

Trends and Determinants of Perinatal Mortality in a Tertiary Care Hospital of Nepal

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ABSTRACT

Introduction: Perinatal mortality rate (PMR) in Nepal is still very high. In major hospitals of Nepal, it is still ranging from 20 to 30 per thousand births. This study was carried out to review the different aspects of PMR and classifying them and identify the causes of perinatal and neonatal deaths and assessing the need for improvement in quality of pregnancy and newborn care.

Methods: It was a retrospective study carried out in Bharatpur Hospital, Chitawan, Nepal. Data of all stillbirths from 22 weeks of pregnancy and neonatal deaths up to seven days of life was taken from monthly perinatal audit and annual mortality review. The data was taken from July 2017 to Jun 2019. All the perinatal deaths were then classified.

Results: Over a two year period, there were total 25,977 births and total death was 369. Thus perinatal mortality rate was 12.3 per thousand births. Still births (fresh and macerated) contributed almost 82.4% of the perinatal deaths and neonatal death contributed 17.6% of total deaths. Deaths related to unexplained intrauterine fetal death (IUFD) showed an increasing trend and have increased by more than 20% in past two years from 39.1% to 60.8%. Deaths due to perinatal asphyxia, neonatal sepsis, respiratory distress syndrome and extreme prematurity were increased.

Conclusions: PMR over the two years has shown increasing trend at our institute. There is need to improve antenatal, obstetric as well as intra-partum services to further reduce the still birth as well as deaths due to prematurity, RDS, neonatal sepsis and perinatal asphyxia.

Key words: IUFD; Macerated; Perinatal Mortality; Stillbirth

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INTRODUCTION

Perinatal mortality comprises of the total number of stillbirths and deaths within the first seven days of life. Perinatal mortality is an important indicator of maternal care and of maternal health and nutrition. The quality of obstetric and paediatric care available directly reflects upon the perinatal mortality. However, social factors exert the main influence on the outcome of a birth and good medical care tends to play equally important role in the perinatal outcome.¹

The main contributor to perinatal and infant mortality is directly associated with maternal mortality.² Globally, 40% of infant mortality and 75% of neonatal mortality occur in perinatal period.³ Worldwide, more than seven million perinatal deaths occur each year.² Notably, more than 8200 babies are stillborn each day in the world while 11000 die within the first week of their birth.^{1,4} World Health Organisation (WHO) estimate world wise PMR was 47 per thousand pregnancies in 2006.¹

Stillbirths and neonatal deaths remain common in many low-income countries. Nepal's most recent estimates of PMR and NMR is 18 per 1000 births and 21 per 1000 live births respectively.⁵ About 43% of deliveries in Nepal occur at home and only 57% are conducted by health personnel at health facility.^{5,6} In developing countries, it is estimated that asphyxia during labor and delivery leads to approximately seven deaths per thousand births, whereas in developed countries it is less than one per thousand births. The main causes of death in developed countries are extreme preterm births and congenital malformations.^{7,8} The demographic survey has shown that there is slight decline in perinatal mortality from 47 to 45 per thousand births over a period of recent five years in Nepal.⁹ In major hospitals in Nepal, PMR ranged from 20 to 30 per 1000 births as per various studies.¹⁰⁻¹² Thus, this study was carried out in Bharatpur Hospital, Bharatpur, Nepal to explore the trend of perinatal mortality and associated causes for it.

METHODS

This is a retrospective analysis of the records of all deliveries conducted at Bharatpur Hospital. Our institute is a 600 bedded tertiary care referral

Hospital with 120 dedicated beds to the Department of Obstetrics and Gynecology. It is situated in Bharatpur, which lies in mid part of Nepal. The data considered for this study was taken from July 2017 to June 2019. Ethical permission from hospital was taken for data collection. In the hospital, the records of perinatal mortality were reviewed on the Maternal and Perinatal Death Surveillance and Response (MPDSR) meeting from the Department of Paediatrics and the Department of Obstetrics and Gynecology every month.

