

Ascertaining Cause of Perinatal Deaths in A Tertiary Care Hospital

J Shrestha^{1,*}, R Shrestha¹, R Tuladhar¹, S Basnet²

¹Department of Obstetrics and Gynecology, Manipal Teaching Hospital, Pokhara, Nepal

²Department of Pediatrics, Manipal Teaching Hospital, Pokhara, Nepal

*Corresponding author: junu152001@yahoo.com

Received April 08, 2015; Revised April 29, 2015; Accepted June 26, 2015

Abstract Perinatal mortality rate of Nepal is high indicating poor obstetrics and neonatal care services in the country. Identifying the causes of perinatal deaths would help in identifying the avoidable deaths so that timely interventions can be implemented in future. This study was conducted with the aim of finding out the perinatal mortality rate and its causes at our centre, Manipal Teaching hospital. This is a prospective observational type of study. Perinatal deaths after 28 weeks of gestation and weighing more than 1 kg and neonatal deaths within one week of birth were included. Maternal and neonatal characteristics were studied. Perinatal deaths were classified according to Aberdeen classification of perinatal deaths. Results indicated perinatal mortality rate of 37.6 per 1000 births with more than 60% stillbirths. Mechanical factors during intrapartum period (21.5%) and neonatal factors like prematurity, meconium aspiration and sepsis (22.4%) were major causes of the perinatal mortality. Almost 24% of the perinatal deaths were unexplained and these occurred in macerated stillbirths. Therefore, focus should be on providing quality antenatal care and strict intrapartum surveillance as well as neonatal care to bring down the perinatal deaths. Autopsy should be considered when cause of death is unexplained.

Keywords: Perinatal Mortality, Stillbirth, Early Neonatal Deaths, Obstetric Classification Perinatal Deaths

Cite This Article: J Shrestha, R Shrestha, R Tuladhar, and S Basnet, "Ascertaining Cause of Perinatal Deaths in A Tertiary Care Hospital." *American Journal of Public Health Research*, vol. 3, no. 4A (2015): 87-91. doi: 10.12691/ajphr-3-4A-19.

1. Introduction

Perinatal deaths occur due to poor maternal health and nutrition, substandard care during pregnancy and childbirth and lack of proper newborn care. However, factors like women's status in the society, socioeconomic status of family, cultural barriers to seek expert care, also play a crucial role in the perinatal outcome. Perinatal mortality is therefore an important indicator of the standards of obstetrics services and neonatal care available in a community. Moreover, it also reveals the socioeconomic status of a community [1,2].

Global burden of perinatal deaths is still quite high with 6.3 million perinatal death every year; with more than 98% occurring in the developing countries and 27% in the least developed countries [3]. It has been seen that the perinatal mortality rate ranges from 10 per 1000 live births in high income countries to 50 per 1000 births in low income countries [3]. Nepal, a low income country still poses perinatal mortality as a major public health problem with perinatal mortality rate of 37 per 1000 births, though declining trend is seen over the last five years [4]. Hospital based data in the last ten years in Nepal revealed perinatal mortality rate to range from 18 to 30 per 1000 births [5,6,7].

A regular audit to find out the perinatal deaths and its causes helps in determining as to which factors are preventable and avoidable. This would help in making future timely intervention, which would help in reducing the perinatal deaths.

Manipal teaching hospital is tertiary level referral centre of Western Nepal with one of the best obstetric and neonatal intensive care services in the region. It caters obstetric and neonatal care not only to the local community but to a large extent to all the high risk referral cases from all over the Western region of Nepal. Most of the recent studies on perinatal mortality is concentrated in the Kathmandu valley based centers. Previously not many studies have been conducted in the Western Nepal. Therefore, this study is taken up with the objective to find out perinatal mortality rate of our centre and to analyze the causes of perinatal mortality.

2. Methodology

2.1. Study Site

Pokhara is the headquarters of the Western Developmental region of Nepal. Manipal Teaching Hospital is tertiary level 850 bed referral care centre. The department of obstetrics and gynecology has 118 beds. Obstetric case load of the department is high with about

250 to 300 monthly deliveries mostly of high risk pregnancies; with 30 to 35% cesarean deliveries.

2.2. Study Design

This was a prospective observational study.

Table 1. Aberdeen (Obstetric) Classification of Perinatal Deaths [10]

Code	Category
	Congenital anomaly
1	Neural tube defect
2	Other anomalies
	Isoimmunization
3	Due to Rhesus (D) antigen
4	Due to other antigen
	Preeclampsia
5	Without APH
6	Complicated by APH
	Antepartum Haemorrhage
7	With placenta previa
8	With abruptio placentae
9	APH of uncertain origin
	Mechanical
10	Cord prolapse or compression with vertex or face presentation
11	Other vertex or face presentation
12	Breech presentation
13	Oblique or compound presentation, uterine rupture etc
	Maternal disorder
14	Maternal hypertensive disorders
15	Other Maternal disease
16	Maternal infection
	Miscellaneous
17	Neonatal infection
18	Other neonatal disease
19	Specific fetal condition
	Unexplained
20	Equal or greater than 5 kg
21	Less than 2.5 kg
22	Unclassifiable

2.3. Study Population

Study population of this study were all women delivering after 28 weeks of gestation and delivering babies weighing more than 1000 gm. The study was conducted for a period of one year from September 2013 to August 2014. Amongst these women, all those having antepartum and intrapartum intrauterine fetal deaths and those who had neonatal deaths within first seven days of life were included in the study.

