

## Study of Obstetric Factors in Perinatal Mortality at a Rural Tertiary Center

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### Abstract

*Background:* Perinatal mortality is an important indicator of maternal care, health and nutrition, it also reflect the quality of obstetric and the pediatric care available. The majority of global perinatal death occurs in the low and middle socioeconomic countries. Our hospital being a tertiary level facility receiving complicated cases from urban as well as remotes areas so this study was carried out here. The present study was conducted to study obstetric factors leading to perinatal mortality at a tertiary centre.

*Materials and Methods:* The present prospective observational study was undertaken in a tertiary centre from October 2016 to March 2018. All perinatal deaths including stillbirths (SBs) and early neonatal deaths within 0-7 days of birth after 28 weeks of gestation were analyzed.

*Results:* Out total 163, 10 cases had congenital malformation. 153 cases i.e. 93.86% had no obvious congenital abnormality. Out of 10 congenital anomalies 2 cases had congenital heart disease. 2 cases had anencephaly. 1 case congenital Diaphragmatic hernia, 3 cases had cleft lip, cleft palate, 2 cases had hydrocephalous.

*Conclusion:* Majority of perinatal deaths are preventable by regular ANC check up and early detection of high obstetric factors before pregnancy and during gestation.

**Keywords:** Perinatal mortality; Antenatal check-up; Risk factors; Maternal complications; Neonatal deaths.

### Introduction

Perinatal mortality is an important indicator of maternal care, health and nutrition, it also reflect the quality of obstetric and the pediatric care available. The majority of global perinatal death occurs in the low and middle socioeconomic countries. A number of studies have shown that suboptimal care, particularly inadequate, inappropriate, or delayed care of complications such as obvious foetal distress, placental abruption, breech presentation, twin pregnancy, or eclampsia, is associated with increased perinatal mortality [1]. The perinatal mortality and stillbirth rates for India is 26 per 1000 birth and 4 per 1000 births respectively [2].

Two thirds of the neonatal deaths occur in first week of life and of these, two third occur in first 24 hours [3]. Health of a mother determines the health of her child and maternal health is in turn affected by health over the life cycle starting from girl child through adolescence and pregnancy [4].

Complication during pregnancy and labour therefore remain important factor to determine

foetal and neonatal survival and health. Our hospital being a tertiary level facility receiving complicated cases from urban as well as remotes areas so this study was carried out here. The present study was conducted to study obstetric factors leading to perinatal mortality at a tertiary centre.

### Materials and Methods

The present prospective observational study was undertaken in a tertiary centre from October 2016 to March 2018. All perinatal deaths including stillbirths (SBs) and early neonatal deaths within 0-7 days of birth after 28 weeks of gestation were analyzed.

Any preterm labour admitted in our hospital received Injection dexamethasone prophylaxis. Mothers with preterm, pregnancy induced hypertension, abruption received vitamin K Injection. Intravenous antibiotics are started in case of any risk factor like maternal infection, preterm labour, pregnancy induced hypertension, abruption, intrauterine death. Routine investigations were sent for mothers including HIV/Hbs Ag/Hemoglobin/blood grouping. In high risk mothers detailed investigations were done.

Patients details were noted in detailed including age, parity, registration for antenatal care at our tertiary centre or outside, referred or not referred, medical complications, complications occurring during antenatal period or during labour, blood group of mother, period of gestation, mode of delivery whether it was intrauterine death, stillbirth or neonatal death, birth weight, any congenital abnormality, intrauterine growth restriction and possible cause of death. In case of Intrauterine death and still birth placenta were examined for any gross abnormalities.

The data was collected through a pre- designed proforma including variables such as maternal age, parity, gestational age, complications during pregnancy and /or labour, mode of delivery and details of perinatal loss particularly birth weight and possible cause of death.

#### Inclusion criteria

- Any intrauterine foetal death occurring from 28 week of gestation to 7 days after birth at tertiary centre.

#### Exclusion criteria

- Any neonatal death occurring in a neonate delivered outside our tertiary centre and referred to neonatal ICU of our hospital.

#### Sample size estimation

According to WHO, Perinatal mortality rate was reported to be 26/1000 births. In our institute there were 5745 deliveries and 163 perinatal deaths during study period. Hence total sample size estimated as 163.

The data was then subjected to statistical analysis using SPSS Version 21 for descriptive statistics and appropriate tests were applied and conclusions were drawn.

### Observations and Results

The present study was conducted among 163 perinatal deaths occurring from 28 week of gestation to 7 days after birth at tertiary centre fulfilling inclusion criteria during the study duration. There were total 5745 deliveries and 163 perinatal deaths. Out of total 163 patients 52 cases i.e. 31.90% were registered and 111 cases i.e. 68.10% cases were unregistered.

