Research Article

Assessment of Neonatal Death and Causes among Admitted Neonates in Neonatal Intensive Care Unit of Mizan Tepi University Teaching Hospital, Bench Maji Zone, South-West Ethiopia, 2018

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Abstract

Background: Neonatal death is loss of the newborn with in the first twenty eight days of life. In many societies, neonatal deaths and stillbirths are not perceived as a problem, largely because they are very common. However, it is remains untold grief for the mother especially in developing countries likes Ethiopia where its magnitude is very high. Because of the high magnitude of the problem and its direct linkage with the quality of health services during pregnancy, peripartum and in the first month of the neonates' life, neonatal mortality rate are used as an important indicators of the health status of a country. Therefore, this study will have a role in fighting against neonatal death through gathering information about neonatal death and its possible causes in the study area.

Objective: The main objective of this study is to assess neonatal deaths and its causes in neonatal intensive care unit of Mizan Tepi University Teaching Hospital, Bench Maji Zone, South-West Ethiopia, 2018.

Method: Institution based cross sectional study was done from June25 to July 20, 2018. The registration book of admitted neonate was reviewed by using checklist to collect data. Data was analyzed manually and presented in text, frequencies, tables, and percentages.

Result: According to the records from Neonatal Intensive Care Unit, 1316 neonates were admitted in the last three years. Among these admitted neonates, 300 died due to different reasons. Out of the deaths, 180 were male and 120 were females. From all deaths 93 (31%) of them were those who delivered prematurely, 89 (29.7%) were those admitted for diagnosis of sepsis and 46 (15.3%) were those admitted due to low birth weight.

Conclusion and recommendation: 300 death of neonates occurred in Neonatal Intensive care unit of Mizan Tepi University Teaching Hospital since the service started. Premature, sepsis and low birth weight accounted higher percent among the causes. Health care providers of MTUTH working on maternal health care service delivery and NICU should be emphasize on educating and counseling about prevention of infection.

Budget: The budget allowed for this study was 6,143.50 EB.

Keywords: Neonatal Death; Cause; NICU; MTUTH; Mizan; Ethiopia

Introduction

The neonatal mortality rate is defined as the annual number of deaths less than 28 days of age per one thousand live births and is an important indicator of health. In 2016, 2.6 million deaths or roughly 46% of all under-five deaths occurred during this period. This translates to 7000 newborn deaths every day [1]. The majority of the neonatal deaths are concentrated in the first day and week with about 1 million dying on the first day and close to one million dying within the next six days. Reducing neonatal mortality is increasingly important not only because the proportions of under-five deaths that occur during the neonatal period is increasing as under-five mortality declines but also because the health interventions needed to address the major causes of neonatal deaths generally differ from those needed to address other under-five deaths [2]. On current trends, more than 60 countries will miss the sustainable development goal (SDG) target of reducing neonatal mortality to at least as low as 12 deaths per 1000 live births by 2030. About half of them will not reach the target by 2050. These countries carry about 80 per cent of the burden of neonatal deaths in 2016 [1].

Although being newborn is not a disease, large numbers of children die soon after birth: many of them in the first four weeks of life (neonatal deaths), and most of those during the first week. The neonatal period begins with birth and ends after 28 days of birth. Neonatal deaths may be subdivided into early neonatal deaths occurring during the first seven days of life (0-6 days), and late neonatal deaths occurring after the seventh day but before the 28th day of life (7-27 days) [3]. Neonatal mortality rate is number of deaths among children below 28 days of age in a year per number of live births in the same year and it is usually expressed per 1000 live births [4].

In many societies, neonatal deaths and stillbirths are not perceived as a problem, largely because they are very common. Many communities have adapted to this situation by not recognizing the birth as complete, and by not naming the child, until the newborn infant has survived the initial period [2]. Skilled care during pregnancy, childbirth, and the postpartum period are important interventions in reducing maternal and neonatal morbidity and mortality [5]. Increasing institutional deliveries is important for reducing maternal and neonatal mortality. Low birth weight is closely associated with fetal and neonatal morbidity [6].

The challenge is to find a better way of establishing continuity between care during pregnancy, at birth, and when the mother is at home with her baby. While the weakest link in the care chain is skilled attendance at birth, care during the early weeks of life is also problematic because professional and programmatic responsibilities are often not clearly delineated. All mothers and newborns, not just those considered to be at particular risk of developing complications, need skilled maternal and neonatal care provided by professionals at and after birth [7].

