

# Trend and pattern of neonatal morbidity and mortality in Tigray Region, Ethiopia

Hadgu Gerensea

## ABSTRACT

**Aims:** The first 28 days are almost pivotal period of life and out of 130 million neonates, four million die in the first month of life. Almost half of all neonatal deaths occur within the first 24 hours while 75% die within first seven days of life. **Methods:** The main aim of this study was to assess four year pattern and trends of neonatal morbidity and mortality in Tigray Region using retrospective study design from patients' registration and Health Management Information System (HMIS) data. The data was interred and coded to Epi Info and exported to SPSS version 21 for statistics analysis. **Result:** Neonatal sepsis, low birth weight and prematurity are the three leading cause of neonatal morbidity. Birth asphyxia is the least leading for morbidity but it is the 3rd leading cause for neonatal mortality next to sepsis and prematurity. The magnitude of neonatal morbidity and mortality in 2014–2015 is 3.9 and 4.9 times higher than 2011–2012. **Conclusion:** Almost 80% of neonatal morbidity and mortality are caused by three easily preventable and manageable problems. The trend of neonatal morbidity and mortality will increase in upcoming years unless great effort and focus are giving for the three most leading cause of morbidity and mortality.

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## INTRODUCTION

The first 28 days are almost pivotal period of life and out of 130 million neonates, 4 million die in the First month of life. Almost half of all neonatal deaths occur within the first 24 hours while 75% die within first seven days of life [1–4].

Neonatal mortality constitutes 40% of under-five mortality and approximately 60–70% of infant mortality [5]. Almost all neonatal deaths (99%) arise in low-income and middle-income countries, and approximately half occur at home [6].

This inequities in child mortality between high-income and low-income countries remain large. In 2012, the under-five mortality rate in low-income countries was more than 13 times the average rate in high-income countries [7].

Globally from 1990–2015, the number of neonatal deaths declined from 5.1 million to 2.7 million [5, 7–9]. But the decline in neonatal mortality from 1990–2015 has been slower than that of postneonatal under-five mortality: 47% compared with 58% globally [5, 9–11]. Similarly, the progress of neonatal mortality remains

insufficient to reach MDG 4 globally and in many regions, particularly in Sub-Saharan Africa [8–10].

Neonatal mortality is becoming one of the major public health problems while the service and the attention given its management is very high. Similarly in the absence of reliable population registration in developing countries, Health Management Information System of hospitals and health centers are the only available window to observe the trend and pattern of neonatal morbidity and mortality in the region through all governmental health centers and hospital registration or statistics.

Moreover, there is a debate in trend of neonatal morbidity and mortality regarding to its exact magnitude and trend. Due to inconsistencies in both research methods and registries, health professionals and policy makers are challenged in decision making regarding pattern and trend of neonatal morbidity and mortality.

## MATERIALS AND METHODS

### Study area and period

The study was conducted in Tigray Region which covers an area of 109 square kilometers and its elevation is 2,084 meters above sea level. The region has 18 public hospitals and 170 health centers with total population of 4,316,988.

### Study design

Secondary data analyzes from August 2011 up to August 2015 were used to address the pattern and trend of neonatal morbidity and mortality.

### Sample size

All four year data of public hospitals and health centers of Tigray Region was taken.

### Data collection procedures and instrument

Data extraction tool was developed to extract data from HMIS registration. Diagnosis have made based on physicians.

### Data analysis

First the data was entered and coded to Epi Info version 3.5.4 and exported to analyzes into SPSS version 21 Window 7. Data analyzes included Descriptive statistics was used to describe participants' demographic characteristics and trend of neonatal mortality and morbidity.

## Data quality management

Data was extracted by statistician from HMIS data of Tigray Region with close supervision.

## Ethical clearance

Institution Review Board (IRB) of Aksum University, College of Health Science was reviewed the protocol to ensured full protection of the rights of study subjects. Following the approval by IRB of Aksum University, IRB of Tigray Region Health bureau also approved and official letter of cooperation was written to the directorate of health information system. In order to keep confidentiality of any information obtained, the data collection procedure was treated anonymous.

## RESULTS

### Sociodemographic

The study was conducted in all public hospitals and Woreda health offices (170 health center) of Tigray Region. A total of 16,596 data of neonatal patients from IPD (inpatient department) was extracted. From the total study subjects in the data 10,141 (61.1%) were males. No data was excluded since all were complete and readable. The sex distribution of the case is 1.6 male to one female (1.6:1).