Data collection was done in the still birth form designated by SEARO-WHO, newborn examination and admission form, maternity register and NICU / SNCU admission and death register. Each perinatal death in labour room and NICU / SNCU was taken into consideration. The births before 22 completed gestational weeks and birth weight < 500 grams were excluded from this study. For analysis of contributory factors, maternal age, parity, antenatal visits, gestational age, birth weight, antenatal and cause of perinatal and neonatal death were recorded and entered in SPSS 16 and analysed. The descriptive analysis was performed.

RESULTS

There were total 25,977 births in two year period. In comparison to first year, 917 (3.6 %) deliveries have been increased on second year. The normal vaginal delivery was decreased by 4.5% and complicated delivery also showed increasing trend than previous year (Table1).

Table 2 shows information about perinatal deaths during the study period. There were total of 320 perinatal deaths within two years period with gross perinatal mortality of 12.3 /1000 births. Among the total 320 perinatal deaths, 304 (94.8%) were still births {fresh-55(18%) and macerated-249(82%)} and 16 (5.2%) were early neonatal deaths. Both the still births and neonatal deaths are decreasing in trend in successive year but early neonatal death (birth to < seven days) was increased by 5% and perinatal death (> 22 weeks of gestation to within seven days of life) increased by 5.5% than previous year.

Table 3 shows information about information of death according to birth weight. Most of newborns

Table 1. Distribution of type of delivery in Bharatpur Hospital from July 2017 to June 2019

Delivery type	July 2017 to June 2018 No. (%)	July 2018 to June 2019 No. (%)	Total (2 Years) No. (%)
NVD	9080 (72.45)	9138 (67.96)	18,218 (70.13)
Caeserean	3147 (25.11)	3967 (29.5)	7,114 (27.38)
Complicated	305 (2.43)	340 (2.52)	645 (2.48)
Total	12,532 (48.2)	13,445 (51.8)	25,977 (100)

(61%)—expired were < 1000 gram with total 151 new born deaths in 2017/2018 and in 2018/2019 among the total 218 newborn deaths, most of newborns 118 (54.2%) expired were 1000 - 2500 gram.

Table 4 shows information based on classification according to gestational age in 5 subgroups. Gestational age was divided in 22 - 27 weeks, 28 - 36 weeks, 37 - 41 weeks, > 42 weeks and not known gestational age.

The primary cause of perinatal death among 369 was analysed as five most important causes. The leading cause of death in still birth was unexplained intrauterine foetus death (IUFD). Birth asphyxia, neonatal sepsis, extreme prematurity and low birth weight and respiratory distress syndrome were leading causes of neonatal death respectively in early and late neonatal period. The number of macerated still births has decreased in recent years. Deaths related to unexplained IUFD shows a

Table 3. Distribution of perinatal death in Bharatpur Hospital according to Birth Weight from July 2017 to June 2019

Year	Birth weight (in Grams)			Total (No. & %)
	< 1000 (No. & %)	1000 - 2500 (No. & %)	>2500 (No. & %)	
July 2017 to June 2018	92 (61)	39 (26)	20 (13)	151 (100)
July 2018 to June 2019	38 (17.4)	118 (54.2)	62 (28.4)	218 (100)
Total	130 (35.2)	157 (42.54)	82 (22.22)	369 (100)

Table 2. Distribution of status of Perinatal Death in Bharatpur Hospital from July 2017 to June 2019.

Year	Perinatal Death				
	Fresh (No. & %)	Macerated (No & %)	Total (No & %)	Early NND (6 days) (No & %)	Total Perinatal Death (No & %)
July 2017 to June 2018	22 (18.5)	97 (81.5)	119 (100)	7 (22)	126 (83.5)
July 2018 to June 2019	33 (18)	152 (78)	185 (100)	9 (27)	194 (89)
Total	55 (18)	249 (82)	304 (100)	16 (24.6)	320 (100)

decreasing trend and have decreased by more than 6% than the previous year from 78.8% to 72.9%. Deaths due to perinatal asphyxia, RDS and extreme prematurity were increased. Of total 320 perinatal deaths, almost 304 (95%) is contributed by stillbirth (fresh and macerated) followed by early neonatal death (< 7 days), 16 (5%). (Table 7)

