

Obstetric Night Mare-Neonatal Mortality Audit in a Tertiary Care Center

Durga Devi¹, Ajeetha Banu², Thennarasi³, Mahalakshmi⁴, Subhashini⁵

¹Assistant Professor, Department of Obstetrics and Gynaecology, Madurai Medical College, Madurai, Tamil Nadu, India

²Assistant Professor, Department of Obstetrics and Gynaecology, Madurai Medical College, Madurai, Tamil Nadu, India

³Assistant Professor, Department of Obstetrics and Gynaecology, Madurai Medical College, Madurai, Tamil Nadu, India

⁴Professor, Department of Obstetrics and Gynaecology, Madurai Medical College, Madurai, Tamil Nadu, India

⁵Junior Resident, Department of Obstetrics and Gynaecology, Madurai Medical College, Madurai, Tamil Nadu, India

Received: 30-01-2023 / Revised: 20-02-2023 / Accepted: 30-03-2023

Corresponding author: Dr. Durga Devi

Conflict of interest: Nil

Abstract

Background: The neonatal mortality is defined as the death within 28 days of life. However two thirds of the newborn death happens within one week of life. It's an index of antenatal and intrapartum care and also of the socioeconomic condition of the community. Institutional deliveries have resulted in the expected reduction in neonatal mortality. This study has been conducted to primarily identify the cause of neonatal deaths and to evaluate factors affecting mortality.

Methods: It's a 3 year retrospective study conducted in a tertiary care center in Tamil Nadu among 46993 deliveries from January 2020 to December 2022. A convenience sampling technique was used and data were collected from medical record section and entered and analysed in statistical package analysis of version 16.

Results: Out of total 46993 births, there were 959 neonatal deaths which accounts to 20.4 per 1000 live births. The most important causes observed were birth asphyxia, respiratory distress syndrome and septicaemia. Among the 959 neonatal deaths, 677 deaths happened to preterm delivery accounting to 70.6%. Rest of the neonatal deaths were due to unavoidable causes like anomalous babies, maternal comorbidities like hypertensive disorders of pregnancy leading to preterm pregnancies. Prevention of premature delivery, intensive care of the very low birth weight babies, early diagnosis and control of the hypertensive disorders of pregnancy have become important strategies in reducing early neonatal deaths.

Conclusion: The neonatal death can be prevented by strengthening the primary health care to the antenatal mothers, educating them the complication, timely access to health care and monitoring of pregnancy. A proper coordination between Antenatal mothers, Obstetrician and the neonatologists is required for reduction of neonatal mortality. Hence studies are required to diagnose the etiology for preterm delivery of unknown causes and to predict and prevent preterm death.

Keywords: Neonatal Death, Preterm Delivery, Hypertension.

This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

Introduction

The World Health Organization (WHO) defines neonates as live-born infants whose age is within 28 complete days of birth. Neonatal mortality (NM) is defined as infant death, which occurred during the first four weeks of life after birth. Studies conducted in developing countries have identified various risk factors associated with neonatal mortality. These include maternal education level, multiple births, lack of antenatal care, maternal infections during pregnancy, prematurity, birth asphyxia, neonatal sepsis. World-wide, many of the neonatal deaths occur at home and because of lack of accurate vital registration systems, the current global mortality estimates have limitations. Neonatal mortality is an important indicator of maternal care, maternal health, and nutrition, and also reflects the quality of obstetric and pediatric care available [1].

This study aimed to find out the prevalence and causes of neonatal mortality in a tertiary care center in Tamilnadu, India.

Methodology

This is a 3 year retrospective study conducted in a tertiary care centre from the year 2020 to 2022. The data of neonatal mortality were obtained from the hospital records. The maternal comorbidities and the neonatal characteristics were analysed and categorized into tables.

Statistical Analysis

The data were documented in a semi structured proforma with the standard case proforma. The variables are described as numbers and percentage in the tables and continuous range of values are described in mean \pm SD and median. The statistical analysis was prepared using SPS software.

