

Two year audit of perinatal mortality at Kathmandu Medical College Teaching Hospital

Shrestha M¹, Manandhar DS², Dhakal S³, Nepal N⁴

^{1,3,4} Medical Officers, ² Head of Department, Department of Pediatrics, Kathmandu Medical College, Sinamangal

Abstract

Introduction: Perinatal mortality rate is a sensitive indicator of quality of care provided to women in pregnancy, at and after child birth and to the newborns in the first week of life. Regular perinatal audit would help in identifying all the factors that play a role in causing perinatal deaths and thus help in appropriate interventions to reduce avoidable perinatal deaths.

Aims and objectives: This study was carried out to determine perinatal mortality rate (PMR) and the factors responsible for perinatal deaths at KMCTH in the two year period from November 2003 to October 2005 (Kartik 2060 B.S. to Ashoj 2062).

Methodology: This is a prospective study of all the still births and early neonatal deaths in KMCTH during the two year period from November 2003 to October 2005. Details of each perinatal death were filled in the standard perinatal death audit forms of the Department of Pediatrics, KMCTH. Perinatal deaths were analyzed according to maternal characteristics like maternal age, parity, type of delivery and fetal characteristics like sex, birth weight and gestational age and classify neonatal deaths according to Wigglesworth's classification and comparison made with earlier similar study.

Results: Out of the 1517 total births in the two year period, 22 were still births (SB) and 10 were early neonatal deaths (ENND). Out of the 22 SB, two were of < 1 kg in weight and out of 10 ENND, one was of <1 kg. Thus, perinatal mortality rate during the study period was 19.1 and extended perinatal mortality rate was 21.1 per 1000 births. The important causes of perinatal deaths were extreme prematurity, birth asphyxia, congenital anomalies and associated maternal factors like antepartum hemorrhage and most babies were of very low birth weight. According to Wigglesworth's classification, 43.8% of perinatal deaths were in Group I, 12.5% in Group II, 28.1% in Group III, 12.5% in Group IV and 12.5% in Group V.

Discussion: The perinatal death audit done in KMCTH for 1 year period from September 2002 to August 2003 showed perinatal mortality rate of 30.7 and extended perinatal mortality rate of 47.9 per 1000 births. There has been a significant reduction in the perinatal mortality rate in the last 2 years at KMCTH. Main reasons for improvement in perinatal mortality rate were improvement in care of both the mothers and the newborns and the number of births have also increased significantly in the last 2 years without appropriate increase in perinatal deaths.

Conclusion: Good and regular antenatal care, good care at the time of birth including appropriate and timely intervention and proper care of the sick neonates are important in reducing perinatal deaths.

Prevention of preterm births, better care and monitoring during the intranatal period and intensive care of low birth weight babies would help in further reducing perinatal deaths.

Key words: Perinatal mortality rate (PMR), still births, early neonatal death (ENND), Total perinatal death (PND)

The period between 28 weeks of gestation to the first 7 days after birth of a baby is called the perinatal period. Thus perinatal mortality rate (PMR) is a very sensitive indicator of quality of services provided to the mother and the infant during the perinatal period¹. Regular audit of perinatal mortality will help to find out preventive factors and thus help in reducing perinatal mortality rate.

WHO estimates that globally four million still births and four million neonatal deaths occur each year². 98% of these deaths occur in the developing countries including Nepal. Reducing these deaths is a

moral imperative and essential for the achievement of Millennium Development Goals (MDG-4)³. The Nepal Demographic Health Survey (NDHS) 2001 reported a national PMR of 47.4 per 1000 births which is very high and suggests that the services provided to the mothers and their newborns in Nepal is quite poor.

Correspondence

Prof. Dharma S. Manandhar
Head, Department of Pediatrics
Kathmandu Medical College Teaching Hospital, Sinamangal
Email: dsm@healthnet.org.np

Aims and objectives

- To determine perinatal mortality rate (PMR) and the factors causing it at KMCTH in the two year period from November 2003 to October 2005 (Kartik 2060 B.S. to Ashoj 2062 B.S.).
- To find out important factors causing perinatal deaths using Wigglesworth's classification and help in developing appropriate interventions to reduce those factors.

Methodology

This is a prospective study of the entire stillbirths and early neonatal deaths that occurred in KMCTH during the two year period from November 2003 to October 2005. The data of each perinatal death were filled in the standard perinatal death audit forms of the Department of Pediatrics, KMCTH. The perinatal deaths were analyzed according to maternal characteristics like maternal age, parity, type of delivery and fetal characteristics like sex, birth weight, and gestational age. The main factors causing perinatal deaths were determined by classifying neonatal deaths according to Wigglesworth's classification. Lastly comparison of this study was made with similar earlier study done from September 2002 to August 2003 in KMCTH

Results

Out of the 1517 total births in the two year period, 22 were still births (SB) and 10 were early neonatal deaths (ENND). Out of the 22 SB, two were less than 1 kg in weight and out of 10 ENNDs, one was less than 1 kg. Perinatal mortality rate during the study period was **19.1** and extended perinatal mortality rate was **21.1** per 1000 births. Most of the births were normal delivery while 29.7% of total births were delivered by caesarean section and 4.3% were instrumental delivery (Table 1).

