

Magnitude, Characteristics, Maternal and Feto-Neonatal Outcomes of Obstetric Emergencies in Western Ethiopia, Nekemte, Ethiopia

Ashenafi Habte WOYESSA¹, Jote Markos CAFO², Thanasekaran PALANICHAMY³

Nekemte, Ethiopia

ABSTRACT

OBJECTIVE: In Ethiopia very little or probably nothing is known about the significance of obstetric emergencies. This study was therefore aimed at assessing magnitude, characteristics, and outcomes of obstetric emergencies in western Ethiopia.

STUDY DESIGN: Institution based prospective cohort study was employed from January to June 2017. To select the hospitals, area sampling technique was used. Total of 567 pregnant women with obstetric emergencies presented and treated in respective hospitals during the study periods and met the inclusion criteria were consecutively included.

Results: Majority (91.7%) of the identified obstetric emergencies have led to termination of pregnancy. Significant proportions of pregnant women (11%) who reached health facility died of obstetric emergencies. Pregnant women with obstetric emergencies traveled to facility carried by people were found to have died about 8 times more likely as compared to those who were transported by ambulance. While 29.21% of women gave birth to normal life births, stillbirth and neonatal death were 8.02% and 7.4% respectively. Higher number of neonatal death was also observed among mothers in whom final mode of delivery was a cesarean section (adjusted odds ratio: 0.19(0.05, 0.62) compared to spontaneous vaginal delivery.

CONCLUSION: This study has revealed that obstetric emergencies are responsible for the significant number of maternal and perinatal death. If the women have been accessed early and received optimum emergency care, many cases of the occurred death would have been prevented. Better outcome can be achieved through maximum utilization of quality and comprehensive antenatal care and organized pre-hospital obstetric emergency services.

Keywords: Feto-neonatal, Maternal, Obstetric emergencies, Outcome, Western Ethiopia

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¹ Department of Emergency and Critical Care Nursing, Wollega University, Institute of Health Sciences, school of Nursing and Midwifery, Nekemte, Ethiopia

² Department of Nursing, Wollega University, Institute of Health Sciences, school of Nursing and Midwifery, Nekemte, Ethiopia

³ Department of Psychiatric Nursing, Wollega University, Institute of Health Sciences, school of Nursing, Nekemte, Ethiopia


Address of Correspondence: Ashenafi Habte Woyessa
Department of Emergency and Critical Care Nursing, Wollega University, Institute of Health Sciences, school of Nursing and Midwifery, Nekemte, Ethiopia
ashexman2015@gmail.com

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ORCID IDs of the authors: AHW: 0000-0002-8362-222,

JMC: 0000-0002-0956-0894, TP: 0000-0001-6033-1782

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Introduction

Obstetric emergencies are one of the leading causes of maternal mortality in our globe. World Health Organization estimates that maternal mortality varies up to 100-fold, from 10 in wealthier countries to about 1,000 in underdeveloped nations. Despite tremendous efforts made to reduce death that could arise in relation to pregnancy and childbirth, maternal death still remains a significant problem in many developing countries (1).

Sub Saharan African countries share the highest maternal death rate in the world. Annually about 500 maternal deaths per 100,000 live births representing over half of the total world maternal deaths occur (2). In Ethiopia maternal and neonatal mortality rates are extremely in the highest in the world. The 2011 Ethiopian Demographic Health Survey revealed that the maternal death rate was 676 deaths per 100,000 live births and neonatal mortality was 37 deaths per 1,000 live births. In other words, for every 1,000 live births, about seven women died during pregnancy, childbirth, or within two months of childbirth (3,4).

Lack of organized pre-hospital services, inadequate health infrastructures, financial constraints, illiteracy, and low health-seeking behaviors worsen the problem in developing countries (5). Evidence indicates that the high maternal, neonatal and child mortality rates are associated with inadequate and poor quality maternal health care. A great deal of studies indicates that an estimated 74% of maternal deaths due to obstetric emergencies could have been averted if all women had access to the interventions for preventing and/ or treating all pregnancy-related emergencies (6-9).