2.4 Sample Size Determination

In a pilot study done prior to the study with 10 cases showed expected percentage of Neonatal Factors as a cause for perinatal deaths was 20%. The required sample

size was 96, for precision = 8 % and desired confidence level 95% [8].

2.5. Ethical Considerations

Ethical clearance for the study was taken from the institutional ethical committee of Manipal teaching hospital. The participants were informed about the study and verbal consent taken.

2.6. Data Collection

All the women who had delivered after 28 weeks of gestation and with babies weighing more than 1000 grams were followed up until 7 days after delivery. The study also included women having intrauterine fetal deaths diagnosed during antepartum and intrapartum period. Deaths before 28 weeks of gestation, with fetuses weighing less than 1000 grams and deaths after 7 days of life were excluded from the study. Maternal profile was reviewed in terms of age, parity, status and place of booking, gestational age at delivery, mode of delivery. Birth weight, sex of baby, Apgar score and type of death, stillbirth or neonatal death were also reviewed and analyzed. The cause of death was classified according to Aberdeen (Obstetric) classification (Table 1) of perinatal deaths, the aim of which is to classify deaths in accordance to factor which probably started the process of events leading to death [9]. This classification was applied as it is more clinically orientated and based on obstetric risk factors and at the same time being conceptually similar to newer classification; therefore making it appropriate for low resource country like ours [9].

2.7. Data Management, Analysis and Presentation

After data collection, it was entered in Microsoft excel sheet. Perinatal mortality rate was calculated and data were analyzed using simple percentage.

3. Results

3.1. Perinatal Indices

During the study period, there were total of 2847 deliveries and 107 perinatal deaths, of which 68 (63.6%) were stillborn and 39 (36.4%) were early neonatal deaths. The Perinatal Mortality Rate was 37.6 per 1000 births.

Table 2. Perinatal Indices

Total no of deliveries	2847
Total no of Perinatal deaths	107
Total no of Stillbirths	68 (63.6%)
Total no of Early Neonatal deaths	39 (36.4%)
Perinatal mortality rate (PMR)	107 per 1000 births
Stillbirth rate (SBR)	23.9 per 1000 births
Early Neonatal mortality rate (ENMR)	14.2 per 1000 live births

3.2. Maternal Characteristics

Table 3. Maternal Characteristics of the Perinatal Deaths

Maternal Characteristics		Macerated Stillbirths (n=30)	Fresh Stillbirths (n=38)	Early Neonatal Deaths (n=39)	Total (107)
Age	≥19 yrs	2	3	3	8 (7.5)
	20-35 yrs	26	34	34	94 (87.9)
	>35 yrs	2	1	2	5 (4.7)
Status and Place of booking	Unbooked	4	3	4	11(10.3)
	MTH	1	5	4	10 (9.3)
	HP/PHC	13	16	18	47 (43.9)
	District/Zonal/Regional Hospital	5	11	7	23 (21.5)
	Private Clinics	7	3	6	16 (15)
Parity	Primi para (P1)	15	15	20	50 (46.7)
	Multipara (P2-3)	3	20	14	37 (34.6)
	Grandmultipara (P≥4)	12	3	5	20 (18.7)
Gestational Age	28-34 weeks	14	10	22	46 (43)
	34-37 weeks	7	10	5	22 (20.6)
	37-42 weeks	8	16	11	35 (32.7)
	>42 weeks	1	2	1	4 (3.7)
Mode of delivery	Vaginal	28	25	26	79 (73.8)
	Instrumental	0	4	1	5 (4.7)
	Cesarean	2	9	12	23 (21.5)

Figure in the parentheses indicate percentages.

Only about 10% of perinatal deaths occurred in women booked during pregnancy at our centre. Most of the perinatal deaths were seen in those cases that had their antenatal checkups at Health Posts (HP) and Primary

Health Centers (PHC). It was observed that about two-third the perinatal deaths were in preterm pregnancies.

3.3. Neonatal Characteristics

Table 4. Neonatal Parameters of the Perinatal Deaths

Neonatal Characteristics		Macerated Stillbirths (n=30)	Fresh Stillbirths (n=38)	Early Neonatal Deaths (n=39)	Total (107)
Birth Weight	1-1.5 kg	16	5	13	34 (31.8)
	1.6- 2.5 kg	8	15	16	39 (36.4)
	2.6 - 4 kg	6	18	9	33 (30.8)
	>4 kg	0	0	1	1 (0.9)
Apgar score at 1 min	0-3			13	13 (33.3)
	4-6			18	18 (46.2)
	≥ 7			8	8 (20.5)
Apgar score at 5 minutes	0-3			9	9 (23.1)
	4-6			14	14 (35.9)
	≥ 7			16	16 (41)
Sex	Male	20	25	16	61 (57)
	Female	10	13	22	45 (42.1)
	Indeterminate	0	0	1	1 (0.9)

Figure in the parentheses indicate percentages.