DISCUSSION

Perinatal mortality (PM) refers to the death of a fetus or neonate and is the basis to calculate the

Table 4. Perinatal Death according to gestational age in Bharatpur Hospital according to birth weight from July 2017 to June 2019

Year	Gestational age (In weeks)					Total (No. & %)
	22 - 27 (No. & %)	28 - 36 (No. & %)	37 - 41 (No. & %)	> 42 (No. & %)	Not known (No. & %)	
July 2017 to June 2018	82 (54.3)	39 (25.8)	28 (18.5)	2 (1.3)	0	151 (100)
July 2018 to June 2019	35 (16)	94 (43)	81 (37.10)	3 (1.37)	5 (2.29)	218 (100)
Total	117 (31.7)	133 (36)	109 (29.5)	5 (1.35)	5 (1.35)	369 (100)

Table 5. Perinatal Death according to Antenatal Care in Bharatpur Hospital according to Birth Weight from July 2017 to June 2019

Year	No. of Antenatal Care During pregnancy			
	1-3 (No, %)	> 4 (No, %)	NO (No, %)	Total (No, %)
July 2017 to June 2018	85 (56.2)	44 (29.1)	22 (14.56)	151 (100)
July 2018 to June 2019	95 (43.57)	56 (25.6)	67 (30.7)	218 (100)
Total	180 (48.78)	100 (27.1)	89 (24.1)	369 (100)

perinatal mortality rate. Variations in the precise definition of the perinatal mortality exist, specifically concerning the issue of inclusion or exclusion of early fetal and late neonatal fatalities. The WHO defines perinatal mortality as the "number of stillbirths and deaths in the first week of life per 1,000 total births, the perinatal period commences at 22 completed weeks of gestation, and ends seven completed days after birth", but other definitions have been used. Globally, an estimated 2.6 million neonates died in 2013 before the first month of age down from 4.5 million in 1990. The United Kingdom has perinatal mortality (PM) about 8 per 1,000 and varies markedly by social class. According to NDHS 2016, the Nepal has perinatal mortality rate is 31/1000birth and in our study is 12.3/1000 birth.

In this study, we found over the period of two years, there were total 25,977 births and total death was 369. Among them, there were 320 perinatal deaths and thus giving a perinatal mortality of 12.3 per thousand births. Still births (fresh and macerated) contributed almost 82.4% of the

Table 6. Perinatal death according to Maternal Age in Bharatpur Hospital according to Birth Weight from July 2017 to June 2019

Year	Maternal Age (In Years)				
	< 20 (No, %)	20 - 35 (No, %)	> 35 (No, %)	Don't Know (No, %)	Total (No, %)
July 2017 to June 2018	29 (19.2)	119 (78.8)	1 (0.66)	2 (1.32)	151 (100)
July 2018 to June 2019	34 (15.59)	173 (79.3)	11 (5)	0 (0)	218 (100)
Total	63 (17.07)	292 (79.1)	12 (3.25)	2 (0.54)	369 (100)

perinatal deaths and neonatal deaths contributed 17.6% of total deaths; deaths related to unexplained intrauterine foetal death (IUFD) showed an increasing trend and have increased by more than 20% in past two years from 39.1% to 60.8%. Deaths due to perinatal asphyxia, neonatal sepsis, respiratory distress syndrome and extreme prematurity were also increased.

In our institute, the increase in delivery rate each year has been there, perhaps due to easy access and skilled human resources availability round the clock. As the Government hospitals are now providing monetary incentives (Travel cost to hospital and ANC checkup incentives) to the families if they deliver in the Government hospital, there has been increasing trend in institutional deliveries.