Table 1: Basic characteristics of the neonatal mortality audit.

	Number	Percentage %
Cause of death		
1.Respiratory distress syndrome	244	25.4
2.Meconium aspiration syndrome	42	4.3
3.Birth asphyxia	211	22
4.sepsis/pneumonia/meningitis	235	24.5
5.Congenital anomaly	89	3.4
5.Prematurity	81	8.4
6.others	55	5.7
7.cause not established	2	0.2
Duration of life		
<1 day	72	7.5
1-3 days	420	43.7
4-7 days	249	25.9
>7 days	2.8	22.7
Age of death		
<1 Day	59	6.1
1-6 days	637	66.4
>7 days	263	27.5
Birth weight		

>2500gms	226	23.5
1500-2499 gms	272	28.3
1000-1499gms	266	27.8
<1000gms	195	20.3
Gestation		
Term	282	29.4
Preterm	677	70.6
Post term	0	0

Table 2: Other factors associated with neonatal deaths.

	Number	Percentage %
Mode of delivery		
1. Normal vaginal delivery	608	63.3
2. Vaccum	31	3.2
3. Assisted breech delivery	25	2.6
4. LSCS	287	29.9
5. Outlet	8	0.8
Sex		
Male	565	57.9
Female	404	42.1
Anomaly		
1. Congenital heart disease	43	4.4
2. Congenital diaphragmatic hernia	24	2.5
3. Multiple anomaly	10	1.0
4. Encephalocele	7	0.7
5. Dandy walker malformation	3	0.3
6. Cleft lip	2	0.2

Table 3: Maternal factors associated with the neonatal deaths.

	Number	Percentage %
Maternal age		
<19 years	89	9.2
19-25 years	567	27.8
25-30 years	235	24.5
>30 years	68	7.0
Parity		
1-2	825	86.1
3	82	8.5
>3	52	5.4
Gestational age		
<28 weeks	124	12.9
28-32 weeks	215	22.5
32-34 weeks	311	32.4
34-37 weeks	117	12.2
>37 weeks	282	29.4
Comorbidities		
Hypertensive disorders of pregnancy	176	18.3

Anemia	33	3.4
Diabetes	54	5.6
Heart disease	39	4.0
Twin pregnancy	25	2.6
Preterm labour	591	61.6

Results

Out of total 46993 births, there were 959 neonatal deaths which accounts to 20.4 per 1000 live births. The most important causes observed were respiratory distress syndrome 244(25.4%) followed by birth asphyxia 211 (22%) and septicaemia 235 (24.5%). Regarding the gestation; 677(70.6%) were preterm, 282 (29.4%) were term and 0(0%) were post-term. From the table no 1, most of the neonatal death observed between 1st to 3rd days of life.

In our study most of the neonatal deaths observed between the birth weight of 1500-2499gms. In regard to birth weight 195 (20.3%) were less than 1000 g, 266(27.8%) were 1000-1500 gram, 272(28.3%) were 1500-2499 gm and 226 (23.5%) were more than or above were 2500 gm. About the sex of the child 565 (57.9%) were male and 404(42.1%) were female. Regarding the anomaly 43(4.4%) had congenital heart disease, 24(2.5%) had congenital diaphragmatic hernia, 10(1.0%) had multiple anomaly, 3 (0.3%) had dandy walker malformation and 2 (0.2%) were associated with cleft lip. Regarding the maternal age; more than half 567(27.8%) belong to 19 to 25 years, 89(9.2%) were less than 19 years, 235(24.5%) were of 25 to 30 years and 68(7.0%) were above 30 years.

Regarding the maternal co-morbidities ,591 (61.6%) had spontaneous preterm labor, 176(18.3%) had the hypertensive disorder, 33 (3.3%) anemia, 54(5.6%) had diabetes, 54 (5.6%) had heart disease, and 39(4.0%) had twin pregnancy.

