A 3 YEARS REVIEW OF MATERNAL DEATH AND ASSOCIATED FACTORS AT AYDER COMPREHENSIVE SPCIALIZED HOSPITAL, NORTHERN ETHIOPIA

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ABSTRACT

BACKGROUND:

Maternal mortality ratio in Ethiopia is one of the highest in the world. Despite measures to alleviate it and showing a promising declining trend, it still remains one of the highest at 412 maternal deaths per 100,000 live births. To our knowledge there is no accessible published study on maternal mortality at Ayder Comprehensive Specialized Hospital (ACSH).

OBJECTIVE

The aim of this study is to systematically analyze causes of maternal deaths and contributing factors at (ACSH).

METHODS

This was a descriptive, retrospective chart review of institutional maternal deaths using a 3-years record from July 1, 2014 – June 30, 2017 at ACSH.

RESULTS

There were 52 maternal deaths from July 1, 2014 – June 30, 2017 at ACSH. The main causes of these deaths were related to obstetric hemorrhage (n=11, 21.2 %), hypertensive disorders of pregnancy (n=10, 19.2%) and sepsis (n=7, 13.5%). About 86.5% (n=45) of the mothers were referral cases of whom 24 (53.33%) of them travelled more than 100 kilometers to reach ACSH. The furthest referral site was 498 kilometers from ACSH. Most common reasons for referral include for admission to intensive care unit, for further workup and management, for blood transfusion and for high risk admission. Most of the maternal deaths occurred in the postpartum period.

CONCLUSION

There is an urgent need for expansion of intensive care unit (ICU) and availing blood transfusion services in all the general and regional hospitals with close monitoring of mothers in the postpartum period. The referral system needs coordinnation from the lower level to the teritirary care centers.

KEY WORDS: Maternal death, cause of maternal death, factors for maternal death, Ayder Comprehensive Specialized Hospital, Mekelle, Tigray, Ethiopia

(Ethiopian Journal of Reproductive Health 2018; 10; 3: 38-45)

INTRODUCTION

Nearly 303, 000 maternal deaths occurred globally in 2015. Developing countries accounted for 99% of these deaths; Sub-Saharan Africa alone contributed for 66% of the maternal deaths. Ethiopia is one of the top ten countries which contributed for 59% of global maternal deaths in 2015. It is the forth following Nigeria, India, and Democratic Republic of the Congo [1,4]. Ethiopia is praised for training the health development army in strategies for addressing social and structural barriers to sexual, reproductive, maternal and newborn health [1].

This, in fact, has contributed greatly for the promising trend in decreasing maternal mortality ratio in the country. The maternal mortality ratio has dropped from 871 in 2000 to 412 in 2016 [4]. It is among the 39 countries categorized as "making progress" in the 1990-2015 maternal mortality estimates with 71.8% change in maternal mortality ratio (MMR)[1]. Despite these measures, however, maternal mortality still remains unacceptably high Analyzing maternal deaths is important to identify where the gap exists. Previous studies show that the top four causes of maternal deaths were obstructed labor/uterine rupture (36%), hemorrhage (22%), hypertensive disorders of pregnancy (19%) and sepsis/infection (13%) [5]. Lack of trasportation, broken referral linkages, low institutional delivery were also the main contributing reasons associated with these causes[6]. Teaching hospitals have high MDR than the national average because most of the very ill patients are usually referred to these tertiary centers for management 7. Maternal demographic factors, availability of reliable transport system, logistic support to pregnant women in the event of emergencies, health service availability and quality are among the multitude of factors that determine the occurrence of maternal death[8]. Systematic analysis of each death is important to know which factors are major and which ones are modifiable[9]. The objective of this study is, therefore, to systematically analyze causes of maternal deaths to identify modifiable factors and recommend the way forward.

SUBJECTS AND METHODS

We conducted a retrospective descriptive chart review of maternal deaths that occurred at Ayder Comprehensive Specialized Hospital in the northern Ethiopia from July 1, 2014 to June 30, 2017. The Hospital is a referral center in the region serving for a catchment area of Eight million people in Tigray, Afar and north Amhara. It is tertiary hospital giving all types of care.The definition of maternal death and classifications was based on the International Classification of Diseases 10th revision (ICD-10).Ethical approval for the study was obtained from the ethics and research committee of Mekelle University, College of Health Sciences. No identifier of the diseased (name etc.) was collected.

RESULT

There were 52 maternal deaths from July 1, 2014 – June 30, 2017. During the study period there were 9128 live births making the maternal mortality ratio of the institution 569.7 per 100,000 live births.