Primary prevention where possible and/or effective management of obstetric emergencies plays a key role in the effort made to reduce an ever-increasing maternal mortality. In many third world countries, obstetric emergencies like bleeding, prolonged labor, sepsis, toxemia of pregnancy, ruptured uterus, abortion, and its complications are the commonly encountering obstetric emergencies [5,6,10]. Information of obstetric emergencies in terms of types, magnitude, and characteristic is crucial especially in countries like Ethiopia where the maternal mortality rate (MMR) is not yet satisfactorily reduced. Nevertheless, in Ethiopia, very little or probably nothing is known about the significance of obstetric emergencies in causing maternal and neonatal morbidity and mortality.

This study was therefore undertaken to indicate the significance of obstetric emergencies in causing maternal and neonatal mortality as end clinical outcomes. The findings of this study are very much helpful for all agents including policy-makers and other stakeholders who mainly work on maternal health care.

Material and Method

This study was conducted in three administrative zones of Wollega, Western Ethiopia. Five hospitals were randomly selected. Namely, Nekemte hospital from East Wollega Zone, Nedjo, Mendi and Gimbi hospitals from West Wollega Zone, and Shambu Hospital from Horo Guduru Wollega Zone. All of the selected health facilities are similar in the level of service they provide. The study was carried out from January 1st to June 30, 2017, among pregnant women who visited the selected hospitals for obstetric emergencies. As when an emergency would occur is not exactly known, all patients who visited respective facilities at any time were considered for this study.

Study design, Sampling procedure and techniques:

Hospital-based prospective cohort study was conducted the study among pregnant women presented to selected hospitals in western Ethiopia in accordance with the Declaration of Helsinki. To select the hospitals, area sampling technique was used. All pregnant women with obstetric emergencies presented and treated in respective hospitals during the study periods and meet the inclusion criteria were consecutively included. Written informed consent was obtained from all participants.

Research tools, data processing and analysis: Data were collected by using structured and pre-tested interviewer administered tool adopted from similar studies and modified to answer research questions and met study objectives. The questionnaire was comprised of four parts (socio-demographic characteristics, obstetric history, Types of obstetric emergencies, and maternal and perinatal outcomes). Data was initially entered into Epi-data version 7 and later the exported to SPSS program Version 20 for data analysis. Descriptive statistics were generated and possible associations among independent variables and outcome variables were examined in bivariate analysis. Odds ratio and 95% CI was used as a measure of association.

Results

The study explored the patterns and clinical outcomes of obstetric emergencies on mothers, fetus, and newborn among pregnant women who visited four hospitals in western Ethiopia the last six-month duration. A total of 567 pregnant women with various obstetric emergencies were included in the study. Of which, 530 were successfully interviewed and the analyzed yielding a response rate of 93.47 percent.

Socio demographic characteristics the respondents

This section looks at the socio-demographic characteristics distribution including age, ethnicity, level of education, occupation, and decision making authority on reproductive issues. The mean age of the women in this study was 25.83 and more than half (52.6%) were between the age of 25-34 years. As depicted in the table below, the majority (86.2%) of the respondents were Oromo in their ethnicity followed by Amhara (6.8%). Of prime concern, this study identified that the decision making authority on fertility issues was 20.8%, 44.0% and 34.3% herself, her husband and both of the couples respectively.

Findings related to baseline information and Obstetric history

The decision-making authority on fertility issues was found to be 20.8%, 44.0% and 34.3% respectively for the mother, husband and both of the couples. Most importantly, this study revealed that more than half (55.1%) pregnant mothers who visited the hospitals for obstetric emergencies had no emergency fund (Table I). This study has explored pregnant mothers' relevant obstetric history. About 21.9% have not attended antenatal counselling (ANC). Among the women who have been attended ANC, only 29.9% of them attended four times. Common types of preexisting medical conditions identified during ANC were chronic hypertension (55%) followed by 'other' (16%) problems like anemia and respiratory tract infections. Even though an ambulance was means of arrival for the majority (65.1%) of respondents, nearly half (47.1%) of them did not receive any form of treatment before arrival. The study also revealed that more than

half (55.1%) had no emergency fund. Time elapsed between arrival and initiation of treatment in minutes for the majority (86.0%) of them was <15 minutes (Table II). Chronic hypertension (55%) followed by 'other' (16%) problems like anemia and respiratory tract infections were among the identified preexisting medical or surgical problems during ANC visit. Out of all respondents, 88 (16.6%) of respondents have found to have some disorders during ANC visit.

