

## Determinants of Perinatal Mortality: A Hospital Based Study

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### Abstract

*Introduction:* Progress of quality improvement in health services is expected to reduce perinatal mortality rate. Various studies from all over India have quoted perinatal mortality rate of 60-120/1000 births which is alarmingly high as compared to 10-20/1000 births in developed countries. *Aims & Objectives:* To determine the incidence of perinatal mortality of this hospital, the various causative factors and their impact on perinatal mortality. *Material and Methods:* The present prospective study was carried out from 01-10-2008 to 30-09-2010 in the Department of OBGY in a tertiary care hospital. Complete general and systemic examination to look for any medical or surgical disorder in mother was conducted. *Results:* In this study the perinatal mortality rate was 77.04 per 1000 live births. The PMR was double in unbooked cases as compared to booked cases (Table 3) which reflect importance of antenatal care. PMR was high in para 4 and above as compared to para 2 and least in para 3. PMR was higher in advanced maternal age and teenage pregnancies. PMR per 1000 births is very high in preterm babies than term babies, which is comparable to the findings of all other studies. In the present study (Table 8) perinatal mortality rate in vaginal deliveries was 84.69 per 1000 births. *Conclusions:* Importance should be given on increasing female literacy

as it is closely linked to high parity, poor nutrition, dietary deficiencies, lack of awareness and underutilization of health services. Efforts should be made to reduce the incidence of prematurity and LBW babies as these were the leading causes of perinatal deaths. Periodic composite perinatal audit involving obstetricians, neonatologists and pathologists can improve performance of clinicians by avoiding repetition of clinical mistakes.

**Keywords:** Perinatal Mortality; Vaginal Deliveries; Hypertensive Disorders of Pregnancy; APH; Intrapartum Asphyxia.

### Introduction

Until the 19th century, the main occupation of the obstetrician was saving the life of mother. The child was minor consideration till the late 1950's when there was a change in attitude towards the well-being of the fetus as well. Standards of maternal care have improved in the recent years and the number of Perinatal rather than Maternal deaths is now used as an index of the quality of maternal care.

During the past few decades, advancements of curative services and various health interventions have made the World a safe place to live in. The focus needs to be drawn towards the world within the womb which has impact on health and survival of babies, not only during first few days of life, but also through first year of life. Newborn dies because of poor maternal health, inadequate care during pregnancy, inappropriate management during delivery and first few hours of life and lack of newborn care.

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Progress of quality improvement in health services is expected to reduce perinatal mortality rate. Various studies from all over India have quoted perinatal mortality rate of 60-120/1000 births which is alarmingly high as compared to 10-20/1000 births in developed countries like Sweden where perinatal mortality is mere 4/1000 births.

Still births contribute nearly 60% of perinatal deaths. Hypertensive disorders of pregnancy, APH, intrapartum asphyxia and infections make up a significant proportion of cases for still births, although the proportion of these contributing causes differ in different studies. The tragedy of it all is that 70% of these are preventable with appropriate care and due precautions such as adequate antenatal care, timely interventions and early referral.

#### *Need to Study Perinatal Mortality Rate*

The primary reason for studying dead is to save the living. Although perinatal period occupies less than 0.5 percent (less than 168 hours) of average life span, there are more deaths within this period than during the next 30-40 yrs of life in many developing countries. The importance of perinatal mortality rate is that it gives a good indication of the extent of perinatal wastage as well as the quality and quantity of health care available to the mother and the newborn. Perinatal mortality rate is taken as an index of efficiency of not only antenatal care, but also of the socio-economic condition of the community. Perinatal mortality serves as the most sensitive index of maternal and neonatal care in an area. Perinatal mortality reflects the efficacy of MCH care and hence a sensitive indicator of MCH cares. PMR reflects the general health and sociological features of mother and infants.