Among the total patients who experienced perinatal mortality, 2.45% were below 20 completed years of age, majority i.e. 91.41% were between 20 to 30 years of age, 6.14% were more than 30 years of age. Out of 163 cases 129 cases i.e. 79.14% were multigravida and 34 cases i.e. 20.86% were primigravida (Table 1).

Out of the total 129 multigravida, 6.98% i.e. 9 cases had one or more pregnancy loss with no living child. 12 cases 9.30% had at least 1 previous perinatal death and had at least 1 living child. Majority of cases 108 i.e. 83.72% had no previous perinatal death with at least 1 living child. Out of total 163 cases, 5 cases i.e. 3.07% had multiple gestations. All 5 cases were twin pregnancies. Out of 163 cases 134 cases i.e. 82.21% had no earlier history of any medical disorders and 29 had one or more pre existing medical conditions, commonest being hypertension with 12 cases i.e. 7.36%. In the present study we observed that the most common obstetric factor causing perinatal mortality was Pregnancy Induced Hypertension (Table 2).

Out of all cases, 14 cases i.e. 8.59% were below 1 kg birth weight and 84 cases i.e. 51.53% were between 1 kg and 1.5 kg both together contributing to more than half i.e. 51.53% of perinatal mortality. There were 46 cases i.e. 28.22% between 1.5 to 2 kg. 6.75% i.e. 11 cases between 2 kg to 2.5 kg, 5 cases i.e. 3.07% between 2.5 to 3 kg and 1.84% cases above 3 kg. Out of total cases 163 i.e. 95.70% had vaginal delivery, whereas 4.30% cases had cesarean section. 50 Cases Showed Placental Pathology. On Macroscopic

findings, calcifications were most common. i.e. 64%. On Microscopic findings, calcification seen in 23 cases i.e. 46% cases, Infarction seen in 7 cases i.e. 14% cases. Villous changes seen in 30% case i.e. 15 cases. And only 5 cases i.e. 10% showed leucocytic infiltration (Table 4,5).

Out total 163, 10 cases had congenital malformation. 153 cases i.e. 93.86% had no obvious congenital abnormality. Out of 10 congenital anomalies 2 cases had congenital heart disease. 2 cases had anencephaly. 1 case congenital

Diaphragmatic hernia, 3 cases had cleft lip, cleft palate, 2 cases had hydrocephalous (Table 6).

Out of 163 cases 149 cases were Intrauterine deaths (91.41%). 12 were neonatal deaths (7.36%), and 0.34% i.e. 2 were intrapartum stillbirths. Most common cause for neonatal death was Prematurity and low birth weight. Out of 12 neonatal deaths 8 died because of extreme prematurity with low birth weight. 2 died because of Respiratory distress syndrome and 1 died because of peripheral cyanosis in case congenital heart disease. 1 case died because of congenital anomaly like Diaphragmatic hernia.

**Table 1:** Demographic characteristics

Parameters		No. of cases	Percent (%)
Age in years	<20	4	2.45%
	20-30	149	91.41%
	>30	10	6.14%
	Total	163	100%
<i>Mean ± SD</i>		<i>26.67 years ± 6.59</i>	
Gravida	Multi	129	79.14%
	Primi	34	20.86%
Multiple gestation history	Single	158	96.93%
	Multi	5	3.07%
Obstetric history of multigravida patients	No previous perinatal death	108	83.72%
	At least one previous perinatal death	12	9.30%
	No living child	9	6.98%

**Table 2:** Pre existing Medical conditions

Parameters		No. of cases	Percentage (%)
Medical conditions	None	134	82.21%
	Anaemia (Hb <8 mg/dl)	10	6.13%
	Hypertension	12	7.36%
	Diabetes mellitus	3	1.84%
	Hypothyroid	2	1.23%
	Heart disease	2	1.23%
	Antiphospholipid antibody syndrome	0	0%
Mode of delivery	Vaginal	156	95.70%
	LSCS	7	4.30%
Total		163	100%

**Table 3:** High risk obstetric factors

Obstetric Factors	No.	Percentage (%)
Pregnancy induced hypertension	69	42.33%
Abruption placenta	27	16.56%
Placenta previa	1	0.61%
Rh Isoimmunisation	5	3.07%
Premature rupture of membranes	52	31.90%
IUGR	33	20.24%

