

Analysis of Perinatal Mortality in a Tertiary Care Hospital in India: A Retrospective Observational Study

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Received on: 19 June 2022; Accepted on: 08 August 2022; Published on: 16 November 2022

ABSTRACT

Aim: To analyze the perinatal mortality rate in a tertiary care center.

Background: To identify possibly responsible maternal risk factors in a tertiary care hospital in developing country.

Methodology: Data of perinatal deaths from 1 January 2019 to 31 December 2019 was collected from monthly perinatal mortality records. All patients with fetal death after 28 weeks of pregnancy till the period of 7 days after neonatal birth were included in this study.

Results: The study conducted at our hospital aimed at investigating the causes of perinatal mortality and related maternal risk factors resulting in perinatal mortality. The total confinement number was 6,688; among these, the number of fresh stillbirth was 155, macerated stillbirth was 137, and neonatal death was 24. Among the 316 perinatal deaths, 241 deaths (69.6%) were noted before 37 weeks of pregnancy and 75 deaths were noted after 37 weeks of pregnancy (15.18%). Out of 316 deaths, 100 deaths observed in patients induced for labor. Of these, 100 neonates, 88 delivered vaginally and 12 neonates delivered by cesarean section. The 69 neonates (21.83%) deaths observed in the patients who had undergone cesarean section. A total of 33 (10.44%) deaths resulted due to birth asphyxia, 72 (22.78%) deaths observed due to preterm delivery, 22 (6.96%) deaths were due to congenital anomalies. Preterm was one of the most important risk factors observed in 72 (22.78%) women with perinatal deaths.

Conclusion: Prematurity, low birth weight (LBW), no proper wrapping of newborns, and no guidance and proper training to mothers were significantly associated with higher probability of neonatal mortality.

Keywords: Low birth weight, Perinatal mortality, Prematurity.

Journal of South Asian Federation of Obstetrics and Gynaecology (2022); 10.5005/jp-journals-10006-2111

INTRODUCTION

Perinatal mortality is defined as total number of stillbirths and deaths in the first week of life by World Health Organization. Perinatal period refers to 28 completed weeks of conception to seven days after birth of neonate.¹ Reporting of perinatal mortality rate is done on yearly basis. It forms a majorly displays the quality of health care delivery in prenatal, intrapartum, newborn attention and thus plays a primarily role in delivering information needed to improvise health conditions of pregnant women and neonates.² In developing countries, perinatal mortality is 5 times more than the developed countries. During intrapartum period and delivery, approximately 50% of stillbirths and early neonatal deaths were noted.³ Yearly, more than 1 million newborn babies die on the first day of birth^{4,5} and approximately 1.3 million stillbirths during labor and childbirth.⁶ Prematurity, LBW, obstructed labor, infection, and pregnancy complications contribute for the majority of these perinatal grief.⁷ Over the period of years, the perinatal mortality rate has reduced globally as well as in developing countries such as India but we are still lagging behind in achieving targets of sustainable development goals (SDGs). Thus, treating each and every pregnant women and newborn equally is the key strategy helping to achieve the SDG target to end preventable perinatal deaths.^{4,8} Hence, this study aims to review systematically the causative factors associated with perinatal mortality in our tertiary care center; thus, providing the proof needed to participate in active interventions to decrease perinatal mortality, and thus helping to achieve the SDG target so that perinatal mortality is reduced to as low as 12 deaths per 1,000 births by 2030.^{4,8}

The aim of the study is to analyze the perinatal mortality rate in tertiary care center with the following objectives:

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How to cite this article: Malewar SS, More V, Dwivedi J. Analysis of Perinatal Mortality in a Tertiary Care Hospital in India: A Retrospective Observational Study. *J South Asian Feder Obst Gynae* 2022;14(5):502–504.

Source of support: Nil

Conflict of interest: None

- To audit the perinatal mortality rate in 1 year (from 1 January 2019 to 31 December 2019).
- To identify possibly responsible maternal risk factors in a tertiary care hospital in developing country.

MATERIALS AND METHODS

This retrospective observational study was conducted in the Department of Obstetrics and Gynecology, Tertiary Care Hospital, Mumbai, India. All patients with the obstetric outcome as perinatal mortality (death of the fetus after 28th week of gestation and/or death of the newborn within 7 days of birth) during the specified time period of 1 year (1 January 2019 to 31 December 2019) were included and analyzed in the study.

Inclusion Criteria

All mothers with the obstetric outcome as perinatal death (death of fetus after 28 weeks of gestation to the period of 7 days of newborn life).

