar Hospital, a study showed neonatal mortality of 14.3% of which 62.7% of deaths occurred in the first 24 hours of age [19].

Therefore, this study provides information about avoidable factors that contributed to maternal and neonatal mortality and guides actions that need to be taken within the formal health care system and at the intersectoral levels to prevent similar deaths in the future.

Objectives of the study

General objective

- To assess the prevalence of maternal and neonatal death and identify avoidable causes of deaths in selected Hospitals of Wollega Zones, 2017

Specific objectives

- To assess prevalence of maternal and neonatal death in selected Hospitals
- To determine avoidable causes of maternal and neonatal deaths

Methodology

Study area and period

This study was conducted in Wollega Zones, Oromia, and Western Ethiopia. Wollega hosts four Zones; East Wollega zone, West Wollega zone, Horo Guduru zone, and Kelem Wollega zone. East Wollega Zone hosts two hospitals; Nekemte Referral Hospital and Gida Ayana Hospital. Nekemte Referral hospital is located in Nekemte town which is the capital of the zone. Nekemte is 331 km far from the capital of the region i.e. Finfine. West Wollega zone similarly hosts two governmental hospitals; Gimbi hospital and

Nedjo Hospital. Gimbi hospital is found in Gimbi town which is the capital of the zone. Gimbi town is 441 km and 110 km far from Finfine and Nekemte town respectively. Horo Guduru Welega is one of the zones of the Oromia Region in Ethiopia. The seat of the zonal administration cabinet is in Shambu town. Shambu Hospital is located in Shambu town. Kellem Wollega zone hosts one governmental hospital; Dembi Dollo hospital. Dembi Dollo hospital is located in Dembi Dollo town which is the capital of the zone. The town is 642 km far from Finfine and 311 km far from Nekemte. This study was conducted in four public hospitals of Wollega Zones between “November-December, 2017”.

Study design

An institutional based cross-sectional study was conducted to retrospectively collect information on maternal and neonatal deaths that occurred in four hospitals of Wollega Zones during 2014-2016.

Population

Source population: All deceased mothers while giving birth and

all neonatal deaths in government hospitals of Wollega zones, Oromia region, western Ethiopia.

Study population: Cards of deceased mothers and neonate during 2014-2016.

Inclusion criteria

Mothers and newborns were deceased in the institutions while giving birth and after delivery within 42 days in the selected hospitals during 2014-2016.

Exclusion criteria

Those mothers who have died due to incidental causes.

Sample size determination and sampling technique

Sample size determination: All maternal and neonatal deaths that occurred during 2014-2016 were included (Figure 1).