Findings related to diagnosed obstetric emergencies

One of the aims of this study was identifying magnitude and commonly encountering obstetric emergencies in the study area. The most common diagnosed obstetric emergencies were obstructed labor (17.9%) followed by abortion (12.5%). Antepartum hemorrhage (11.3%) and preterm labor

(7.9%) were also common diagnoses (Table III). Majority (91.7%) of identified cases of obstetric emergencies in this study have led to termination of pregnancy. As to the place of delivery, out of hospital delivery i.e. home delivery and on street delivery were 9 (1.79%) and 16 (3.03%) respectively. Delivery conducted outside of health facility, the delivery was assisted by untrained birth attendants (8%), health extension workers (56%), Emergency Medical and technicians (20%) and family members (16%). Among pregnant women in whom obstetric emergencies have led to termination of pregnancy, the final mode of delivery was identified. While emergency caesarian section was the final mode of delivery form most mothers (36.62%), about 3.49% of the women have undergone laparotomy for ectopic pregnancy and ruptured uterus (Figure 1).

Table I: Distribution of respondents by their base line information in western Ethiopia, Nekemte, Ethiopia, 2017

No	Variables	Category	Frequency	Percent
1	Age of the mother	15-24	213	40.2
		25-34	279	52.6
		>35	38	7.2
		15-24	213	40.2
2	Ethnicity	Oromo	457	86.2
		Amhara	36	6.8
		Tigre	11	2.1
		Gurage	8	1.5
		Other	18	3.4
3	Marital status	Single	71	13.4
		Married	441	83.2
		Divorced	9	1.7
		Widowed	9	1.7
4	Level of education attained	No schooling	160	30.2
		Primary school	185	34.9
		Secondary school	120	22.6
		College diploma	38	7.2
		Degree and above	27	5.1
5	Occupation of mother	Government employee	47	8.9
		Private business	85	16
		Servant	14	2.6
		House wife	247	46.6
		Farmer	94	17.7
		Other	43	8.1
6	Occupation of husband/partner	Government employee	61	11.5
		Private business	165	29.5
		Farmer	259	48.9
		other	54	10.2
7	Residence	Town	229	43.2
		Rural	301	56.8

Table II: Distribution of respondents by their Obstetric history in western Ethiopia, Nekemte, Ethiopia, 2017

No	Obstetric history	Category	Frequency	Percent
1	Type of pregnancy	Wanted/planned	450	84.9
		Unwanted/unplanned	80	15.1
2	Parity	Primigravid	181	34.2
		Parity 2 - 4	276	52.1
		Parity 5 and above	73	13.8
3	Antenatal counseling follow up	Yes	414	78.1
		No	116	21.9
4	Time of the first antenatal counseling visit	First trimester	206	38.9
		Second trimester	196	37.0
		Third trimester	21	4.0
5	Number of antenatal counseling visit (n = 414)	Once	38	9.1
		Twice	111	26.8
		Three times	152	36.7
		Four times and above	124	29.9
6	History of violence	Beating	24	4.5
		Stabbing	4	.8
		Throwing	10	1.9
		Kicking	7	1.5
		Rape	33	6.2
		Control of finance	33	6.2
		Other	7	1.5
		No history of abuse	412	77.7
7	Presence of preexisting diseases	Yes	41	7.7
		No	471	88.9
		Unknown	18	3.4

Table III: Distribution of diagnosed of obstetric emergency by age of respondents in western Ethiopia, Nekemte, Ethiopia, 2017

Patterns of obstetric emergency	Age of respondents			Total	
	15-24	25-34	>35	Frequency	Percent (%)
Retained placenta	4	23	0	27	5.1
Preterm labor	15	27	0	42	7.9
Premature rupture of membrane	15	23	0	38	7.2
Ante partum hemorrhage	25	33	2	60	11.3
Postpartum hemorrhage	4	17	2	23	4.3
Severe anemia	1	6	0	7	1.3
Retained second baby	3	1	0	4	0.8
Ectopic pregnancy	0	2	1	3	0.6
Disseminated intravascular coagulation	0	0	5	5	0.9
Cord prolapse	0	7	1	8	1.5
Puerperal sepsis	0	1	1	5	0.6
Obstructed labor	40	51	4	95	17.9
Mal presentation	10	19	3	32	6.0
Abortion	49	8	9	66	12.5
Severe pre-eclampsia	15	17	2	34	6.4
Eclampsia	13	2	3	18	3.4
Uterine rupture	1	14	3	18	3.4
Fetal distress	7	18	0	25	4.7
Intra uterine fetal death	7	3	2	12	2.3
Uterine inversion	0	2	0	2	0.4
Others	3	5	0	8	1.5
Total	213	279	38	530	100.0

