

## Analysis of perinatal mortality in a tertiary care hospital

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### ABSTRACT:

**Aim:** To analyze the perinatal mortality in a tertiary care center. **Background:** To identify the maternal risk factor in a tertiary care center in a developing country. **Methodology:** Data on perinatal deaths was collected from 1 January 2023 to 31 December 2023 from the monthly perinatal mortality records. Fetal death after 28 weeks till 7 days of birth was included in this study. All fresh, macerated, and inborn and outborn early neonatal deaths were included. **Results:** The study was conducted to identify the cause of perinatal mortality and its maternal risk factors. During the study period, a total of 3931 deliveries were done and there were 60 perinatal deaths, 9 fresh, 29 macerated, and 22 early neonatal deaths. Out of 60 perinatal deaths, 47 deaths (78.33%) were before 37 weeks of gestation and 13 deaths (21.66%) were after 37 weeks of gestation. Among 60 perinatal deaths, 22(36.5%) had no antenatal checkups, 19(31.7%) had irregular antenatal checkups and 19(31.7%) had regular checkups. 14 (23.3%) had one maternal risk factor and 5 (8.3%) had more than 1 risk factor. Out of 60 deaths, 41(68.3%) underwent NVD and 19(31.7%) underwent LSCS. A total of 44 (69.8%) deaths were below 2.5 kg. Prematurity and preeclampsia (17.5% and 17.5% respectively) were one of the most common causes of perinatal deaths. **Conclusion:** Prematurity, Low birth weight (LBW), preeclampsia, irregular antenatal checkups, and ignorance of seeking medical help were the most associated factors in perinatal mortality.

**Keywords:** perinatal mortality, prematurity, low birth weight.

### INTRODUCTION:

Perinatal mortality is defined as the number of stillbirths and deaths in the first week of life per one thousand total births. The Perinatal period refers to birth after 28 completed weeks of pregnancy to seven days after birth of neonate<sup>1</sup>. Every year over 4 million babies die in the first four weeks of life, 3 million of these deaths occur in the early neonatal period<sup>2</sup>. The risk of mortality in the first 4 weeks of life is 30-fold higher than the post-neonatal period<sup>3</sup>, especially the first week of life is the most critical for a neonate with 36% of neonatal deaths (1 million) occurring in the first 24 hrs of life<sup>7</sup>. Out of all perinatal deaths, 90% are in developing countries<sup>5</sup>. There is a huge difference in perinatal mortality between developing (50 per 1,000 total births) and developed countries (10 per 1,000 total births) almost 5 times more<sup>6</sup>. About 0.75 million neonates die every year in India, which is one of the highest countries in the world<sup>3</sup>. Every year around 2 million stillbirths occur, mainly during labor which accounts for up to 40%<sup>4</sup>. The main contributing factors for perinatal mortality are infections

(0.6 million), intrapartum conditions (0.7 million), and preterm birth complications (1.0 million)<sup>7</sup>. Preterm birth or small for gestational age (SGA) is the biggest risk factor accounting for 80% of neonatal deaths<sup>7</sup>; therefore perinatal reporting is pertinent in health services. It is done yearly. It provides information about the availability of health services, the quality of services and its effectiveness to pregnant women, during childbirth and newborns as well. Though the number of neonatal deaths declined from 5.0 million in 1990 to 2.3 million in 2022, developing countries like India are still falling behind in achieving targets of sustainable development goal (SDG)<sup>2</sup>. Perinatal mortality is an important marker of the overall health of a society.

Analysis and auditing of perinatal deaths identifies the maternal risk factors, and gaps in providing health services and newborn care. It provides information for effective and timely interventions to reduce preventable perinatal mortality. Therefore, this study is being done in a tertiary care centre to review the associated maternal factors helping us to achieve the SDG target of reducing

perinatal mortality to 12 deaths per 1,000 births by 2030<sup>8</sup>.

The following goals will be achieved as part of the study's analysis of a tertiary care hospital's perinatal death rate:

- To study the perinatal mortality rate for 1 year (1 January 2023 to 31 December 2023).
- To identify the associated maternal risk factors and gaps in health services.