Data collection method

Hospital registers were used to identify the maternal and neonatal

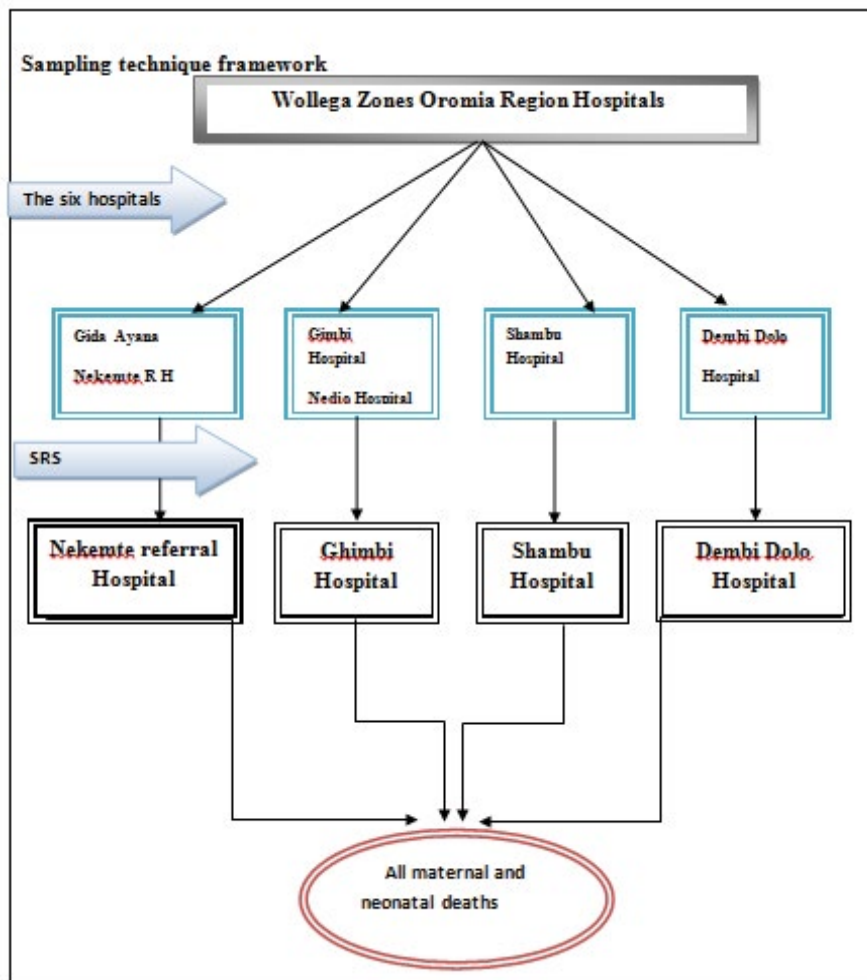


Figure 1 Schematic presentation of the sampling procedure.

Table 1: Characteristics of the deceased women in selected hospitals of Wollega Zones 2017/2018.

S. No.	Characteristics	Category	Frequency	Percentage (%)
1	Condition on admission	Stable and on labor pain	16	23.2
		Admitted with complication	51	73.9
		Brought dead	2	2.9
2	Referred from other institution	Yes	54	78.3
		No	15	21.7
3	Received ANC	Yes	40	58
		No	29	42
4	Number of ANC visit	Once	7	10.1
		Twice	25	36.2
		Three times	7	10.1
		Four times	1	1.4
5	Complication	Previous C/S	8	11.6
		Abnormal presentation/lie	13	18.8
		Hypertensive disorder with proteinuria	10	14.5
		Severe Anemia in pregnancy	6	8.7
		APH	10	14.5
		PPH	11	15.9
		Puerperal sepsis	2	2.9
Ruptured uterus	15	21.7		

Table 2: Obstetric history of deceased women in selected hospitals of Wollega Zones 2017/2018.

S. No.	Characteristics	Category	Frequency	Percentage (%)
1	Partograph used	Yes	27	39.1
		No	42	60.9
2	Mode of delivery	SVD	33	47.8
		Vaginal assisted vacuum	4	5.8
		Caesarian section	32	46.4
3	Outcome of delivery	Live birth	36	52.2
		Stillbirth	33	47.8
3	Puerperium	Uncomplicated	11	15.9
		Complicated	58	84.1
4	Puerperium complicated by	PPH	39	56.5
		Sepsis	21	30.4
		Psychological problem	3	4.3
5	Stages of labor she died in	1 st stage	9	13
		2 nd stage	5	7.2
		3 rd stage	31	44.9
		4 th stage	24	34.8

deaths using the following procedure by trained midwives. All women who died at the age of 15-49 years were identified from the hospital's in-patient registers; deaths were then classified as maternal or not by reviewing the records and, when possible, interviews with health workers who provided care to the deceased were held. Maternal deaths were identified only using the registers; no attempt was made to go through all hospital's patient records to identify maternal deaths. Data was collected by using a standardized information gathering tool from documents/chart review/in institutions. The sources of the information for facility death reviews include referral sheets, medical records. Any death of a woman of reproductive age should trigger a

review of her medical record to assess whether there was any evidence the woman was pregnant or within 42 days of the end of a pregnancy. The investigation should determine the medical or pathophysiologic cause of death as specifically as possible and categorize it as a direct obstetric, indirect obstetric, or non-maternal death. Mechanisms for establishing the medical cause of death was depending on whether the woman was hospitalized or not. The medical cause of death can frequently be established from the medical records. Interviews of facility personnel involved in the care of the woman may provide additional information that can be used to corroborate facts in the facility record.

Table 3: Characteristics of deceased newborn in selected hospitals of Wollega Zones 2017/2018.

S. No.	Characteristics	Category	Frequency	Percentage (%)
1	GA at birth	<32 weeks	11	6
		32-36 weeks	77	42.3
		37-42 weeks	92	50.5
		Above 42 weeks	2	1.1
2	Sex of the new born	Male	100	54.9
		Female	82	45.1
3	Place of delivery	Home	29	15.9
		Health center	87	47.8
		Health post	3	1.6
		Hospital	63	34.6
4	Mode of delivery	SVD	137	75.3
		Caesarean section	19	10.4
		Vacuum assisted	14	7.7
		Forceps assisted	12	6.6
5	Number of fetuses	Singleton	161	88.5
		Twins	19	10.4
		Triplet or more	2	1.1
6	Birth weight of the newborn	<1000 gm	10	5.5
		1000 gm-1500 gm	44	24.2
		<2500 gm	41	22.5
		>=2500 gm-4000 gm	83	45.6
		4000 gm	4	2.2

Data analysis

The analysis of data was performed using the Statistical Package for Social Science (SPSS) Windows 20.0. A descriptive analysis was conducted.