Among the 959 neonatal deaths, 677 deaths happened to preterm delivery accounting to

70.6%. Rest of the neonatal deaths were due to unavoidable causes like anomalous babies, maternal comorbidities like hypertensive disorders of pregnancy leading to preterm pregnancies. Prevention of premature delivery, intensive care of the very low birth weight babies, early diagnosis and control of the Hypertensive disorders of pregnancy have become important strategies in reducing early neonatal deaths.

Discussion

In our study out of total 46993 births, there were 959 neonatal deaths which accounts to 20.4 per 1000 live births. A study done in Arghakhanchi district hospital showed the neonatal mortality rate was 32.2 per 1,000 births higher than our study [3]. In a study conducted by Hemangini J *et al* neonatal mortality rate was 17.5 per 1000 live birth which is lower than our study [4]. A study conducted in Tanzania showed that Perinatal mortality rate was 10.83 per 1000 total births which is less than our finding [5].

In our study, neonatal mortality was associated with birth weight between 1500-2499 gms. According to Daftary *et al* and Chakarvati *et al*, 40% of all still birth and 80% of all neonatal deaths were associated with birth weight less than 2.5 kg [6]

This study showed that the most common cause of neonatal loss was Respiratory distress syndrome (25.4%), followed by sepsis (24.5%), birth asphyxia (22%) and prematurity(8.4%). In Pancholi *et al* study, most common cause of neonatal mortality rate was idiopathic (26%), followed by preeclampsia (14%), oligohydramnios and APH [7]. In a study conducted by Hemangini

J et al most common cause of neonatal loss was idiopathic (70.17%), followed by abruptio placenta (33.78%), followed by pre-eclampsia (13.51%), oligohydramnios (10.8%) and congenital malformation (8.10%) [8]. According to WHO estimates, in developing countries, asphyxia caused around 7 deaths per 1000 live birth, where as in developed countries this portion was less than 1.9

In our study regarding the gestation 70.60% were preterm and 29.4% were term. The same finding was found in a study conducted in Medical College and Teaching Hospital, Kathmandu that is 81.25% were preterm births while 18.75% were term [9]. Another study conducted by Rai *et al* showed perinatal deaths more at gestational age <34 weeks and at >40 weeks,9 which has different findings with this study. [10]

Regarding the maternal age, in our study high neonatal mortality rate observed between the maternal age group of 19-25yrs (27.8%) followed by the age group of 25-35yrs(24.5%). In Duhok, 52.6% were 20–29 and 35.3% were 30–39 years old [11]. Another study done in Sikkim revealed that 57.5% were of 18-25 years and 32.5% were above 35 years of age had more neonatal deaths [12].

About the sex of the baby; 57.9%were male and 42.1%were female. In a study conducted by Saraswoti Kumari *et al* 102 (54.5%) were male and 85 (45.5%) were female [13]. In a study conducted in Kathmandu showed 50% were male and 50% female [9].

Internal audit lacunae:

- To improve manpower for subsequent, follow up of babies.
- Careful FH monitoring.
- Decision for LSCS to be taken earlier in high-risk cases.
- Limit the number of PVs to avoid early onset sepsis.

- Paediatric PGs to do ward rounds and write notes in case sheets.
- Level 1 babies to attend ward assistant rounds without fail.
- Exclusive breastfeeding to be monitored by Health care providers.
- Method of breastfeeding to be monitored.
- For VBAC cases, careful maternal and fetal monitoring is mandatory.
- Syntocinon monitoring chart to be done properly.
- Avoid prolonged labor.
- Antibiotic Guidelines for PROM to be followed.
- As sepsis is the most common cause of perinatal mortality, all steps to prevent sepsis to be followed without fail.
- Babies of diabetic mothers usually go for hypoglycaemia within 12-24 hours of life
- BW less than 1.8kg to be admitted to NICU.
- Babies of thyroid disease mothers - TFT to be done on 3rd postnatal day for babies
- IUGR babies to be admitted in NICU.
- Obstetric history taking to be written in detail to identify high risk cases.
- If any obstetric high-risk factors, the obstetrician can request the paediatrician for baby admission.
- Protocol for gel induction was emphasised- preinduction and post induction CTG and FH monitoring every 15 minutes.
- For all PPROM cases, to start T ERYTHROMYCIN 250mg qid.
- Blood sugar monitoring for babies of diabetic mother as they are more prone for hypoglycemia within 12 to 24 hrs of birth.