**Table 4:** Birth weight

Birth weight (Kg)	No. of cases	Percentage (%)
<1 kg	14	8.59%
1 kg-1.5 kg	84	51.53%
1.5 kg-2 kg	46	28.22%
2 kg-2.5 kg	11	6.75%
2.5 kg-3 kg	5	3.07%
>3 kg	3	1.84%
Total	163	100%
Mean $\pm$ SD	1.397 kg $\pm$ 0.87kg	

**Table 5:** Placental Pathology

Placental Pathology	No. of Cases (163)	Percentage
Placental Pathology	Absent	69%
	Present	31%
Macroscopic findings of placenta	Calcification	64%
	Infarction	12%
	Retroplacental Haematoma.	24%
Microscopic findings of placenta	Calcification	46%
	Infarction	14%
	Leucocytic infiltration	10%
	Avascular villi	13%
	Syncytial Knots	20%
	Basement membrane thickening	40%
	Cytotrophoblastic hyperplasia	27%

**Table 6:** Congenital Abnormality and outcomes

Parameters	No. of cases	Percentage (%)
Congenital Abnormality	Absent	93.86%
	Present	6.14%
Perinatal Loss	Intrauterine Death	91.41%
	Neonatal Death	7.36%
	Intapartum Stillbirth	1.23%
Total	163	100%

## Discussion

Perinatal death is a traumatic experience for both mother and the obstetrician. perinatal mortality is taken as a index of the efficacy of not only antenatal and intranatal care, but also of the socioeconomic condition of the community [5]. The availability of effective antibiotics, establishment of organized blood transfusion services, introduction of routine antenatal care and neonatal facilities has led to decreasing perinatal mortality.

This hospital based study was undertaken to know the causes of perinatal mortality and thus help in its prevention in future. one of the reason for perinatal mortality is poor antenatal visits and late referrals.

In our study, the total no deliveries was 5745 and there were total 163 perinatal deaths. Hence the perinatal mortality was calculated as 28.37 per 1000 births. The current perinatal mortality rate (PMR) of India is 26 per 1000 births [2]. It ranges from 16 per 1000 births in urban areas to 28 per 1000 births in rural areas [2]. Our results were higher than national average but lower than other studies. Our perinatal mortality is higher than national average because of high percentage of unregistered patients came when complication had already occurred.

Raut D et al. [6] conducted a study on perinatal mortality in tertiary centre. The total number of births during their study period was 6460, with 249 perinatal mortalities accounting to perinatal mortality rate of 50.77 per 1000 live births, comprised of 260 still births and 169 early neonatal

deaths. Perinatal mortality rates were highest in teenage group mothers, second gravida, maternal anemia and preterm delivery group.

In our study, total number of live births was 5745, with 163 perinatal mortalities accounting to perinatal mortality rate of 28.37 per 1000 births of which 149 were intrauterine deaths, 2 were intrapartum still births and 12 were early neonatal deaths. Perinatal mortality rates were higher in younger age groups, multigravida and in PIH patients.

Srivastava S et al. [7] conducted a retrospective study over a period of one year from June 2013 to May 2014, which included total 2691 deliveries out of which 184 perinatal deaths occurred, hence perinatal mortality rate was 68.37 per 1000 birth. Out of 68.37% perinatal mortality, majority of perinatal deaths (54.3%) occurred due to preterm low birth weight with or without associated other factors, 8.6% due to congenital anomalies, more than 38% perinatal death due to maternal factor Antepartum Hemorrhage, Eclampsia, Obstructed labour, Malpresentation, medical problem in pregnancy.

In our study perinatal mortality rates was 28.37 per 1000 birth. Most common obstetric factor causing perinatal mortality rate was PIH. Other causes of perinatal mortality were Prematurity, Low birth weight, Congenital anomalies. In our study there were 91.41% intrauterine deaths, 7.36% neonatal deaths and 1.23% stillbirth.

In our study majority of cases i.e. 68.10% were unregistered same as other studies [5-7]. Most of the patients had one or two antenatal visits only before an adverse obstetric event occurred. This is one of the areas in developing country like India needs effort to implement effective antenatal care. When patient present with intrauterine death or advanced labour, nothing much can be done as damage had already been done and no intervention could save the pregnancy and our aim was to minimize mortality.

Though risk of adverse perinatal event increases in teenage and in elderly gravid pregnancy, in our study majority of patients were between 20 years to 30 years of age group. Approximately 91.41% of all deliveries were in females between 20 to 30 years of age, it means 2.45% of patients below 20 years of age and above 30 years of age contributed to 6.14% of perinatal death. This is comparable to many studies like meta analysis of 14 cohort studies by Naoko Kozuki et al. in 2013 [8].