Ethical considerations

Ethical clearance was obtained from the Institutional Health Research Ethics Review Committee (IHRERC) of Wollega University. An official letter of co-operation was written to Zonal Health Bureaus (ZHB) from which the Hospitals were selected. To protect the confidentiality of the information names of participants were not included in the questionnaires. The identification of an informant was only possible through numerical codes.

Result

Maternal death

Facility-based reviews of maternal deaths were conducted for 69 deaths that occurred in five hospitals in the last three years from 2014-2016. Thirty-seven (53.6) deaths were from Nekemte Hospital, 20 (29%) deaths were from Shambu Hospital, 10 (14.5) deaths were from Gimbi Hospital, 2 (2.9%) deaths were from Najo Hospital.

The mean (standard deviation) age at the time of death was 26.35 (5.86). The majority of the deceased were referral cases 54 (78.3%) and 15 (21.7%) were not referral cases. Most of them were admitted with complications 51 (73.9%). The majority of them had visited ANC two times 25 (36.2%) (Table 1).

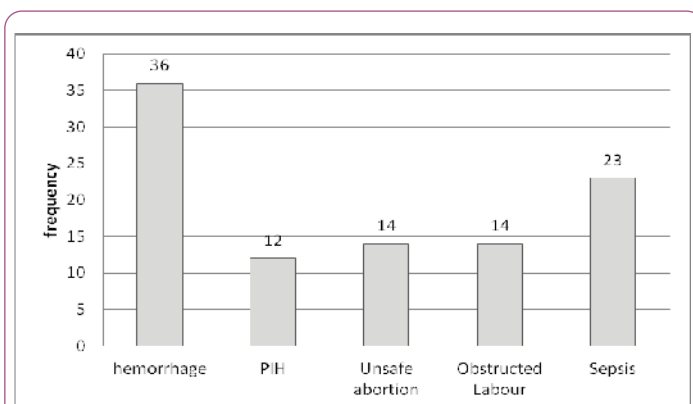


Figure 2 Direct Contributing factors of death, in deceased women in selected hospitals of Wollega Zones 2017.

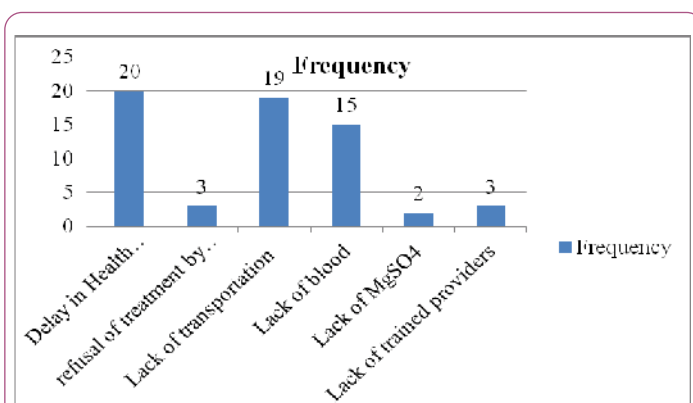


Figure 3 Other causes of maternal deaths among deceased women in selected Hospitals of Wollega Zones 2017/2018.

The majority of deaths happened during the third stage of labor 31 (44.9%). For the majority of them, partograph was not used 42 (60.9%) and 58 (84.1%) of the deaths happened in mothers with complicated puerperium (Table 2).

Contributing factors of death: This study revealed that the most common cause of death was hemorrhage 36 (52.2) followed by sepsis 23 (33.3) (Figure 2).

The other causes of maternal death was a delay in health-seeking 20 (29%) followed by lack of transportation 19 (27.5%) (Figure 3).