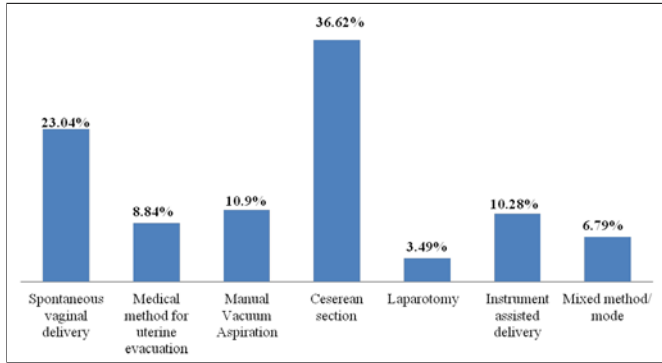


Figure 1: Final mode of delivery due to obstetric emergencies in western Ethiopia, Nekemte, Ethiopia, 2017

Maternal Outcomes of Obstetric Emergencies

The study identified the consequences of obstetric emergencies on mothers’ health and life. Nearly two-third (57.07%) of the women were peacefully discharged after the termination of pregnancy. A significant proportion (11%) of maternal death due to obstetric emergencies was recorded (Figure 2).

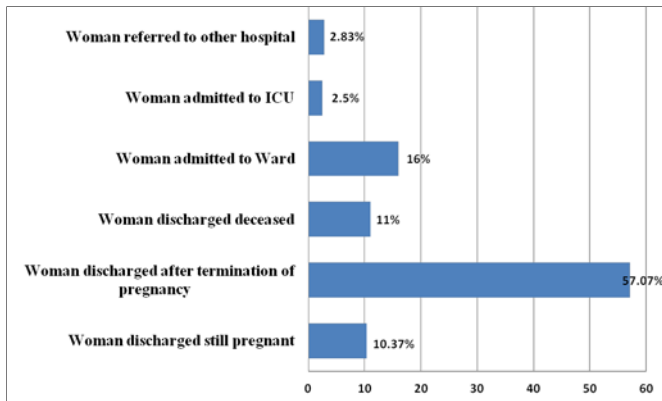


Figure 2: Distribution of respondents by their maternal outcomes of obstetric emergencies in western Ethiopia, Nekemte, Ethiopia, 2017

The study also explored the underlying causes of maternal death. The main contributing factors for death were obstetric hemorrhage (31.9%) followed pregnancy-related infections (21.27%). In about 15%, the underlying cause of death was unknown (Figure 3).

The main contributing factors for maternal death were obstetric hemorrhage (31.9%) followed pregnancy-related infections (21.27%). Mothers who did not attend ANC were more likely to die of obstetrics emergencies as compared to mothers who received ANC service ($p<0.001$). Mothers who travel longer than 15 kilometers to reach health facility were about 10 times more likely to die of obstetrics emergencies as compared to mothers who travel less than 5 kilometers ($p<0.001$). Pregnant women with obstetric emergencies traveled to facility carried by people should were found to die about 8 times more likely as compared to those who transported by an ambulance (Table IV). Duration of hospital stay following the di-