Sixty nine percent of the maternal deaths (n=36) were rural dwellers. Their age at death ranged from 19 – 46 years and their parities from 0 – 8. Most of them (n=33, 63.5%) were para 0-4 and the remaining (n=19, 36.5%) were para 5 or more. Most of them (n=32, 61.5%) were in the age group of 20 – 34 years. Threety two (61.5%) of the cases had at least one antenatal care visit while the remaining 20 (38.5%) had no antenatal care visit in the index pregnancy (Table 1).

Table 1: Characteristics of 52 maternal deaths at Ayder Comprehensive Specialized Hospital July 1, 2014 – June 30, 2017

Characteristics	Frequency	Percent
Age (in years)		
<20	1	1.9%
20-34	32	61.5%
>34	19	36.5%
Region		
Tigray	41	78.8%
Afar	8	15.4%
Amhara	3	5.8%
Distance in Kilometers of referrals from ACSH*		
<10 k.m.	9	20.0%
10-49 k.m.	4	8.9%
50-99 k.m.	8	17.8%
100-149 k.m.	12	26.7%
150-200 k.m.	9	20%
199-400 k.m.	1	2.2%
>400 k.m.	2	4.4%
ANC Booking Status		
Yes	32	61.5%
No	20	38.5%

*Total of 45 because the remaining 7 cases came directly to ACSH from Mekelle City, where ACSH is based.

Thirty of the deceased (57.7%) suffered direct maternal deaths. The leading causes of direct maternal deaths were obstetric hemorrhage (n=11, 21.2%), hypertensive disorders of pregnancy (n=10, 19.2%) and sepsis accounting (n=7, 13.5%). There was no death due to obstructed labor. Nine of the 11 mothers (81.8%) who died of obstetric hemorrhage were due to postpartum hemorrhage. The remaining two had antepartum bleeding because of ruptured uterus on a background of previously scared uterus.

The leading causes of indirect maternal deaths were congestive heart failure (n=5, 9.6%), viral hepatitis (n=4, 7.7%) anesthesia comcaplications (n=3, 5.8%). Of the 3 anesthesia related deaths, 1 was because of faulty intubation during general anesthesia and two were because of high spinal anesthesia. Intestinal obstruction, AIDS and cancer related deaths accounted for 3.8% (n=3) each (Table 2). Five mothers died of congestive heart failure with background heart disease. Two of the mothers refused for termination in early pregnancy and discontinued antenatal care. The other three had severe pulmonary hypertension and died immediately after birth. Two mothers died of intestinal obstruction, one of them refused operative intervention and the other died because of overwhelming sepsis after operative intervention.

Forty mothers (76.9%) died postpartum (Table 2) of whom 24 (60%) died in the first 48 hours postpartum. More than 60% of patients spent less than 24 hours in the hospital before they die. Nearly 90% died within the first 48 hours of referral.

Six of the 52 maternal deaths died without getting ICU care. It was noted in their charts that they could not be admitted to the ICU because the beds were occupied with other critical patients. There are 8 ICU beds for the entire hospital and referrals which are mostly occupied by critical medical and surgical cases.

Table 2 Causes of 52 maternal deaths at Ayder Comprehensive Specialized Hospital July 1, 2014 – June 30, 2017

Direct Causes (n=30)	Number	% of total causes
Obstetric hemorrhage	11	21.2%
Hypertensive disorders in pregnancy	10	19.2%
Sepsis	7	13.5%
Abortion complicated with sepsis	1	1.9%
Embolism	1	1.9%
Subtotal (Direct Causes)	30	57.7%
Indirect Causes (n=22)		
Heart failure	5	9.6%
Viral hepatitis and its complications	4	7.7%
Anesthesia related deaths	3	5.8%
Intestinal obstruction	2	3.8%
AIDS related	2	3.8%
Cancer related deaths	2	3.8%
Diabetic ketoacidosis with preeclampsia	1	1.9%
Disseminated Tuberculosis	1	1.9%
Chronic kidney disease with uremic encephalopathy	1	1.9%
Misoprostol toxicity	1	1.9%
Subtotal (Indirect causes)	22	42.3%
Total	52	100%
Timing of death		
Antepartum	11	21.2%
Postpartum	40	76.9%
Postabortal	1	1.9%

Forty-five mothers (86.5%) were referred of which 53.33% (n=24) travelled more than 100 kilometers to reach the hospital. Two mothers (4.4%) travelled 498 kilometers. The commonest reasons for referral were for intensive care admission and for further work-up and management each accounting 26.67% (n = 12 patients each). The second commonest reason (n=7, 15.6%) was for blood transfusion including the two mothers who travelled 498 kilometers from the referral site. Six patients (13.33%) were referred for high risk admission and 5 (11.11%) other for senior (surgical and medical) evaluation. Two patients (4.44%) were referred for lack of general anesthesia in the referral site. One patient (2.22%) came self referred.