Neonatal death

Facility-based reviews of neonatal deaths were conducted for 182 deaths that occurred in four hospitals in the last three years from 2014-2016. 63 (34.6%) deaths were from Nekemte Hospital, 36 (19.8%) deaths were from Shambu Hospital, 39 (21.4%) deaths were from Ghimbi Hospital, 44 (24.2%) deaths were from Nedjo Hospital. The mean (standard deviation) age at the time of death were 2.42 (3.33%) days. The majority of the neonatal death happened within 24 hours 100 (54.9%) followed by within a week 54 (29.7%) and 15 (8.2%), 13 (7.1%) after one week of age, and within one hour respectively. Among the deceased newborn babies, 77 (42.3%) were at GA of 32-36 weeks whereas 87 (47.8%) were those delivered at the health center (Table 3).

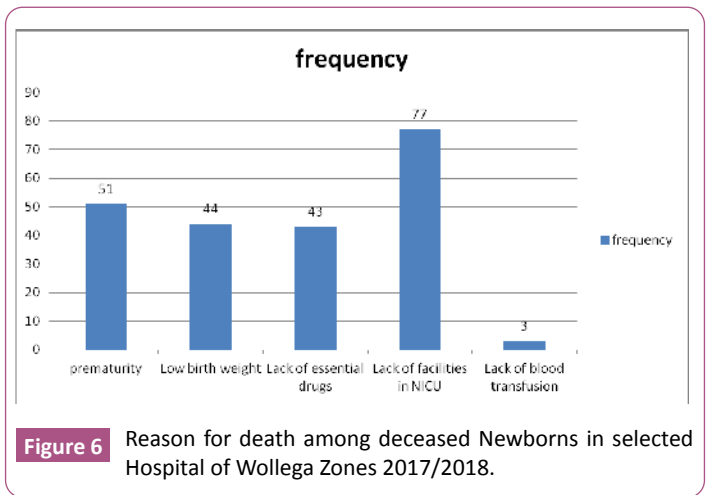


Figure 6 Reason for death among deceased Newborns in selected Hospital of Wollega Zones 2017/2018.

The majority of the deceased newborn were admitted with a diagnosis of prematurity 56 (30.8%) followed by sepsis 42(23.1%) (Figure 4).

The major intervention given for the deceased newborn were antibiotics followed by Oxygen therapy (Figure 5).

The most common cause of death of the newborn was lack of facilities in NICU followed by prematurity (Figure 6).

Discussion

The maternal and neonatal deaths identified in the four hospitals during the three-year study period were probably underestimated because of missing deaths, largely incomplete registration and recording of maternal and neonatal deaths. Thus, this study could be regarded as showing a little about maternal and neonatal deaths occurring in hospital settings. The number of maternal deaths occurring without reaching hospitals could even be greater and very difficult to determine. Access to maternal health services remains poor in many developing countries [5]. Although this study tried to obtain complete information in as many ways as possible, this was not an easy exercise for many reasons. The lack of a standard way of maintaining medical records posed one of the major challenges. It appears that during an emergency, record-keeping is given the least attention, probably because care providers are overwhelmed by the situation and all their attention is on saving the patient rather than taking the records. However, it is important to have a detailed medical record for every patient to provide proper care and follow progress more effectively.

This study indicated that the majority of deceased women were referral cases 54 (78.3%). This is in line with the study done in Sweden and Eastern India where 49% and 88% of deceased women were referred from other Institutions respectively [4,5].

Also, this study revealed that Most of the deceased women were admitted with complications 51 (73.9%) and Most of the deaths occurred in the third stage of labor. This is in line with the study done in Eastern India where 36% of maternal deaths have occurred in the third stage of labor [4].

In this study, the most common cause of death was hemorrhage

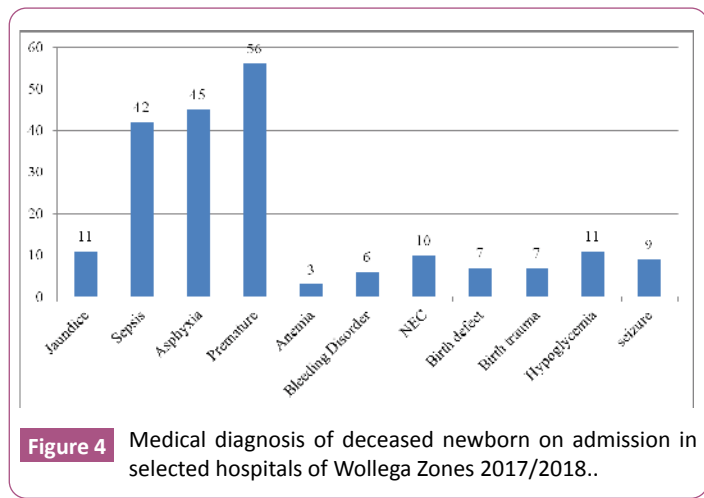


Figure 4 Medical diagnosis of deceased newborn on admission in selected hospitals of Wollega Zones 2017/2018..