Out of total perinatal deaths, 87.6% of mothers were of the age group 20-35 years while 6.2% of perinatal deaths were in mothers of less than 20 years and more than 35 years of age. About 56% of total

perinatal deaths occurred in primi gravida mothers, 31.2% of PNDs occurred in multigravida mothers and remaining 12.5% of PNDs occurred in grand multi gravida mothers. Among the total perinatal deaths, 50% of them were delivered by normal delivery, 31.3% were delivered by Caesarian section, 9.4% by breech delivery, 6.2% were premature delivery and 3.1 % were twin deliveries (Table 2). 62.5% of total perinatal deaths were male and 37.5% were female.

9.4% of total perinatal deaths were of less than 1 kg at birth. 19% of total perinatal deaths had a birth weight between 1 kg to less than 1.5 kg and PMR in this weight group was 750 per 1000 births. The group with weight between 1.5kg to less than 2.5 kg comprised 31.2% of total perinatal deaths and PMR in this weight group was 77.5 per 1000 births. When the birth weight was more than 2.5 kg, PMR was only 8.8 per 1000 births. (Table 3)

About 60% of total PNDs were preterm births (Table 4). About 77 % of still births were macerated and 33% were fresh still births. Among the causes of still births, 27.2% were due to maternal factors like antepartum hemorrhage, obstructed labor, oligohydramnios, severe pre-eclampsia, 36.4% were due to fetal factors like congenital anomalies, tight cord around neck, cord prolapse and 36.4% were due to unknown factors (Table 5).

Among the causes of early neonatal deaths (ENND), 60% were due to extreme prematurity, 20 % due to birth asphyxia and 10% each due to congenital anomalies and septicaemia (Table 6). 60% of ENNDs died within 1- 24 hours of birth while 20% of ENNDs died within 24-72 hours of birth and 20% of ENNDs died after 72 hours of birth. 80% of ENNDs had moderate birth asphyxia at birth and 20% had severe birth asphyxia at 1 minute APGAR scoring (Table 12). According to Wigglesworth's classification, 43.8% of perinatal deaths were in Group I, 12.5% in Group II, 28.1% in Group III, 12.5% in Group IV and 12.5% in Group V (Table 7).

Table 1: Distribution of deliveries and perinatal mortality in two year period (November 2003 to October 2005)

Category	No.
Total no. of births	1517
Total no. of still births	22
Total still birth rate	14.5
Total no. of still births (excluding < 1kg)	20
Total still birth rate (excluding < 1kg)	13.4
Total no. of ENNDs	10
Total ENND rate	6.7
Total no. of ENNDs (excluding <1 kg)	9
Total ENND rate (excluding <1 kg)	6.1
Total perinatal death	32
PMR per 1000 live births	19.1
Extended PMR per 1000 live births	21.1
Caesarean section out of total births (in %)	451 (29.7%)
Instrumental delivery out of total births (in %)	64 (4.2 %)

Table 2: Distribution of types of delivery of perinatal deaths

Types of delivery	SB		ENND		Total PND	
	No.	%	No.	%	No.	%
Normal delivery	14	63.6	2	20	16	50
Caesarian section	5	22.7	5	50	10	31.3
Breech delivery	3	13.7	0	0	3	9.4
Twin delivery	0	0	1	10	1	3.1
Premature delivery	0	0	2	20	2	6.2
Total	22	100	10	100	32	100

Table 3: Distribution of perinatal deaths according to weight

Weight	SB		ENND		Total PND		Total births	PMR per 1000 births
	No	%	No.	%	No.	%		
< 1kg	2	9.1	1	10	3	9.4	3	1000
1- < 1.5 kg	3	13.6	3	30	6	18.8	8	750
1.5- < 2.5	7	31.8	3	30	10	31.2	141	77.5
> 2.5 kg	10	45.5	3	30	13	40.6	1369	8.8
Total	22	100	10	100	32	100	1517	21.1

Table 4: Distribution of perinatal deaths according to gestational age

Gestational age	SB		ENND		Total PND	
	No.	%	No.	%	No.	%
< 28 weeks	2	9.1	2	20	4	12.5
28 - 36 weeks	9	40.9	6	60	15	46.9
37 - 41 weeks	10	45.5	1	10	11	34.4
42 weeks and above	1	4.5	1	10	2	6.2
Total	22	100	10	100	32	100

Table 5: Causes of still birth

Causes	SB	%
Maternal factors: Intrapartum asphyxia	6	27.2
a) Antepartum Haemorrhage	3	13.6
b) Obstructed labour	1	4.6
c) Oligohydramnios	1	4.5
d) Severe pre- eclampsia	1	4.5
Foetal factors:	8	36.4
a) Congenital anomalies	3	13.5
b) Tight cord around the neck	2	6.7
c) True knots formed of umbilical cord	1	4.5
d) Cord prolapse	2	6.7
Unknown	8	36.4
Total	22	100