### Pattern of Neonatal Morbidity and Mortality

The most common cause of neonatal morbidity is neonatal sepsis which accounts 47%. Low birth weight and prematurity are the second and third leading cause

Table 1: Pattern of neonatal morbidity and mortality in Tigray Region from 2011–2015

Pattern of Neonatal illnesses	Morbidity Frequency (%)	Mortality Frequency (%)
Birth asphyxia	1153 (7)	199 (12)
Neonatal sepsis	7747 (47)	720 (45)
Low birth weight newborn	2618 (16)	129 (8)
Other or unspecified perinatal diseases	1549 (9)	84 (5)
Congenital malformations, deformations and chromosomal abnormalities	1000 (6)	116 (7)
Prematurity	2529 (15)	358 (22)
Total	16596	1606

of morbidity which accounts 16% and 15% respectively. Birth asphyxia is the least leading cause of morbidity but it is the third leading cause of mortality next to neonatal sepsis and prematurity (Table 1).

## Trend of Neonatal Morbidity and Mortality

The trend of neonatal morbidity is increasing every year. The magnitude of neonatal morbidity in 2014–2015 is 3.9 times higher than 2011–2012. Similarly, the magnitude of neonatal mortality is 4.9 times higher than 2011/12. Every pattern of neonatal morbidity is increasing every year (Figures 1 and 2).

## DISCUSSION

Even though there is no full data and enough evidences of diagnosis of neonatal registry in Ethiopia yet, starting from 2011–2012 HMIS was introduced. There is also deficient registration of death certificates and an underestimation of neonatal mortality in Ethiopia. In the absence of reliable population, registration in developing countries like Ethiopia using HMIS is the only available window to observe the trend and pattern of neonatal morbidity and mortality in Tigray Region.

The study shows neonatal sepsis, prematurity and birth asphyxia are the three leading cause of mortality which is consistent with the study in low income counties [12]. Furthermore, other studies also shows neonatal sepsis as the major cause of neonatal ill-health and death followed by asphyxia and prematurity [13–14].

Moreover study from developing countries shows sepsis is responsible for 30–50% of the total neonatal deaths each year [2]. Similarly, most neonatal deaths

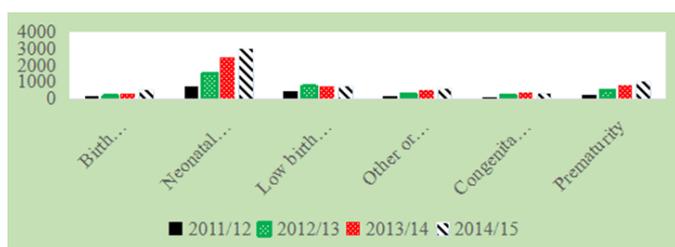


Figure 1: Pattern and trend of neonatal morbidity in Tigray Region from 2011–2015.

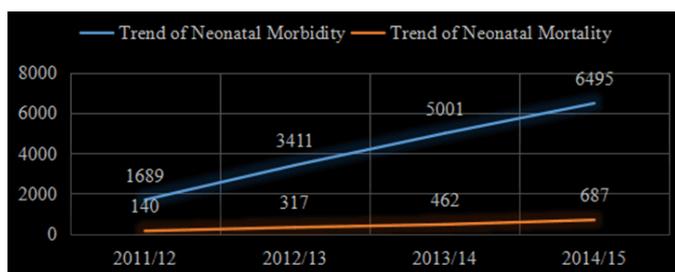


Figure 2: Trend of neonatal morbidity and mortality in Tigray Region from 2011–2015.

(99%) arise in low-income and middle-income countries, and approximately half occur at home [6].

This finding was, however, not consistent with the study conducted in developed countries which shows prematurity and malformations are leading causes of death. This difference may be related with the difference in accessibility of treatment and quality of care [12]. Not only mortality the study also indicates neonatal sepsis and prematurity are the leading cause of morbidity which is comparable with the study conducted in Nigeria [15].

Similarly, study from Rwanda also show sepsis and prematurity are the leading cause of admission [16]. Moreover study from Pakistan also report similar finding [17].

As the study shows the trend of neonatal morbidity and mortality are increasing every year. This is consistent with other study which shows the number of neonatal admissions and death increased over four years from 2006–2009 [18].

Despite global reduction in under-five mortality including sub-Saharan Africa, progress in neonatal mortality remains insufficient to reach MDG 4. Similarity, the proposed SDG: by 2030, end preventable deaths of newborns in all countries aiming to reduce neonatal mortality to at least as low as 12 deaths per 1,000 live births shows some failure from the starting [19].

Furthermore, other study also indicate slow decline of neonatal mortality rate unlike infant and child mortality rate in the last two to three decades [5, 8–11].

## CONCLUSION

Almost 80% of neonatal morbidity and mortality are caused by three easily preventable and manageable problems. The trend of neonatal morbidity and mortality will increase in the coming few years unless great effort and focus are giving for the three most leading cause of morbidity and mortality.

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## Author Contribution

Hadgu Gerensea – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

## Guarantor

The corresponding author is the guarantor of submission.

## Conflict of Interest

Authors declare no conflict of interest.

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