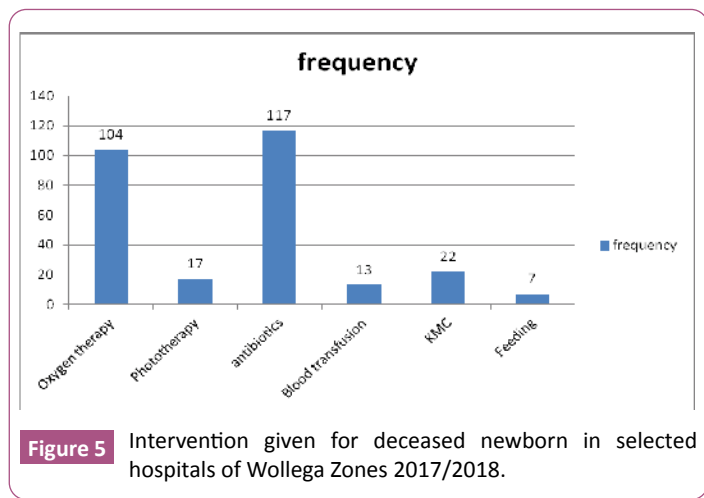


Figure 5 Intervention given for deceased newborn in selected hospitals of Wollega Zones 2017/2018.

36 (52.2%) followed by sepsis 23 (33.3%) which is in line with the study conducted in other parts of Ethiopia Tigray region [13] and with adequate preparation especially by applying appropriate management of the third stage of labor it is possible to avoid death from these. Despite this pregnancy Induced Hypertension was the major cause of maternal mortality in Sweden, which is followed by hemorrhage 30% and 14% respectively. The difference could be because of the difference in lifestyle between the two countries and the Health facility set up [4].

This study revealed that for the majority of deceased women partograph were not used 42 (60.9%) and 58 (84.1%) of the deaths have happened in mothers with complicated puerperium. This study revealed that Delay in seeking care 20 (29%) and lack of transportation 19 (27.5%) were other causes of maternal deaths among deceased women in selected Hospitals. This is in line with the study done in other parts of Ethiopia in the Tigray Region, Eastern India, UNFPA report, and Rwanda [5,13,19,20].

Neonatal mortality remains a major concern in developing countries and complications from prematurity are the leading cause of neonatal death globally accounting for thirty-five percent of neonatal death. Neonatal infections, intrapartum complications, and congenital malformations are significant causes of neonatal death by 23%, 23%, and 9% respectively [21,22]. This study revealed that the majority of the neonatal death has happened within 24 hours. Our study showed thirty-one percent of neonatal deaths were contributed by prematurity which is very high when compared to the study done in Gaborone, Botswana in which the death was 3.4 percent. The discrepancy might be due to high study participants in the latter study [14].

In the Eastern part of Ethiopia at Kersa Health and Demographic Health surveillance among all neonatal deaths reported 82%

happened in their first week which is higher than this study. This might be because more attention was given to neonatal care these days in all involved Hospitals [15].

The study done in 26 NICUs of Chinese Hospitals showed (744) 1.2 percent of neonatal death over 1 year study period. This finding is higher than our study were 182 neonatal deaths occurred. This difference might be due to large study participants in the former study in which twenty-six hospitals were involved while our study only included six hospitals [16].

Conclusion

As shown in this study, the most common cause of maternal death was hemorrhage followed by sepsis, delays in health-seeking, and lack of transportation, lack of partograph utilization. The majority of deceased women were referral cases. Most of the neonatal death happened within 24 hours. The mean (standard deviation) age at the time of death were 2.42 (3.33%) days. Lack of facilities in the NICU was the major cause of neonatal death.

Recommendations

Health workers should focus on counseling during antenatal visits and through community health volunteers on promoting individualized birth plans. Emergency obstetric care should focus on hemorrhage, sepsis, and health workers should be able to manage these emergencies adequately and also Health professionals should utilize partograph for all laboring mothers as per the guideline. Timely referral of women with due consideration to transportation problems to reduce delays in health-seeking. Health facilities should equip NICU with all necessary drugs and Materials at least for life-saving procedures.

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