Table 6: Causes of ENNDs

Causes	ENND	%
Extreme prematurity	6	60
Birth asphyxia	2	20
Septicaemia	1	10
Congenital anomalies	1	10
Total	10	100

Table 7: Perinatal Death Analysis by Wigglesworth's classification

Wigglesworth's classification	SB		ENND		Total PND	
	No.	%	No.	%	No.	%
Group I	14	63.6	0	0	14	43.8
Group II	3	14.6	1	10	4	12.5
Group III	3	14.6	6	60	9	28.1
Group IV	2	9.2	2	20	4	12.5
Group V	0	0	1	10	1	3.1
Total	22	100	10	100	32	100

Table 8: Comparison of present perinatal death audit with previous perinatal death audit done from October 2002 to September 2003

Category	Earlier study (October 2002 to September 2003)	Present study (November 2003 to October 2005)
PMR	30.7	19.1
Extended PMR	47.9	21.1
Caesarian rate in %	26.4	29.7
Perinatal death of LBW in %	70.5	62.5
Wigglesworth's classification		
Group I (%)	18.5	43.8
Group II (%)	14.8	12.5
Group III (%)	31.3	28.1
Group IV (%)	40.7	12.5
Group V (%)	3.7	3.1

Table 9: Comparison of perinatal mortality rate and extended perinatal mortality rate of KMCTH with major hospitals in and out of Kathmandu and whole Nepal

	KMC ('03-'05)	Patan Hospital ('02)	Prasuti Griha ('04-'05)	TUTH ('01)	NMC ('98-'02)	Bheri Zonal Hospital ('97)	Tansen Mission hospital ('97)	Kathmandu Model Hospital ('96-'98)	Nepal ('01)
PMR (per 1000 births)	19.1	22.4	29.5	24.4	29.4	138.8	91.2	34.1	47
EPMR (per 1000 births)	21.1	24.7	34.8		32.6				

Discussion

The perinatal death audit done earlier in KMCTH for one year period from September 2002 to August 2003 showed a perinatal mortality rate of 30.7 and extended perinatal mortality rate of 47.9 per 1000 births⁴(Table 8). There has been a significant reduction in the perinatal mortality rate in the last 2 years at KMCTH. The main reasons for decrease in perinatal mortality rate were improvement in care of both the mother and the newborns and the number of births have also increased significantly in the last 2 years without a concurrent increase in perinatal deaths. There has also been a slight increase in caesarean section rate from 26.4 % to 29.7%. This study also shows a huge increase in macerated still births (Group I of Wigglesworth's classification) from 18.5% to 43.8%. On the other hand, deaths due to birth asphyxia have decreased significantly from 40.7% to 12.5%. This shows that intrapartum care

has improved over the last two years. The report "State of the World's Newborns: Nepal" states that low birth weight babies is the leading cause of perinatal mortality in major hospitals like Maternity hospital (75% of ENNDs are LBW babies), Patan Hospital (66%) and TUTH (84%). KMCTH too has a high percentage of low birth weight babies among total perinatal deaths which is 62.5%. Though prematurity is still the leading cause of early neonatal deaths, the slight fall in Group III of Wigglesworth's classification shows that deaths due to prematurity has fallen in the last two years.

PMR and EPMR in this hospital during the study period have been compared to Patan Hospital⁵, Prasuti Griha⁶, Tribhuvan University Teaching Hospital (TUTH)⁷, Bheri Zonal Hospital⁸, Tansen Mission Hospital⁹, Kathmandu Model Hospital¹⁰,

Nepal Medical College Teaching Hospital¹¹ and also to that of whole Nepal¹² (Table 9). The PMR and extended PMR of KMCTH during the study period is comparable to that of Patan Hospital while it is significantly lower than that of Prasuti Griha (Maternity Hospital) and other hospitals in and outside Kathmandu valley. The possible factors for such a low perinatal mortality rate are good antenatal care, good intrapartum care including use of partograph and timely intervention whenever any problem was detected. Locally made low cost equipments which are used in special care baby unit of KMCTH have been found to be adequate in managing most of the sick neonates¹³. Use of such equipments drastically cuts the cost of newborn care in hospitals. The commonest cause of perinatal deaths in Maternity Hospital was birth asphyxia, sepsis in TUTH while prematurity was the major cause of perinatal deaths in other hospitals including KMCTH. Since prematurity is the leading cause of early neonatal deaths, reduction of further deaths require intensive care of sick neonates by use of ventilators, administration of surfactants and parenteral nutrition.

Conclusion

Most of the perinatal deaths in this study occurred in Group I (macrated still births) and Group III (death due to immaturity) of Wigglesworth's classification which showed that extreme prematurity with very low birth weight babies and macrated still births were the commonest causes of perinatal deaths.

Good and regular antenatal care, good care at the time of birth including appropriate and timely intervention and proper care of the sick neonates are important in reducing perinatal deaths.

Improvement in antenatal care, prevention of preterm births, better care and monitoring during the intrapartum period and intensive care of very low birth babies using ventilators, administration of surfactants and parenteral nutrition would help in further reducing perinatal deaths.

Conflict of interest statement

We declare that we have no conflict of interest.

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