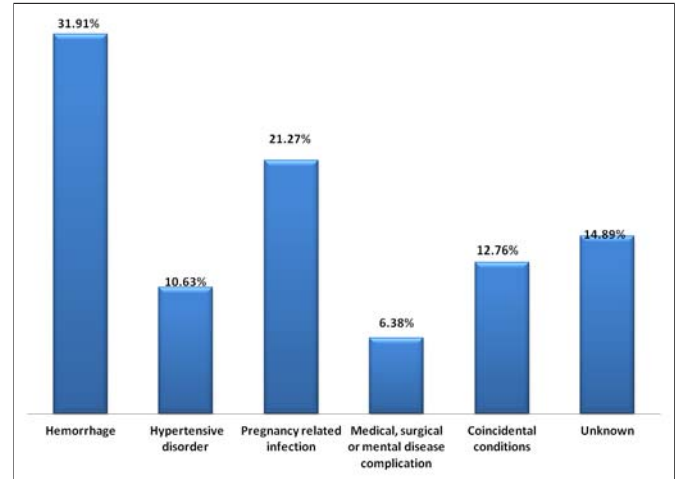


Figure 3: Underlying cause of maternal death in obstetric emergencies in western Ethiopia, Nekemte, Ethiopia, 2017

agnosed obstetric emergency or related problem was considered a possible outcome. Among admitted cases, while the majority (83%) of them stayed in hospital less than 10 days, the hospital duration of stay for a significant proportion (10%) of women was 15 days and above. Among commonly identified underlying causes of ward admission, pregnancy-related infection accounted contributed 28.23% followed by obstetric hemorrhage (25.8%).

Feto-neonatal outcomes of obstetric emergencies

This research has looked the fate of infants and neonates with a mother diagnosed with obstetric emergency. About 29.21% of women gave normal life birth. Stillbirth and neonatal death were 8.02% and 7.4% respectively (Figure 4).

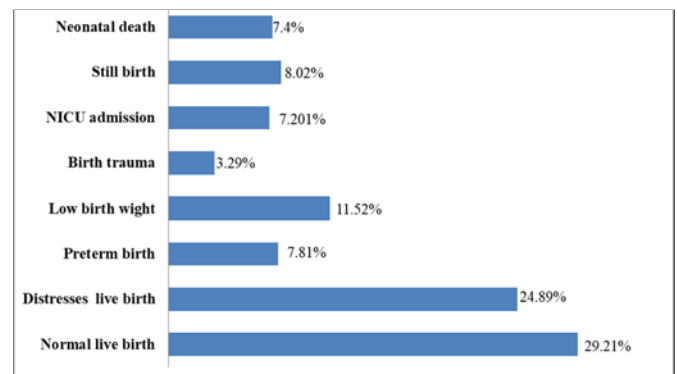


Figure 4: Feto- neonatal outcomes of obstetric emergencies in western Ethiopia, in western Ethiopia, Nekemte, Ethiopia, 2017

The most common underlying cause of neonatal death was noticed to be distress/asphyxia (39%) followed by neonatal sepsis (33%). The remaining death was contributed by hypothermia (11%) and other causes (17%). Infants born from mothers arriving hospitals on weekend days carried higher chance of death ($p=0.01$). Higher number of neonatal death was also observed among mothers in whom final mode of delivery was cesarean section (adjusted odds ratio (AOR): 0.19 (0.05, 0.62) compared to spontaneous vaginal delivery (Table V).

Table IV: Binary logistic regression of maternal obstetric emergency outcomes with selected study variable, Nekemte, Ethiopia, 2017