Conclusion

Neonatal mortality is one of the indicators for the health care system. Preterm deliveries, hypertensive disorders of pregnancy are the major causes for the neonatal mortality

audited in our institution. Hence early diagnosis, control and serial monitoring of hypertensive disorders of pregnancy could reduce the neonatal mortality rate invariably. However steps must be taken to reduce preterm deliveries of unknown reasons by regular antenatal follow up, history and examination of the patients.

References

1. Harding EBM, Harrington LT, Lockwood CM, Duncan Brown Daftary S, Sudip Chakravarti S, ed. Manual of Obstetrics, 3rd ed. Reed Elsevier India Pvt. Limited; 2011.
2. JR, Hall AC, Brown MA, *et al.* Perinatal and neonatal mortality. Br Med J. 1980; 281(6254):1567.
3. Census of India Website: SRS Statistical Report 2013. Available from: https://www.censusindia.gov.in/vital_statistics/srs_reports_2013.html. Accessed on 11 February 2022.
4. Manandhar SR, Manandhar DS, Adhikari D, Shrestha J, Rai C, Rana H, Paudel M. Analysis of health facility based perinatal verbal autopsy of electoral constituency 2 of Arghakhanchi District, Nepal. Journal of Nepal Health Research Council. 2015 Sep 8.
5. International Journal of Reproduction, Contraception, Obstetrics and Gynecology Upadhyay HJ *et al.* Int J Reprod Contracept Obstet Gynecol. 2022 Dec;11(12):3368-3371.
6. Dhakne, Perinatal death: review of causes, risk factors for perinatal deaths in low resource setting and study of different classification systems for classifying perinatal death. PhD diss., 2018.
7. Daftary S, Sudip Chakravarti S, ed. Manual of Obstetrics, 3rd ed. Reed Elsevier India Pvt. Limited; 2011.
8. Pancholi N. Study of cases with perinatal mortality. International Journal of Reproduction, Contraception, Obstetrics and Gynecology. 2019 May 1;8(5):1719-24.
9. Trosclair K, Dhaibar HA, Gautier NM, Mishra V, Glasscock E. Neuron-specific Kv1. 1 deficiency is sufficient to cause epilepsy, premature death, and cardiorespiratory dysregulation. Neurobiology of disease. 2020 Apr 1; 137:104759.
10. Dwa YP, Bhandari S. Prevalence of Perinatal Deaths in a Tertiary Care Hospital of Nepal. JNMA J Nepal Med Assoc. 2019 May- Jun; 57(217):164-7.
11. Hebbar S, Rai L, Adiga P, Guruvare S. Reference ranges of amniotic fluid index in late third trimester of pregnancy: what should the optimal interval between two ultrasound examinations be? Journal of pregnancy. 2015 Jan 15;2015.
12. Mohammed AAAG, Al-aaragi ANH, Merzah MA. Knowledge, Attitude, and Practice Regarding Diabetic Mellitus among a Sample of Students at Technical Institute of Karbala. Med J Babylon. 2018;15(2):164–8
13. Srivastava D, Sharma D, Kharkwal D, Chaudhary D. A study of causes of perinatal mortality in tertiary centre in Bundelkhand region in India. Int J Reprod Contraception, Obstet Gynecol. 2015;4(1):43-6.
14. Bhattarai SK, Ghimire R, Duwadi S, Khadka R, Gautam K. Perinatal Mortality among All Deliveries in a Tertiary Care Center: A Descriptive Cross-sectional Study. JNMA: Journal of the Nepal Medical Association. 2021 Nov;59(243).