**MATERIALS AND METHODS:**

Time-bound hospital-based retrospective observational study was conducted in the Department of Obstetrics and Gynecology, tertiary care center, Naharlagun, India. The data was collected from perinatal death records. Here

**RESULTS:**

**Table 1: Maternal factors for perinatal deaths (n=60)**

Factors		Number	Percentage
Maternal age	<20 years	5	8.3
	21-35 years	48	80
	>35 years	7	11.6
Parity	Primigravida	37	61.7
	Multigravida	23	38.3
Antenatal visits	Regular ANC	19	31.7
	Irregular ANC	19	31.7
	No ANC	22	36.7
Recurrent pregnancy loss	Present	9	15
	Absent	48	80

(\*ANC-antenatal care)

**Table 2: Relationship between gestational age and perinatal deaths**

Gestational age(weeks)	Number of perinatal deaths	Percentage
28-30	21	35
31-32	10	16.7
33-34	7	11.7
35-36	9	15
37-38	8	13.3
39-40	1	1.7
>40	4	6.7

**Table 3: Risk factors for perinatal deaths**

Risk factors	Number	Percentage
Present	18	30
Absent	41	68.3
One risk factor	14	23.3
> One risk factor	5	8.3

population study included all fresh, macerated stillborn & early neonatal death cases.

**INCLUSION CRITERIA:**

All deliveries > 28 weeks of gestation to 7 days of newborn life. Birth weight > 1kg.

**EXCLUSION CRITERIA:**

All deliveries < 28 weeks and death of a newborn after 7 days of life. Birth weight< 1kg.

Data was collected by using a predesigned questionnaire. Data was analyzed by using appropriate computer software.

**Table 4: Factors responsible for perinatal deaths**

Factors	Number	Percentage
Placental previa	1	1.6
Fetal distress	8	12.7
Eclampsia	1	1.6
Anemia	1	1.6
HELLP syndrome	3	4.8
Unknown	15	23.8
Pre-eclampsia	11	17.5
Prematurity	11	17.5
Asphyxia	8	12.7
Sepsis	8	12.7
Oligohydramnios	5	7.9
RDS	11	17.5
Cord prolapse	3	4.8
LBW	14	22.2

(\*RDS-respiratory distress syndrome)

**Table 5: Relationship between birth weight and perinatal deaths**

Birth weight(kg)	number	Percentage
1-1.5	20	31.7
1.6-2	13	20.6
2.1-2.5	11	17.5
2.6-3	9	14.3
3.1-3.5	5	7.9
3.5-4	2	3.2

The study had a total of 60 perinatal deaths, among these, the number for fresh stillbirth was 9, macerated stillbirth was 31 and early neonatal death was 21. Out of 21 neonatal deaths, 13 were inborn & 9 were outborn. A total of 80% of deaths were in mothers of age group 21-35 years (table 1). Out of 60 deaths, 47(78.4%) were observed before 37 weeks of gestation and 13 deaths after 37 weeks (table 2). Most of the cases were primigravida (61.7%). Though 31.7% had ANC; most of the cases (36.7%) had no antenatal checkups. Out of 60 deaths, 27 (45%) cases were referred cases. Recurrent pregnancy loss was found in 9% of cases. Distance was the most common cause (41.7%) for seeking medical help. However, 36.7% were ignorant to seek medical assistance & 16.7% had financial issues for delay in getting admission. 41 deaths were reported after vaginal delivery and 19 after Lower segment cesarean section (LSCS). Out of 18(30%), 14(23.3%) had one maternal risk factor while 4 (6.66 %) had more than one risk factor. Preeclampsia was one of the most important maternal risk factors observed in 11 cases (17.5%) with perinatal death followed by oligohydramnios (7.9%), HELLP syndrome (4.8%), and cord prolapse (4.8%). The most common reason for perinatal death remained unknown (23.8%). LBW (22.2%) is the highest in the

known causes of perinatal death followed by prematurity (17.5%), birth asphyxia, sepsis, and fetal distress (12.7%, 12.7%, and 12.7% respectively). A total of 20 (31.7%) neonatal deaths were observed in neonates weighing 1 to 1.5 kg while 20.6% were seen in the 1.6-2 kg group. The gender of the neonates was 50 % boy and 50% girl. Out of 23 live admissions, 13 neonates survived for > 24 hours, 6 survived for 24 hours, 3 survived for 60 minutes and 1 survived < 30 minutes. Among 60 perinatal deaths, only 3 cases (5%) were associated with fetal anomalies while 57 (95%) were not. There were five sets of twins in the study and 8 cases with a history of decreased fetal movement.