Because of the high magnitude of the problem and its direct linkage with the quality of health service during pregnancy, peripartum and in the first month of the neonates' life, neonatal mortality rate (NMR) are used as an important indicators of the health status of a country [8]. The goal of the reproductive health program is to reduce the maternal mortality ratio to 199 maternal deaths per 100,000 live births and the neonatal mortality rate to 10 per 1,000 live births by 2020 [7].

Ethiopia is the second most populous country (with population grows at a rate of 2.6% per annum) in Africa after Nigeria whose the majority of people live in rural areas. High mortality, high fertility, and low life expectancy characterize the country's demography like most sub-Saharan African countries. In the past decade, however, the country witnessed an unprecedented decline in under-5 mortality from 166 per 1000 in 2000 to 88 per 1000 live births in 2011; an average decline of 47%. But still today, approximately 42% of mortality in Ethiopia contributes to high neonatal death which needs further action like implementing SDG even though application of this plan will have different challenges of various aspects [3].

In general, the proportions of deaths attributed to prematurity and congenital disorders increase as the neonatal mortality rate decreases, while the proportions caused by infections, asphyxia, diarrhea and tetanus decline as care improves. The main causes of neonatal mortality are intrinsically linked to the health of the mother and the care she receives before, during and immediately after giving birth [9]. Asphyxia and birth injuries usually result from poorly managed labor and delivery and lack of access to obstetric services. Many neonatal infections, such as tetanus and congenital syphilis, can be prevented by care during pregnancy and childbirth [2].

Globally, around 3.7 million neonates die each year, 99% of them from low-income countries. Since neonatal death rates stagnated in many low-income countries, neonatal deaths now represent an increasing proportion of under-five child deaths, an estimated 41% globally in 2008 compared to 38% in 2000. According to 2017 WHO report, about 7000 newborns die every day, despite steady decrease in under-five mortality [2,7,10].

Every day in 2016, 15 000 children died before their 5th birthday, 46% of them or 7000 babies died in the first 28 days of life according to a new UN report. Levels and trends in Child mortality in 2017 reveals that although the number of children dying before the age of five is at a new low-5.6 million in 2016, compared with nearly 9.9 million in 2000–the proportion of under-five deaths in the newborn period has increased from 41% to 46% during the same period [1,6,8].

At current trends, 60 million children will die before their fifth birthday between 2017 and 2030, half of them newborns, according to the report released by UNICEF, the World Health Organization, the World Bank and the Population Division of UNDESA which make up the Inter-agency Group for Child Mortality Estimation. Most newborn deaths occurred in two regions: Southern Asia (39%) and sub-Saharan Africa (38%). Five countries accounted for half of all new-born deaths: India (24%), Pakistan (10%), Nigeria (9%), the Democratic Republic of the Congo (4%) and Ethiopia (3%) [2].

Newborn deaths now contribute to about 40% of all deaths in children under five years of age globally, and more than half of infant mortality. Rates are highest in sub-Saharan Africa and Asia. Two thirds of newborn deaths occur in the WHO Regions of Africa (28%) and South-East Asia (36%) [11]. The gap between rich and poor countries is widening: neonatal mortality is now 6.5 times lower in the high-income countries than in other countries [5].

Although modest declines in neonatal mortality have occurred worldwide (for example, vaccination is well on the way to eliminating tetanus as a cause of neonatal death), in sub-Saharan Africa some countries have seen reversals that are both unusual and disturbing. Each year nearly 4 million more die within 28 days of coming into the world [2].

In Ethiopia, about 90% of deaths are caused by situations related to preterm birth, intra-partum complications and infections. Neonatal infection is the leading cause of neonatal mortality in Ethiopia, contributing for 31% of neonatal deaths [8].

Neonatal Mortality (NM) until nowadays is still the highest mortality in human life, among these deaths around 50-60% occur during the first week of life is associated with preventable causes. According to World Health Organization data, 7.3 million of perinatal deaths take place annually and 300,000 of them in developed countries. The remaining 7 million deaths occur in lesser developed countries, of which it is estimated that between 40% and 50% occur during the first seven days of life [2].

Global women's and child health planned to reduce neonatal mortality to at least as low as 12 per 1,000 live births in every country. However, as shown in the, Ethiopia recorded a rapid decrease in infant and under-five mortality during the five years prior to the survey compared to those reported in the 2011 EDHS [1,7].