Exclusion Criteria

Patients with gestational age below 28 weeks.

Methodology

After obtaining approval from our institutional scientific and ethical committee, this study was carried out in the Department of Obstetrics and Gynecology. Data of perinatal deaths from (1 January 2019 to 31 December 2019) was collected from monthly perinatal mortality records. All the patients with fetal death after 28 weeks of pregnancy till the period of 7 days of newborn were included in this study. Also, the major factors responsible for stillbirths and early neonatal deaths were identified and taken into account. There was no risk to the patients participating in this study.

Factors that we studied were as follows:

- Medical disease in pregnant women
- Complications during pregnancy
- Intrapartum factors
- Fetal
- Placental
- Socioeconomic

Expected Outcome

This study enabled us to know the perinatal mortality rate and the probable contributing factors responsible for it. The identified preventable factors such as premature birth, LBW, intrapartum complications, infection, and complications during pregnancy were evaluated so that intervention at earlier stage to prevent the stillbirth and early neonatal death could be done through improved quality of antepartum, intrapartum, and postnatal care (PNC).

RESULTS

The study was conducted at our hospital aimed at investigating the causes of perinatal mortality and related maternal risk factors resulting in perinatal mortality. The total confinement number was 6,688; among these, the number of fresh stillbirths was 155, macerated stillbirth was 137, and neonatal death was 24. Among the 316 perinatal deaths, 241 deaths (69.6%) were noted before 37 weeks of pregnancy and 75 deaths were noted after term gestation (15.18%) (Table 1). A total of 34.81% perinatal deaths were reported in patients at maternal age of 20–25 years (Table 2). Regarding the mode of delivery, 127 (40.18%) perinatal deaths occurred after spontaneous vaginal delivery, 7 deaths reported after forceps delivery. Out of 316 deaths, 100 deaths observed in patients induced for labor. Of these 100 neonates, 88 delivered vaginally and 12 neonates delivered by cesarean section. A total of 69 neonates (21.83%) deaths observed in patients who had undergone cesarean section; 9 neonatal deaths reported in patients undergoing hysterotomy; 3 patients had obstetric hysterectomy with neonatal deaths.

Out of 316 deaths, 155 deaths were fresh stillbirths, 137 deaths were macerated stillbirths, and 24 deaths were neonatal deaths. A total of 33 (10.44%) deaths resulted due to birth asphyxia, 72 (22.78%) deaths observed due to preterm delivery, 22 (6.96%) deaths were due to congenital anomalies. A total of 23 neonates had sepsis, and pneumonia observed in 7 neonates (Table 3). A total of 105 (33.22%) perinatal deaths were observed in neonates weighing less than 1,000 gm while 30.06% deaths were seen in neonates with weight between 1,500 and 2,499 gm, 22.46% deaths

Table 1: Relationship between the gestational age and number of perinatal deaths

Gestational age (weeks)	Number of perinatal deaths
28–30	54
31–32	79
33–34	76
35–36	32
37–38	26
39–40	37
>40	12

Table 2: Relationship between the maternal age and number of perinatal deaths

Maternal age (years)	Number of perinatal deaths
<20	5
20–25	110
26–30	109
31–35	62
36–40	25
>40	5

Table 3: Factors responsible for the cause of perinatal mortality

Cause of death	Number of perinatal deaths
Birth asphyxia	33
Congenital anomalies	22
Meconium aspiration syndrome	16
Preterm	72
Pneumonia	7
Respiratory distress syndrome	6
Sepsis	23
Macerated stillbirth	137

Table 4: Relationship between the birth weight and number of perinatal deaths

Birth weight (gm)	Number of perinatal deaths
<1,000	105
1,000–1499	71
1,500–2499	95
>2,500	45

were observed in neonates with weight in between 1,000 and 1,499 gm, and 14.24% were reported in neonates with weight more than 2,500 gm (Table 4).

Preterm was one of the most important risk factors observed in 72 (22.78%) women with perinatal deaths followed by pre-eclampsia responsible for 60 (18.98%) perinatal deaths, and 17 (5.37%) perinatal deaths reported in women with abruption. A total of 17 (5.37%) deaths were reported in women with oligohydramnios and intrauterine growth restriction.