### **DISCUSSION:**

Perinatal mortality represents the quality of maternal and neonatal care, as well as the socioeconomic status of the country. Countries from sub-Saharan Africa and southern and central Asia bear the highest burden for newborn deaths<sup>2</sup>. In this study perinatal death rate was 15.26% which was comparable to a study done in Ethiopia by Dessu S et al with 12.6% (95% CI: 11.80, 13.40)<sup>9</sup> but contrasting to a study by Dwa YP et al done in Nepal with 1.46%<sup>10</sup> which was much lesser. Out of 22 early neonatal deaths, inborn deaths were higher than out-born

deaths similar to findings in a study in Tanzania 54% and 46% respectively<sup>11</sup>. Dessu S ET al<sup>9</sup> recorded 304 (51.90%) cases with severe preeclampsia where as 17.5% had preeclampsia in our study and 1 case of eclampsia.

In this study, LBW babies had 2.75 times more risk than babies with birth weight >2.5kg. Similarly, in the study done in Ethiopia, the odds of perinatal mortality were higher for low and big birth weight compared with the term normal birth weight (small birth weight, AOR=3.98; 95% CI 3.04 to 5.20; large birth weight, AOR=2.51; 95% CI 1.76 to 3.57)<sup>12</sup>. Very low birth weight (<1.5 kg) and low birth weight (<2.5kg) newborns were more common in cases, 18.1% and 36.2% respectively whereas, in a study by Geteye Y et al, it was 31.7% and 38.1% respectively<sup>13</sup>.

In a study conducted in Bhutan, history of obstetric complications (odds ratio [OR] = 3.53; 95% confidence interval [CI] = 1.48-8.42), intrapartum complications (OR = 3.86; 95% CI = 1.71-8.74) gestational age (OR = 8.07; 95% CI = 2.89-22.52), and Apgar 1 minute (OR = 4.40; 95% CI =1.83-10.59) were associated with neonatal death<sup>14</sup>.

Prematurity and meconium aspiration were the top recorded causes of neonatal deaths<sup>11</sup>. In a study in Iran, preterm labor and sepsis were the most common reason for stillbirth second to unknown etiology similar to this study<sup>15</sup>.

According to a study by Musafili A et al from 2012 to 2013 in Rwanda, delay in care-seeking was identified in 39% of deaths, delay in arriving at the health facility in 10%, and provision of suboptimal care at the health facility in 37%. The delay in seeking medical help was mainly due to a delay in reporting pregnancy-related danger signs. The financial issue was the major cause of the delay in reaching a health facility. Delays in referrals, diagnosis, and management of emergency obstetric cases were also found as contributing factors. Half of the perinatal deaths were judged to be potentially avoidable<sup>16</sup>. In our study, 41.7% had distance issues, 36.7% were ignorant of danger signs and 16.7% had financial issues.

In a study conducted in urban Indonesia, Primiparous women were 0.526 times more likely to experience neonatal death than grand-multiparous women in urban areas of Indonesia (OR 0.526; 95% CI 0.307-0.903). Women who have antenatal care visits  $\geq 4$  times have a 0.237 chance of experiencing neonatal death compared to women who have antenatal care visits <4 times in urban areas in Indonesia (OR 0.237; 95% CI 0.163-0.334)<sup>17</sup>. It was also observed that the death rate gradually decreased as parental level of education increased<sup>18</sup>.

In a study from 2015 to 2020 in Ethiopia, rural residence (adjusted OR (AOR) =3.43; 95% CI 2.04 to 5.76), birth

weight (low birth weight, AOR=3.98; 95% CI 3.04 to 5.20; big birth weight, AOR=2.51; 95% CI 1.76 to 3.57), not having antenatal care (ANC) (AOR=1.67; 95% CI 1.29 to 2.17) were associated with higher number in perinatal mortality<sup>12</sup>.

There were no gender differences in our study unlike previous studies showing male gender with higher mortality<sup>11, 19</sup>.

## **CONCLUSION:**

Starting from antenatal visits, a high index of suspicion should be present at all times for high-risk patients. Danger signs of pregnancy and daily fetal movement count should be explained to mothers while on antenatal visits. Compelling steps to make all deliveries institutional. The other options are to improve peripheral health infrastructure, and transportation, to provide accessible and quality medical care. The study highlights the importance of strengthening proper postnatal care services in healthcare facilities both for mothers and neonates. Alongside this, effort should also be stressed to improve the socio-economic condition of the households to address the issue. The main cause remained unknown (23.8%), therefore proper history taking and evaluation of cases on first contact is necessary.

The use of partographs for all women in active labor, appropriate intrapartum fetal monitoring, and early referral of fetal distress cases will reduce deaths due to birth asphyxia. Prematurity, RDS, and LBW are the main causes of perinatal mortality therefore emphasis on the availability of surfactant treatment and mechanical ventilation for preterm and sick babies can improve the survival outcome thus reducing perinatal mortality.