Delay in receiving adequate healthcare contributed for 44.2% (n=23) of maternal deaths and delay in decision to seek care and delay in reaching care contributed for 32.7% (n=17) and 23.1% (n=12) maternal deaths each, respectively.

DISCUSSION

The leading causes of direct maternal deaths of the present study are similar to studies in other developing countries [10,11]. However, it differs from other local finding which has reported 36% of obstructed labor/uterine rupture [11]. In our study no mother died of obstructed labor which might indicate decline in obstructed labor.

Indirect causes accounted for 42.3% (n=22) of the total audited deaths. This is higher

than global and regional studies. For example, a systematic analysis which has reviewed 23 studies showed that indirect causes as a cause of 27.5% of deaths which is much lower than our study [11] and in another study in developing country indirect causes caused for the death of 19.6% of 998 maternal deaths[12].

AIDS related indirect maternal death contributed higher than global (1.6%) and Sub-Saharan (2.0%) estimates [1]. Anesthesia related death was found to be similar to another study in a similar set up in Nigeria[13]. In the present study, poor pre-anesthetic evaluation, poor clinical judgment, inadequate anesthetic monitoring and poor readiness to anesthesia complication management were found to be causes of anesthesia related mortality.

In the present study the MMR of the Ayder Comprehensive Specialized Hospital is 569.7 per 100,000 live births higher than the national MMR of 412 per 100,000 live births [4] and higher than a study in a university hospital in Ghana (493/100,000 live births) [7]. This ratio, however, is lower than MMR at Jima University Specialized Hospital (857/10,000) in Ethiopia [14]. The MMR is higher than the national figure for several reasons. Patients referred to teaching hospitals are very ill and critical because they are thought to be centers with both human and technical resources that can manage these complicated cases. This, however, is not always true. The Hospital is inadequately resourced with personnel, and essential requirements required in the management of these cases.

Several patients reach the tertiary hospital after developing serious complications. More than 60% of patients spent less than 48 hours in the hospital before they die, indicating how gravely ill the patients arrive to the hospital giving little time for work-up and management. This can be due to several reasons.

Twenty-four mothers (53.33%) out of the 45 referred mothers travelled more than 100 kilometers to reach Ayder Comprehensive Specialized Hospital without any support making them vulnerable for irreversible complications. Seventeen were reluctant to sick care till their condition worsen and become critical. Three other patients refused treatment in our referral center as per the documentation on their chart by the treating physician. In 14 of the maternal deaths there was ineffective and inappropriate referral and were poorly managed prior to referral. Nine of the 40 postpartum maternal deaths delivered at home and came with serious morbidity making it difficult to understand what happened in the per partum period.

Seven mothers (15.6%) were referred for blood transfusion and two of these had to take a risky journey of 498 kilometers to reach Ayder Comprehensive Specialized Hospital.

The present study revealed multiple examples of substandard obstetric care in Ayder Comprehensive Specialized Hospital. Poor interdepartmental teamwork, poor record keeping, and lack of ICU bed is among the most frequently encountered. None of the reviewed maternal deaths record charts contains educational status, marital status and socio-economic status making analysis of the deaths against these important variables difficult.

CONCLUSION

Despite the expected higher MMR in teaching and referral centers than the national average, the ratio in Ayder Comprehensive Specialized Hospital is still unacceptably high. Poor referral system (including delay in referral, inappropriate management before referral and lack of support during the referral and travel (e.g., oxygen), poor record keeping, lack of ICU in general hospitals, and relatively few mechanical ventilators and ICU beds in our center, poor inter-departmental teamwork and unreasonable referrals from nearly 500 kilometers for blood transfusion when availing the services is much easier than referring a dying patient were the identified gaps.

This study gives emphasis to urgent need to proper and complete record keeping including important socio-demographic variables, expansion of intensive care unit (ICU) and availing blood transfusion services in all the general and regional hospitals. Similarly, delays in referral, poor management prior to referral, risky long referral line without support require a health system approach and solutions and actions are needed at all levels. We also emphasize that mothers with obstetric

complications be followed strictly specially for the first 48 hours postpartum.

Previous studies show that interventions like availability of ambulance referral system, improved referral services, instituting of variety standardized quality improvement techniques, integrating the MDSR into routine clinical care is crucial to ascertain the cause of deaths and near misses and thereby reduce morbidity and mortality, filling gaps in facilities so that they functional fully avert maternal mortality [15-18].

The relatively high home delivery, refusal for treatment and contraceptive services in mothers with medical conditions which contraindicate pregnancy and delay in seeking care can be averted by winning the confidence of mothers through compassionate and respectful care, proper communication and discussion with the mothers and community mobilization and education on obstetric complication.

COMPETING INTERESTS

The authors of this paper have no conflicts of interest to report

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