DISCUSSION

In this study, LBW babies had 2.3 times more risk than babies with more than 2,500 gm. Similarly, the study conducted in Central Nepal (Chitwan district) observed that the risk of neonatal deaths was increased by more than 8 times in LBW newborns than in those with normal or more birth weight. This was similar with findings from study done in Zimbabwe 4.67 (95% CI: 3.92–5.57) and also Iran 7.68 (95% CI: 1.49–39.55).^{9,10} Similarly, a study conducted in Nigeria reported that LBW babies are at more risk to die approximately 4.7 times more during neonatal period as compared to neonates with birth weight of 2.5 kg or more.¹¹ There is increased risk of hypothermia, poor immunological function, infection increasing the risk of deaths in neonatal period. Low birth weight babies be given extra attention for giving them healthy life.¹²

A series paper of 2005 Lancet Series on Neonatal Survival reported the speeding up of advancement in newborn health after 2015. Three main factors, such as infections (0.6 million), preterm birth complications (1.0 million), and intrapartum conditions (0.7 million) were responsible for 2.9 million yearly neonatal deaths worldwide. More than 80% of neonatal deaths were because of small-for-gestational age (SGA) and preterm births. The highest preterm birth rates were observed in sub-Saharan Africa and SGA rates were maximum in South Asia. Preterm neonates especially less than 32 weeks of gestation were at the maximum risk of neonatal death and at increased risk of long-term neurological and developmental impairment and non-communicable delays and conditions.

In a study conducted by Kambarami et al. at Harare Central Hospital Neonatal Unit, Zimbabwe, increased neonatal mortality risk were observed in unregistered mother odds ratio (OR) 2.36 (95% CI: 1.98–2.81), LBW OR: 4.67 (95% CI: 3.92–5.57), breech delivery OR: 1.76 (95% CI: 1.39–2.22), prematurity OR: 2.36 (95% CI: 2.09–2.66), birth asphyxia OR: 1.79 (95% CI: 1.51–2.12), and congenital malformations OR: 2.80 (95% CI: 1.72–4.53).⁹ Similarly in a study conducted by Chaman et al. in rural Iran had identified; LBW, prematurity, cesarean section, interconception period less than 24 months and birth order of more than 3 as important risk factors for mortality in neonatal period. In the final model prematurity [adjusted odds ratio (AOR) = 5.57], LBW (AOR = 7.68), cesarean section (AOR = 7.27), birth order of more than 3 (AOR = 6.95), and inter conception period less than 24 months (AOR = 4.65) showed statistical significant association ($p < 0.05$) with neonatal mortality.¹⁰ Also in a study conducted by Lawoyin et al. in rural area of southwestern Nigeria, almost 50% of all infant deaths responsible for resulting in neonatal mortality rate with 32.9 per 1,000. Twelve (37.5%) of neonatal deaths accounted on the day of birth of newborn; 50% of neonatal deaths within 48 hours of birth; 21 (65.6%) accounted within 7 days of neonatal period; and only 11 (34.4%) deaths occurred after 7 days of neonatal period till the completion of first month of birth. The most common factor for cause of death was LBW which resulted in 8 (25%) deaths, whereas sepsis/fever responsible for four (12.5%) and maternal deaths/failure to thrive were responsible for three (9.4%) deaths. Asphyxia resulted in 3 (9.4%) deaths; congenital abnormality, neonatal tetanus, and diarrhea accounted for 1 (3.1%) death each.¹¹ In this study, 40.18% perinatal deaths occurred after spontaneous vaginal delivery while 21.83% deaths observed in patients undergone cesarean section, 10.44% deaths resulted due to birth asphyxia, 22.78% deaths observed due to preterm delivery, 6.96% deaths

were due to congenital anomalies. 23 neonates had sepsis, and pneumonia observed in 7 neonates. In this study, 33.22% perinatal deaths were observed in neonates weighing less than 1000 gm while 30.06% deaths were seen in neonates with weight between 1500–2499 gm, 22.46% deaths were observed in neonates with weight in between 1000–1499 gm, and 14.24% were reported in neonates with weight more than 2500 gm. Preterm was one of the most important risk factors observed in 72 (22.78%) women with perinatal deaths.

CONCLUSION

Prematurity, LBW, no proper wrapping of newborns, and also no guidance and proper training to mothers were significantly responsible for higher probability of neonatal mortality. Further, women empowerment by educating them would lead to the increased survival and care of newborns. Postnatal care facilities must be provided to all mothers after delivery as well as to newborns. Programs targeting mothers as well as newborns should include PNC services. In safe motherhood programs, the pregnant women should be encouraged for immediate and exclusive breastfeeding, baby should be kept dry and warm. These practices should be promoted as healthy post-natal care behavior.

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