A two-year perinatal audit done by Shrestha et al at Kathmandu Medical College Teaching Hospital, Kathmandu, Nepal, has also shown that almost 44% of PMR was contributed by still birth.¹³

Table 7. Primary Cause of Death in Bharatpur Hospital according to Birth Weight from July 2017 to June 2019

Year	Primary cause of Death					
	Unexplained IUFD (No. & %)	Birth Asphyxia (No. & %)	Infection (sepsis) (No. & %)	Extreme prematurity / LBW (No. & %)	RDS (No. & %)	Total (No. & %)
July 2017 to June 2018	119 (78.8)	9 (5.9)	10 (6.62)	7 (4.6)	6 (3.97)	151 (100)
July 2018 to June 2019	159 (72.9)	21 (9.60)	13 (5.9)	14 (6.4)	11 (5.04)	218 (100)
Total	278 (75.33)	30 (8.1)	23 (6.2)	21 (5.69)	17 (4.6)	369 (100)

Though PMR has decreased by 41%, it is not satisfactory as compared to the study done by Das et al. In their study conducted in hospital in Orissa, India, they have achieved reduction on PMR by almost 50% over 10 year period and 60% of the perinatal death was contributed by still birth with decline in SBR by 43% in that period.¹⁴ In contradictory to the 13 years study done by Shrestha M et al on trends in perinatal mortality in Tribhuvan University Teaching Hospital which had shown still birth 50% of all the perinatal deaths.¹⁵ In our study, we found the still birth contributed 95.0%, among which IUFD contributed 75.0% mortality. Similarly, we found the neonatal mortality contributed 17.6% of the total newborn deaths. Over these years it has decreased by 55%.

In this study, the early newborn death showed increasing trend. Deaths due to extreme prematurity and extremely low birth weight are alarming presently. It might be increased by due to the fact that many complicated cases are being referred in our hospital. We are providing tertiary care for obstetric problems and have started NICU services with well-equipped instruments, trained health staffs and free new born care services. The availability of continuous positive airway pressure (CPAP) and mechanical ventilation for past four years has increased our newborn care. Presently, there has been hardly any referral out of the hospital and this has increased the number of total deaths in the hospital itself. As most of the preterm deliveries are unpreventable, prevention of this death mainly depends on neonatal care with aggressive respiratory and cardiovascular treatments including surfactant therapy, mechanical ventilation and vasopressor supports.^{16,17}

Approximately 90% of the 5.7 million perinatal deaths suffered globally occur in developing countries (WHO 2006b). Despite progress made in reducing maternal, infant and perinatal deaths due to various safe motherhood initiatives, much still

needs to be done in most developing countries. In Nepal, the MMR decreased substantially from 539 per 100,000 live births in (WHO, 2007) 1996 (NFHS) to 259 per 100,000 live births. The under-five mortality declined from 142 in 1990 to 39 in 2016. Infant mortality declined from 99 in 1990 to 32 in 2016. Neonatal mortality declined from 53 in 1990 to 21 in 2016⁵ while the PMR declined from 45 in 2006 to 37 per 1,000 pregnancies.¹⁸

Since it is a retrospective study and data is collected from monthly and yearly perinatal audit, it could not identify the important factors contributing to still birth and neonatal deaths well as birth asphyxia, neonatal sepsis, extreme prematurity/ low birth weight and respiratory distress syndrome and knowledge on danger signs, nutrition habit, maternal education, family support during pregnancy etc.

Thus, well trained staffs, resident doctors' and consultants with periodic refresher course in neonatal care and upgrading the facilities would help to decrease these deaths. Regarding deaths due to asphyxia and sepsis, they are almost static. So, there is dire need to focus more on obstetric care and management and infection control in our unit.

CONCLUSIONS

Perinatal deaths have shown an increasing trend in successive years. PMR has not decreased as other maternal and child health parameter are decreasing in the same time frame. High perinatal mortality is present amongst the mothers who did not attend the antenatal checkups. We need to focus on proper antenatal checkups and provide adequate health education with registration of all pregnant women with early detection of high-risk pregnancy and their timely management to prevent of the maternal, foetal, cause for perinatal deaths.

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