The alarmingly high rate of perinatal mortality in Indian makes it a major health problem necessitating a precise definition of the factor which contributes to its high incidence. Repeated evaluation or periodic audit is essential to study its magnitude and causative factors to reduce perinatal deaths which are still alarming. Perinatal mortality has emerged as a reliable yardstick by removing from consideration the dividing line between a still birth and an early neonatal death.

The term perinatal mortality includes still births (late fetal deaths) and early neonatal deaths. The two types of death rates are combined, because the factors responsible for these two types of deaths are often similar, being those operating before and around the time of birth. In the wake of this situation, this study is carried out to know the perinatal mortality rate in this hospital, to analyze and evaluate the trends of

perinatal mortality and to search for effective measures to bring down the perinatal mortality to irreducible minimum.

#### *Aims & Objectives*

1. To determine the incidence of perinatal mortality of this hospital.
2. To determine the various causative factors and their impact on perinatal mortality.

#### **Material and Methods**

The present prospective study was carried out from 01-10-2008 to 30-09-2010 in the Department of OBGY in a tertiary care hospital.

Data was collected in the form of complete maternal history i.e. age, occupation, education, socio-economic status, signification past or family history. Complete general and systemic examination to look for any medical or surgical disorder in mother was conducted.

#### *Inclusion Criteria*

The study included cases of Still Births and Early Neonatal Deaths which were delivered in this Institute only.

#### *Exclusion Criteria*

Babies born outside this hospital and dying in this hospital NICU/PICU were excluded from the study.

#### **Results**

The study was conducted in the Department of OBGY in a tertiary care hospital for two years (from 01-10-2008 to 30-09-2010).

Table 1 shows distribution of cases in this study and respective mortality in each group. Total perinatal deaths during the study were 1064. PMR was 77.04 per 1000 total births. Still birth rate was 43.66 per 1000 total births and early neonatal death rate was 34.90 per 1000 live births.

Table 2 shows that out of total still births, 36.65 % were fresh still births and 63.35 % were macerated still births. This shows that macerated still births contributed significantly ( $P < 0.01$  - Chi square test) to perinatal mortality than fresh still births.

Table 3 shows that perinatal mortality rate (PMR) in unbooked cases was 100.68 per 1000 births and

perinatal mortality rate (PMR) in booked cases was 44.17 per 1000 total births.

So the difference in perinatal mortality in unbooked cases and booked cases was highly significant ( $P < 0.001$  - Z test).

Table 4 shows distribution of perinatal mortality according to parity of women. PMR was highest in para 4 and above. Second highest was in primipara and lowest in para 3.

The perinatal mortality was significantly more ( $P < 0.001$  Chi square test) in para 4 and above and para 1 than in para 2 and 3.

Table 5 shows distribution of perinatal mortality in different maternal age groups. The maximum number of perinatal mortality was found in maternal age  $>30$  years followed by second highest in teenage pregnancies. The mortality in advance age and

teenage group was significantly more ( $P < 0.01$  Chi square test) than in the age group of 20-29 years.

Table 6 shows perinatal mortality according to duration of pregnancy. Perinatal mortality was significantly more ( $P < 0.001$  Chi square test) in pre-term babies as compared to term babies. PMR had declining trend as gestational age advances. Perinatal mortality also increases in postdate pregnancies.

Table 7 shows that low birth weight (LBW) babies contributed nearly two times more to perinatal mortality as compared to normal weight babies. This finding was true for both still births and early neonatal deaths.

Table 8 shows that PMR in vaginal deliveries was 84.69 per 1000 total births as compared to 47.68 per 1000 total births in LSCS births. Ventouse delivery led to PMR of 100 per 1000 total births. This was due

**Table 1:** Still birth rate, early neonatal death rate, perinatal mortality rate

Mortality	Number	Total Births	Rate Per 1000 Births
Still Births	603	13811	43.66
Early Neonatal Deaths	461	13208	34.90
Perinatal Mortality	1064	13811	77.04

**Table 2:** Still birth: fresh / macerated

Still Births	Total No.	Percentage
Fresh	221	36.65
Macerated	382	63.35
P Value		$P < 0.001$