The 2016 EDHS results show that the neonatal mortality is 29 with great regional variations, SNNPR having 35 losses per 1000 live births. In other words, in Ethiopia 1 in every 35 children dies within the first month. When the trend is seen, Neonatal mortality declined from 49 deaths per 1,000 live births in 2000 to 29 deaths per 1,000 births in 2016, a reduction of 41% over the past 16 years [8]. Childhood mortality has declined substantially since 2000. However, looking further at the breakdown of the data it becomes evident that the neonatal mortality rate did not show significant decrease as the change in infant and child mortality [12].

Neonatal death remains untold grief for the mother especially in developing countries like Ethiopia. Despite millions of neonatal death report, as an undocumented problem, it leftover neglected in development goals (millennium development goal and sustainable development goal) and in any global health policy agendas. Neonatal

deaths continue to occur in significant amount with a very sluggish reduction over a period of years while maternal and child mortality is showing significant improvement. Thus, this slow progress on neonatal death is intolerable and has to be tacked as soon as possible [13-19]. The more information health providers and administrative bodies have about the magnitude and causes of neonatal death in the study area, the more they understand preventability the problem and set strategies. In the intended study area, there is no study conducted to identify the problem despite significant number of neonatal death were reported. Therefore, this study was aimed to assess neonatal death and causes among admitted neonatal in NICU of Mizan Tepi University Teaching Hospital, Bench Maji Zone, South-West Ethiopia [20-23].

Methods

Study area

Mizan-Aman town is the administrative center for Bench Maji Zone. It has the total population of 34,080; of which 18,138 are males and 15,942 are females. This town has one teaching hospital, and also the location of two institution of higher education, namely Aman Health science Collage and Mizan-Tepi University. The Mizan Tepi University Teaching Hospital was established in 1986. It is the only Teaching hospital in the Bench-Maji zone that gives charge free service for pregnant mothers and neonates. It has total of 136 beds and it runs multidisciplinary health care system with total of 209 staffs, of these 155 are health professionals and the remaining 54 are supportive staffs.

Study design and study period

Institution based cross sectional study was done from June 25 to July 20, 2018.

Population

All neonates admitted in NICU of Mizan-Tepi University teaching hospital were included in the study.

Sample size

All cards of admitted neonates to NICU of Mizan Tepi University Teaching Hospital since NICU service started (from June 2016 to June 2018) in the hospital were reviewed. From the day of NICU service started at MTUTH to the data collection time, 1316 neonate were admitted.

Sampling procedure

The registration book of admitted neonates in NICU taken and then all needed data according to the objectives were recorded by using the check lists.

Inclusion and exclusion criteria

All neonates born and admitted to intensive neonatal care unit of Mizan Tepi University teaching hospital, whose age less than 28 days were included in the study.

Data collection tools and analysis

The observational chek list that answear the objectives of the study was prepared and recorded from the registration book of admitted neonates in NICU of Mizan Tepi University teaching hospital. Before the actual data collection, the registration book was checked to see if all needed data were available or not.

Operational Definition

Neonatal mortality rate: number of newborn deaths less than 28 days of age per one thousand live births per year.

Causes of neonatal death: In this study it is to mean that any medical or other cause which will be diagnosed on the chart as a cause of neonatal death.

Antenatal care visit: Any history of visit or follow up during current or index pregnancy at any health institution for checkup of pregnancy and designated or recorded on chart.

Congenital malformation: Body deformity or deformities from the birth believed to have impact on health of the baby.

Hypoglycemia: A measure of low blood glucose (<40 mg/dL) that was diagnosed and recorded on charts by professionals on admission.

Hypothermia: Any low body temperature measurement (<36°C) diagnosed and recorded on charts during admission of neonates.

Premature: Any viable neonate before term (<37 weeks of gestation) that was already diagnosed by professionals in charge on admission of neonate to neonatal intensive care units.

Sepsis: Record of infection or sepsis diagnosed either clinically or with culture by professionals during admission of the neonate and as possible causes of death and designated or recorded on chart.

Dissemination of Results

The final result of this paper was submitted and presented to Mizan Tepi University and copy of the document was given to Mizan Tepi University Teaching Hospital.

Result

Neonatal death

According to record from Neonatal Intensive Care Unit, 1316 neonates were admitted in the last three years, of them 300 (22.8%) are dead due to different reasons. Among death 180 were male and 120 were females. 293 (97.7%) deaths occurred within 7 days and 7 (2.3%) deaths between 28 days (Table 1).