Perinatal mortality were more in multigravida compared to primigravida as noted in other

studies [6,7]. With increasing parity the risk of anemia, increases which predisposes patients to the various risk factors like pregnancy induced hypertension, abruption placenta and also chances of twin gestation increases with age which in itself is a risk factor for increased perinatal loss. Twin pregnancy contributes significantly to perinatal mortality because of risk of premature rupture of membranes, preterm birth, LBW, pregnancy induced hypertension and various other complications. This is comparable to other studies where perinatal mortality is high in twins like other Indira Hanumaiah et al. [9].

Peinatal mortality was more in pregnancies complicated by medical disorders like anemia, hypertension diabetes, similar to other studies like by Hugara siddalingappa et al. [10]. Pre existing maternal disorders are associated with increase perinatal loss and need more aggressive antenatal management. Other studies like Ayushma Jejani [June 2014] [11] showed that anemia was most commonly associated with perinatal loss. In our study hypertension was most commonly associated with perinatal loss similar other study like [(Reddy 2010)] [12]. Pregnancies complicated with pre-existing medical disorders are more likely to develop pregnancy induced hypertension which is also an independent risk factor for perinatal loss.

Pregnancy induced hypertension remains one of the most important obstetric factor for perinatal loss and risk of having an adverse perinatal events increases with age and parity as seen in study by Ananth in 2010 [13].

In our study severe pre-eclampsia and abruption placenta were the important cause of perinatal mortality. Similar findings were noted in other studies [7]. Though there are no strategies at present to prevent these conditions but severity of its effect and mortality can be reduced by effective antenatal care, intranatal care and neonatal care. Unless urgent delivery does not happen, abruption placenta usually results in intrauterine death.

Premature rupture of membranes is cause for prematurity. In our study 31.90% of cases of perinatal loss were associated with premature rupture of membranes. Most cases of maternal infection were associated with premature rupture of membranes. Usually perinatal loss occurs because of prematurity and low birth weight and neonatal septicemia. Preterm birth was the single most important cause of perinatal loss either because premature rupture of membranes or in case of severe uncontrolled pregnancy induced hypertension when preterm induction was mandatory.

Preterm babies have less chance of survival because of asphyxia, hyaline membrane disease, hypoglycemia and septicemia. Our results was comparable to other studies in Ahmadabad [14].

Higher perinatal mortality was seen in pregnancies complicated by intrauterine growth restriction. In our study perinatal loss because of IUGR is 20.24%. Comparable to other study [7].

Perinatal loss due to placenta previa has reduced because of almost universal use of ultrasonography. A patient with even a single visit to a hospital also has a ultasonography report so this condition is fortunately identified and perinatal loss can be minimise. Our study differed from other study where perinatal mortality was high due to placenta previa [15].

Perinatal loss because of rhesus isoimmunisation is only 3.07%. It has reduced due to availability of Anti D injection in all hospital free of cost, all females with rhesus negative blood group receive Anti D injection.

Congenital abnormality was present in total 10 cases i.e. 6.14% commonest being congenital heart disease. it is higher than study by Sujata et al. [5]. Where it was 3.3%. 95.70% were delivered by vaginal route and 4.30% required cesarean delivery. Our cesarean section rates lower than other studies by Bhattacharya S et al. [16]

The most unfortunate perinatal loss was due to meconium aspiration syndrome In our study there were 2 babies ie. 1.23%. who had intrapartum stillbirth due to meconium aspiration syndrome. It was lesser than other studies like [5]. Where it was 6.6%.

In our study we sent placentas for histopathology, Abnormal placental pathology was seen. On Macroscopic findings calcification was most common finding. Other being infraction, retroplacental hematoma. Microscopical findings were calcification, Infraction, villous changes, leucocytic infiltration.

In our study 51.53% of perinatal loss occurred between 1 to 1.5 kg of weight. Whereas study by M.S Kolkila et al. it was 50% [17]. low birth weight remains an important cause of perinatal mortality.

It is important to know that there may be more than one cause for perinatal loss like premature rupture of membrane in a patient with severe pregnancy induced hypertension. The perinatal loss in this case is multi factorial. In our study we have tried to give the primary single most important factor as cause of death but there may be more than one causative factor.

Pregnancy induced hypertension,abruption and preterm are most common causes of perinatal loss. It cannot be prevented, but reduced definitely by early registration, identification of risk factors and good antenatal care. Other important causes were congenital malformation, premature rupture of membrane, intrauterine growth restriction.

### Conclusion

Majority of perinatal deaths are preventable by regular ANC check up and early detection of high obstetric factors before pregnancy and during gestation.

Early referral of the patient, timely intervention in terms of instrumentation or surgery will definitely minimise perinatal mortality.

Paediatrician and obstetrician should have co-ordinated approach to bring down perinatal mortality.

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