Variable	Category	Crude		Adjusted	
		OR (95%CI)	p value	OR (95%CI)	p value
Age of the Women	15-24	4.89(1.82, 13.15)	0.00	3.68(.076,17.87)	0.10
	25-34	2.39(0.99, 5.71)	0.05	1.21(0.28,5.14)	0.78
	35 and above	R	R	R	R
Mode of facility arrival	By people/foot	1.42(0.53,3.76)	0.48	7.92(1.76, 35.70)	0.00*
	Public car	2.19(0.90, 5.34)	0.08	5.30(1.18,23.81)	0.02*
	Ambulance	R	R	R	R
Presence of emergency fund	Yes	R	R	R	R
	No	0.67(0.36, 1.25)	0.21	1.29(.400, 4.19)	0.666
Marital status	Single	0.93(0.37, 2.30)	0.88	0.28(.05,1.57)	0.15
	Divorced	0.04(0.01, 0.18)	0.00	0.008(0.00,0.11)	0.00*
	Married	R	R	R	R
Distance from facility in kilometer	<5	1.05(0.46, 2.39)	0.89	1.24(.040,3.83)	0.70
	6-15	1.52(0.70, 3.28)	0.28	10.08(2.90,34.97)	0.00*
	16-30	2.21(0.75, 6.45)	0.14	16.79(3.46,81.28)	0.00*
	>31	R	R	R	R
Time of treatment initiation	<15 minute	R	R	R	R
	16- 30 minutes	4.05(0.54, 30.23)	0.173	2.613(.243, 28.137)	0.428
	>30 minutes	1.53(0.19, 11.9)	0.68	.274(.022,3.473)	0.318
Pre-existing illness	No	R	R	R	R
	Yes	0.24(0.109, 0.53)	0.00	0.24(.08,0.72)	0.01*
	Unknown	0.36(0.09,1.32)	0.12	0.52(0.10, 2.65)	0.43
Type of pregnancy	Wanted/planned	R	R	R	R
	Unwanted	0.45(0.22, 0.92)	0.03	2.27(.204, 25.33)	0.50
Arrival times	Day time	R	R	R	R
	Night time	0.51(0.27,0.97)	0.043	.918(.377, 2.237)	0.85
	On weekend	1.43(0.52,3.91)	0.47	2.60(.60, 11.31)	0.20
Antenatal counseling attendance	Yes	R	R	R	R
	No	0.41(0.21,0.76)	0.00	0.15(0.05, 0.45)	0.00*
Decision making role on sexuality	Both Couples	R	R	R	R
	Husband alone	0.37(0.20, 0.709)	0.002	0.09(0.02, 0.31)	0.00*

Table V: Binary logistic regression fetoneonatal obstetric emergency outcomes with selected study variable, Nekemte, Ethiopia, 2017

Variables	Category	Crude		Adjusted	
		CrudeOR (95%CI)	p value	OR (95%CI)	p value
Mode of facility arrival	People /on foot	1.20(0.45,3.23)	0.70	0.53(0.14,1.98)	0.35
	Public car	3.76(1.12,12.55)	0.03	3.62(0.85,15.31)	0.08
	Ambulance	R	R	R	R
Residence	Urban	R	R	R	R
	Rural	0.63(0.31, 1.25)	0.18	0.50(0.18,1.40)	0.19
Marital status	Divorced	0.32(0.06,1.61)	0.16	0.02(0.00,0.28)	0.01*
	Married	R	R	R	R
Distance from facility in kilometer	<5	R	R	R	
	6-15	0.42(0.15,1.13)	0.08	0.46(0.14,1.55)	0.21
	16-30	1.54(0.50, 4.72)	0.44	2.05(0.48,8.80)	0.33
	>31	0.36(0.13,1.01)	0.05	0.47(0.10,2.11)	0.32
Time of treatment initiation	<15 minute	R	R	R	R
	16- 30 minutes	3.38(0.45,25.3)	0.23	2.80(0.30,26.26)	0.36
Type of pregnancy	Wanted	R	R	R	R
	Unwanted	3.38(0.79,14.34)	0.09	0.50(0.02,8.87)	0.63
Arrival times	Day time	R	R	R	R
	Night time	0.44(0.21,0.92)	0.03	0.63(0.26,1.52)	0.30
	On weekend	0.57(0.23,1.40)	0.22	0.20(0.05,0.71)	0.01*
Antenatal counseling attendance	Yes	R	R	R	R
	No	11.71(1.59,86.27)	0.01	3.60(0.39,33.07)	0.25
Decision making role on sexuality matter	Both Couples	R	R	R	R
	Husband alone	0.65(0.34,1.25)	0.20	0.96(0.39,2.35)	0.94
Mother's substance use	No	R	R	R	R
	Yes	2.11(0.63,7.03)	0.22	25.19(1.89,334.3)	0.01*
Final mode of delivery	SVD	R	R	R	R
	MVA	2.31(0.26,20.22)	0.44	0.07(0.00,1.12)	0.06
	Cesarean section	0.19(0.07,0.51)	0.00	0.19(0.05,0.62)	0.00*
	Instrumental Delivery	2.53(0.29,22.15)	0.40	4.00(0.38,41.30)	0.24

SVD: Spontaneous vaginal delivery, MVA: Manual vacuum aspiration

Discussion

Globally, obstetric emergencies take the top rank in causing of maternal mortality. Literacy, poverty, lack quality antenatal care, low transportation facilities and insufficient equipment and providers amplify the problem in underdeveloped nations (3-7). Ethiopia is one of the countries blamed to have the highest maternal death in the world. It has been reported that the country is one of the six countries that contribute about over 50% of the deaths (11,12). Poor health care seeking habit lesser coverage of health services, unavailability of sufficient transport facilities, deep-rooted poverty and wrong beliefs are among the few factors known to worsen the end outcomes obstetric emergency in developing countries (13-14).