Age category	Sex		Total death
	Male	Female	
Within 7 days	175	118	293
Between 7-28 days	5	2	7
Total	180	120	300

Table 1: Total death of neonates among the 1316 admitted NICU of MTUTH from June 2016-June 2018.

Cause of neonatal deaths

Among all deaths 93 (31%) of them are those who delivered prematurely, 89 (29.7%) were those admitted for diagnosis of sepsis and 46 (15.3%) were those admitted due to low birth weight. Congenital malformation and hypothermia each accounts (1.3%) cause for neonatal death. RDS and PNA account for 4.7% and 7.7% cause of death respectively. The least cause of death in this study is hypoglycemia, one case out of 300 deaths while 26 (8.7%) deaths are due to other miscellanies causes (Table 2).

S. No	Cause of admission and death	Frequency (n=300)	Percentage
1	Prematurity	93	31
2	Sepsis	89	29.7
3	Low birth weight	46	15.3
4	Other	26	8.7
5	PNA	23	7.7
6	RDS	14	4.7
7	Hypothermia	4	1.3
8	Congenital mal-formation	4	1.3
9	Hypoglycemia	1	0.3
10	Total	300	-

Table 2: The causes of death among neonates admitted in Mizan Tepi University Teaching hospital.

Discussion

From 1,316 admitted cases in NICU, 300 (22.8%) of them are reported to be dead which mean 227.8 neonatal death from 1000 admitted neonate that indicates high number of newborn babies admitted at neonatal intensive care unit died. This is similar to the study conducted in Ethiopia; Gondar university teaching hospital that was 23.1% [13]. This finding is higher than the study conducted in Jimma zone which showed that neonatal mortality rate was 35.5 per 1000 live births [9]. The difference is might be due to difference in study population mean that this study was done on the neonate admitted to NICU that were in critical condition that may increase the probability of death an. This finding is also higher than the study conducted in Ethiopia; Gondar university teaching hospital that was 14.3% [14]. The discrepancy is might be due to the difference in hospital setting in materials and skilled person that means in the former study the hospital is senior institution which is resource full and has many senior pediatricians and sup specialists in neonates. The finding of this study also showed that 97.7% neonatal death occurred during early neonatal age. This is consistent with the conclusion by WHO and study in north showa zone of Amhara region of Ethiopia [2,3]. This is might be due to prematurity and congenital disorders, lack of skilled care during pregnancy, childbirth, and the postpartum period may attribute for early neonate.

According to this study, around ninety three (31%) neonatal death is due to prematurity. This finding is in line with study done in Northern Ethiopia in which, prematurity accounts for 34% of neonatal death [15, 24-27]. This finding revealed that, infection is accountable for nearly 30% of neonatal death. This is higher than the global report of 20% [1]. This difference might be due to the fact that there is infrastructural and supply scarcity in our set up and difference in infection prevention activities, case load, and number of staff. This finding is almost similar with the study done in Jimma Zone that shows infection accounts for 34.3% of neonatal death [9]. In other way this study indicated that sepsis, low birth weight, and prematurity collectively accounts for 76% of cause of death which is similar with the report of global Strategy for Women's and Children's Health that was 60–80 % of death is due to reason of prematurity, LBW, and sepsis [1].

Including the all admitted neonates in last 3 years since the service of NICU started in the hospital is the strength of this study. The study was only depending on record review which is subjected for incompleteness of record which enhances bias.

Conclusion

300 death of neonates occurred in Neonatal Intensive care unit of Mizan Tepi University Teaching Hospital since from the service started. The higher percent of deaths occurred within 7 day of birth. Premature, sepsis and low birth weight accounted higher percent among the causes.

Ethics Approval and Consent to Participate

This study was not involved in any experiment on human subjects. The written consent was taken from the respondents just before data collection. Ethical approval was obtained from Mizan Tepi University Collage of Health Sciences, Institutional Review Board to communicate with hospital administrative body. Permission letter was obtained from administrative body of Mizan Tepi University Teaching Hospital.

Competing Interests

The authors declare that they have no competing interests.

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Authors' Contributions

The authors' responsibilities were as follows: All authors designed, supervised the study, ensured quality of the data and assisted in the analysis and interpretation of the data. All authors critically reviewed the manuscript. The corresponding authors did the analysis & drafted the manuscript and had the responsibility to submit the manuscript for publication.

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