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## **REFERENCES:**

1. World Health Organization Neonatal and Perinatal Mortality: Country, Regional and Global Estimates. World Health Organization; Geneva, Switzerland: 2006
2. Newborn mortality [Internet]. [cited 2024 Mar 24]. Available from: <https://www.who.int/news-room/fact-sheets/detail/newborn-mortality>
3. Sankar MJ, Neogi SB, Sharma J, et al. State of newborn health in India. *J Perinatol*. 2016;36(s3):S3-S8. doi:10.1038/jp.2016.183
4. Lawn JE, Blencowe H, Oza S, You D, Lee AC, Waiswa P, Lalli M, Bhutta Z, Barros AJ, Christian P, Mathers C. Every Newborn: progress, priorities, and

- potential beyond survival. *The Lancet*. 2014 Jul 12;384(9938):189-205.
5. Zupan J. Perinatal mortality and morbidity in developing countries. A global view. *Med Trop (Mars)*. 2003;63(4-5):366-368.
  6. World Health Organization (WHO). *Child Health: Health Topics*. Geneva: WHO (2016).
  7. Stillbirth [Internet]. [cited 2024 Mar 24]. Available from: <https://www.who.int/health-topics/stillbirth>
  8. World Health Organization. Every Newborn: An Action Plan to End Preventable Deaths. Available at: <https://apps.who.int/iris/handle/10665/127938>. Accessed on: 2014.
  9. Dessu S, Dawit Z. Perinatal Mortality and Associated Factors Among Antenatal Care Attended Pregnant Mothers at Public Hospitals in Gamo Zone, Southern Ethiopia. *Frontiers in Pediatrics* [Internet]. 2020;8. Available from: <https://www.frontiersin.org/articles/10.3389/fped.2020.586747>.
  10. Dwa YP, Bhandari S. Prevalence of Perinatal Deaths in a Tertiary Care Hospital of Nepal. *JNMA J Nepal Med Assoc*. 2019;57(217):164-167. doi:10.31729/jnma.4431.
  11. Mdoe P, Katengu S, Guga G, Daudi V, Kiligo IE, Gidabayda J, et al. Perinatal mortality audit in a rural referral hospital in Tanzania to inform future interventions: A descriptive study. *PLOS ONE*. 2022 Mar 11;17(3):e0264904.
  12. Dheresa M, Daraje G, Fekadu G, et al. Perinatal mortality and its predictors in Kersa Health and Demographic Surveillance System, Eastern Ethiopia: population-based prospective study from 2015 to 2020. *BMJ Open*. 2022;12(5):e054975. Published 2022 May 18. doi:10.1136/bmjopen-2021-054975
  13. Getiye, Y., Fantahun, M. Factors associated with perinatal mortality among public health deliveries in Addis Ababa, Ethiopia, an unmatched case control study. *BMC Pregnancy Childbirth* 17, 245 (2017). <https://doi.org/10.1186/s12884-017-1420-7>
  14. Lethro P, Nishizawa Y, Dorjee K, Zangmo K, Dorji L, Tenzin K. Determinants of Neonatal Mortality in Bhutan: A Case-Control Study. *Asia Pacific Journal of Public Health*. 2023;35(8):486-493. doi:10.1177/10105395231203112
  15. Ghorat, F., Ghafarzadeh, R., Jafarzadeh Esfehiani, R. Perinatal Mortality and Its Associated Risk Factors: A Study in the North-East of Iran. *Iranian Journal of Neonatology*, 2016; 7(1): 47-51. doi: 10.22038/ijn.2016.6665
  16. Musafili, A., Persson, LÅ., Baribwira, C. *et al.* Case review of perinatal deaths at hospitals in Kigali, Rwanda: perinatal audit with application of a three-delays analysis. *BMC Pregnancy Childbirth* 17, 85 (2017). <https://doi.org/10.1186/s12884-017-1269-9>
  17. Laksono AD, Wulandari RD. Understanding neonatal death in urban area in Indonesia. *Medico-Legal Update*. 2020 Apr 1;20(2):825-829.
  18. Hossain MB, Mistry SK, Mohsin M, Khan MHR. Trends and determinants of perinatal mortality in Bangladesh. *PLOS ONE*. 2019 Aug 23;14(8):e0221503.
  19. Bayou G, Berhan Y. Perinatal mortality and associated risk factors: a case control study. *Ethiopian journal of health sciences*. 2012;22(3).