**Table 3:** Perinatal mortality rate in unbooked and booked cases

Status	Total Births	Still Births	Early Neonatal Deaths	Perinatal Deaths	Pmr Per 1000 Births
Unbooked	7608	458	332	790	100.68
Booked	6203	145	129	274	44.17

**Table 4:** Parity and perinatal mortality rate

Parity	Total births	Total live births	Still births	Still birth rate (SBR)	Early neonatal deaths	Early neonatal death rate (NND)	Perinatal deaths	PMR per 1000 births
P1	4695	4480	215	45.79	176	37.21	391	83.28
P2	4557	4366	191	41.91	142	31.16	333	73.07
P3	3590	3465	125	34.81	86	23.96	211	58.77
P4	552	525	27	48.91	28	50.72	055	99.63
> P4	417	372	45	107.91	29	69.54	074	177.45

**Table 5:** Maternal age and perinatal mortality rate

Maternal Age (Years)	Total Births	Total Live Births	Still Births	Early NND	Perinatal Deaths	PMR Per 1000 Births
15-19	603	562	41	24	65	107.79
20-24	7028	6750	278	241	519	73.84
25-29	5629	5396	233	156	379	67.32
$\geq 30$	551	490	61	40	101	183.30

**Table 6:** Duration of pregnancy and perinatal mortality rate

Duration of Pregnancy	Total Births	Total Live Births	Still Births	Early Neonatal Deaths	Perinatal Mortality	PMR per 1000 Births
Preterm	5297	4895	404	313	717	135.35
Term	7410	7272	138	110	248	33.46
Postdate	1104	1041	061	038	099	89.67
Total	13811	13208	603	461	1064	

**Table 7:** Contributions of LBW babies to perinatal mortality

Birth Weight	Still Births	Early NND	Perinatal Deaths	Percentage of Perinatal Deaths
< 2.5 Kg	417	320	737	69.26
>2.5 Kg	186	141	327	30.73

**Table 8:** Perinatal mortality rate in relation to mode of delivery

Mode of Delivery	Total Births	Total Live Births	Still Births	Early NND	Perinatal Deaths	PMR Per 1000 Births
Vaginal	10898	10356	542	381	923	84.69
LSCS	2873	2803	57	80	137	47.68
Ventouse	040	036	04	00	04	100.00

**Table 9:** Sex of baby and perinatal mortality

Sex	Still Births		Early Neonatal Deaths		Percentage Of Perinatal Deaths	
	No	%	No	%	No	%
Male	324	53.73	239	51.84	563	52.91
Female	279	46.26	222	48.15	501	47.08

**Table 10:** Multiple pregnancy and perinatal mortality rate

Delivery	Total Births	Total Live Births	Still Births	Early NND	Perinatal Deaths	Pmr Per 1000 Births
Singleton	13515	12936	579	429	1008	74.58
Twins	296	240	24	32	56	189.18

to the fact that ventouse was applied for the delivery of four fresh still borns, which gave higher PMR in ventouse

Table 10 shows that perinatal mortality rate per 1000 births in twin deliveries was more than two times as compared to perinatal mortality rate per 1000 births in singleton deliveries.

## Discussion

In this study (Table 1) the perinatal mortality rate was 77.04 per 1000 live births. The high perinatal mortality in present study was accounted for the fact that this hospital is referral hospital where the patients with complications are referred from PHCs and nearby hospitals. Many times patients come to the hospital quite late. The patients attending our hospital are mainly illiterate, ignorant and from lower socio economic group.

The PMR at this hospital is comparable with studies of Abdoulaye Hama Diallo [1], Kiran Wassan [2], Das Lucky [3], Mangala Shinde [4] and Manorama Varma [5]. Low PMR (38.5/1000 births) was reported by Pradeep M [6] from Kerala. This may be due to high literacy rate, awareness and adequate antenatal care. Low PMR of 40.99 was also reported by Anjali Kamat [4] in Goa which is shown to be the result of improvement in antenatal care and intensive neonatal care. Oona Campbell [8] from Egypt reported PMR of 34 per 1000 births while Fathia Al-Mejhim [9] from eastern Pvince Saudi Arabia reported PMR of 26.2 per 1000 births.