Very socio-economic status of a community certainly contributes to negative outcomes of an obstetric emergency. In the

present study, while in higher proportion (44.0%) husband or partners were mandated for decision making on fertility issues, only 110 (20.8%) women have authority for decision making. Women of the higher socioeconomic status usually receive better pregnancy outcomes. Because they are relatively better informed, likely to develop better choices, more likely to develop and implement birth readiness and are more empowered to make decisions in case they come across with obstetric emergencies (10,15,16)

In this study, 414 (78.1%) of pregnant women who have visited the selected hospitals for obstetric emergencies had received ANC at least once. Study was done in Kenya to assess fetomaternal outcome of obstetric emergencies reported that 93.4% of women attended an antenatal clinic at least once. The difference could be due to better awareness and service of

ANC as a result of the difference of socioeconomic status between the two countries (17).

When faced with obstetric emergency that might needs referral, arranging private cars consume time and. Delays to reach facilities and misdiagnosis of cases are directly related to near miss mortality. In this study, 345 (65.1%) patients have used ambulance to reach the hospital which is higher as compared with the finding from India study (18-20).

Maternal mortality in Ethiopia is one of the highest in the world. It has been reported that Ethiopia is one of the six countries that contribute about 50% of the maternal deaths; the others being India, Nigeria, Pakistan, Afghanistan and the Democratic Republic of Congo (12). In this survey, significant number, 47(11%) of pregnant women who reached health facility were died of their obstetric emergencies. This is in line with a study done in south west Nigeria which reported there were 17 maternal deaths out of 262 obstetric emergencies and greater than 4% of Indian study (17,21). However, this finding is much greater than the finding of recent Ethiopian Demographic Health Surveys (8,15). Despite a great deal of studies suggest maternal mortality has been decreasing from time to time, studies done in public hospitals in Tigray regional state in Ethiopia showed an increase in maternal mortality (22). The main contributing factors for maternal underlying in this studies were death were obstetric hemorrhage (31.9%) followed pregnancy related infections (21.27%). These are nearly similar with findings of study done to assess causes of maternal death in Ethiopia (23).

It is also noticed that fetal and neonatal death were noticed to be 8.02% and 7.4% respectively. Higher number of neonatal death was also observed among mothers in whom final mode of delivery was cesarean section (AOR: 0.19 (0.05, 0.62) compared to spontaneous vaginal delivery. As reported, in this study there were 11.52% low birth weight and 7.8% preterm babies while the remaining 7.2% were admitted to the neonatal intensive care units.

Conclusion

This study has shown that obstetric emergencies do occur and found to be responsible for significant number of the maternal and perinatal mortality. If the women have been accessed early and received optimum emergency help both during transportation and in health facilities, many of the occurred death would have been avoided. Better outcome can, therefore, be achieved through maximum utilization of quality and comprehensive antenatal care and organized pre-hospital and in hospital obstetric emergency services.

Declarations

Ethics approval and consent to participate: the research was approved by Wollega University (Reference Number: W/U 100, 617/Res: 1-26). Formal letter of permission and support

was written to the respective health facilities. Prior to collecting the required data both verbal consent and written consent were taken from all of the study subjects.

Availability of data and materials: The raw data supporting our findings are available from authors on a reasonable request.

Informed consent: Both verbal and written consent have been taken from the study participants and the study was conducted in accordance with the Declaration of Helsinki.

Authors' contribution: Ashenafi Habte has designed and developed the research concept; involved in supervision of the data collection process, statistical analysis and preparation of the final document. Jote Markos and P. Thanasekaran have helped with research tool preparations, supervising data collection, data analysis, and involved in revision of the final manuscript.

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Conflict of interest: The authors declare that there is no conflict of interest.

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