Higher PMR per 1000 births was observed in studies of Sudarsan Saha [10] and Sujata [11], S.S. Gaddi [12] and Farkhunda Khursheed [13]. The PMR was double in unbooked cases as compared to booked cases (Table 3) which reflect importance of antenatal care. The results of this study are similar to all other studies. In present study (Table 4), PMR was high in para 4 and above as compared to para 2 and least in para 3.

The present study findings were comparable with findings of Ramesh Agarwal [14], Mangala Shinde [4], Anjali Kamat [7], while the studies of Abdoulaye Hama Diallo [1], R. K. Kapoor [15], and Murali Paul [16] and Das Lucy [3] noted high PMR in primigravida.

In present study (Table 5) PMR was higher in advanced maternal age and teenage pregnancies. Same findings have been observed in all other studies. The high PMR in advanced maternal age may be due to high incidence of anaemia, malpresentations and congenital anomalies etc., while in teenage pregnancies, high PMR may be due to increased incidence of malnutrition, PIH, Eclampsia, APH and operative interference.

In the present study (Table 6) it is found that PMR per 1000 births is very high in preterm babies than term babies, which is comparable to the findings of all other studies.

In present study, PMR per 1000 births is more in postdate babies as compared to term babies, which is comparable to Ramesh Agarwal [14], Sudarsan Saha [10] and Das Lucy [3].

The PMR (Table 7) was highest in babies with LBW. The PMR decreased with the increase in the birth weight of the baby. The result of present study is similar to all other studies [4, 6, 7,10, 12, 14, 17, 18].

In the present study (Table 8) perinatal mortality rate in vaginal deliveries was 84.69 per 1000 births which were lower than the studies by Mangala Shinde [4] and S.S. Gaddi [12].

In present study Perinatal mortality rate in LSCS cases was 47.68 per 1000 births. It was lower than Ramesh Agarwal [14], Mangala Shinde [4] and S.S. Gaddi [12].

Perinatal mortality rate per 1000 births in ventouse in present study was 100 per 1000 births, which was higher than the study by Mangala Shinde [4] and lower than the study by S.S. Gaddi [12].

Among the total perinatal deaths (Table-9), 52.91% were male babies which were comparable to studies by Sanjay Rao [19] and Murali Paul [16].

Perinatal mortality rate per 1000 births (Table 10) in twin delivery was almost double as compared to singleton delivery. This finding was comparable to studies of S. Saha [10] and Ramesh Agarwal [10].

## Conclusion

PMR in present study was 77.04 per 1000 births which is quite high. This is because it is a hospital

based data which is not truly representative of the community as it often deals with highly selective high risk pregnant population from which they have been referred to referral centers. Analysis of perinatal death helps the obstetrician to assign the leading causes of perinatal death. Most perinatal deaths occurred amongst unbooked cases which show importance of antenatal care. Prematurity, LBW, poor utilization of ANC services, high parity and advanced maternal age were the leading causes of perinatal deaths.

Universal availability of ANC care, early ANC registration, minimum 3 ANC visits (4 as per WHO), screening of all expectant mothers for high risk factors, early recognition of high risk pregnancies and their timely referral to tertiary care institute would certainly help in reducing the PMR. Importance should be given on increasing female literacy as it is closely linked to high parity, poor nutrition, dietary deficiencies, lack of awareness and underutilization of health services. Efforts should be made to reduce the incidence of prematurity and LBW babies as these were the leading causes of perinatal deaths. Periodic composite perinatal audit involving obstetricians, neonatologists and pathologists can improve performance of clinicians by avoiding repetition of clinical mistakes.

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