It was found that most of the perinatal deaths were low birth weight (68.2%) with almost one third of all cases weighing less than 1.5 kgs.

3.4. Causes of Perinatal Deaths

Table 5. Causes of Perinatal Mortality according to Aberdeen Classification

Obstetric Classification of Perinatal Death	Macerated Stillbirths	Fresh Stillbirths	Early Neonatal Deaths	Total	
Congenital Anomalies	Neural tube defects	1	1	8	10
	Non immune hydrous		1	0	1
	Single umbilical artery			1	1
	Total				12 (11.2)
Iso immunization			1	1 (0.9)	
Hypertensive Disorders	Pre eclampsia	3	4	4	11
	Eclampsia		1	1	2
	Total				13 (12.1)
Antepartum hemorrhage	Placenta previa		3		3
	Abruptio	2	3		5
	Total				8 (7.5)
Mechanical	Malpresentation		3	3	6
	Cord prolapse		2		2
	Rupture uterus	1	2		3
	Shoulder dystocia		1		1
	Asphyxia		11		11
	Total				23(21.5)
Maternal Disorders	Diabetes	1			1
	Total				1 (0.9)
Neonatal Factors	Respiratory distress syndrome			14	14
	Meconium aspiration		1	3	4
	Sepsis			3	3
	IUGR	3			3
	Total				24 (22.4)
Unexplained	< 2.5 kg	17	1	1	19
	>2.5 kg	2	4	0	6
	Total				25 (23.4)
Total	30 (28.0)	38 (35.5)	39 (36.4)	107 (100)	

Figure in the parentheses indicate percentages.

Perinatal deaths mostly occurred due to mechanical factors (21.5%) like malpresentations, cord prolapse, ruptured uterus, prolonged labor leading to asphyxia, shoulder dystocia etc. Neonatal aspects like prematurity and its complications also contributed to about 13 % of mortality. Causes of deaths could not be ascertained in as many as one fourth of the cases.

4. Discussion

Perinatal death is a painful experience not only to the mother and family but also to the obstetrician. The perinatal mortality rate is painfully high in the developing and least developed countries like ours. The figure in our study was also quite high with PMR of 37.6 per 1000 births. This is comparable to the country statistics of 2011 [4]. It is very high when compared to the recent mortality rates of other centers of our country [6,7]. The reported PMR at their centers ranged from 18 to 27 per 1000 births. This difference in the PMR could be due to difference in study population. Our centre caters obstetric care to all the referrals coming from far off places as well as to other local centers nearby. Most of the patients in our centre were not registered at our centre. More than 80% were booked outside. The quality of antenatal services may not be as good as in the tertiary centers at the health post and primary health care centers. There are no facilities for obstetric ultrasound and routine blood investigations at such centres. The antenatal care is provided at these centers by auxiliary health workers and midwives.

Therefore, though pregnancies booked at these centers are booked, it is practically like being unregistered. Majority of the cases (43.9%) in our study belonged to this group along with 10% patients who were totally un booked at any center. This could be the reason for higher PMR at our centre. Moreover, there were many referrals just for delivery of the intrauterine fetal deaths from other centers like private hospitals and even regional hospital of the community, contributing to higher perinatal deaths at our centre. It is not merely the provision of antenatal that is important for a good perinatal outcome. The quality of the antenatal care and the facilities for routine investigations during pregnancy are the ones that make a larger impact in the final outcome. Therefore measures must be taken for improving the quality of antenatal surveillance during pregnancy at all levels.

The number of stillbirths (63.6%) was more than the early neonatal deaths (36.4%). Similar proportion of stillbirths in perinatal deaths was observed in a study done in South Africa [11]. Still birth contributed to a little less (50%) to the total perinatal mortality in studies conducted in centers based in Kathmandu [6,7]. Since larger burden is due to the stillbirths, there is room for improving the PMR by improving the antenatal care to determine the risk factors and implementing timely interventions. However, when the causes of macerated stillbirths were analyzed later, it was found that 63.3% of these cases of macerated stillbirths remained unexplained. It was due to the fact that most of these cases arrived only after intrauterine fetal death just for safe delivery from different centers, making analysis of cause difficult.

Ascertaining the cause of perinatal death helps in determining the avoidable and preventable factors. Therefore, improvements could be assured in future. In our study, one of the major contributor to perinatal deaths (21.5%) was due to mechanical factors (breech, transverse lie with hand prolapse, rupture uterus, dystocia); almost all causing fresh intrapartum deaths. These are all preventable factors. Good obstetric care and appropriate antenatal planning for delivery as well as proper intrapartum monitoring would help in bringing down the perinatal deaths due to these causes. Similar results were noted by Korejo R with 21% perinatal deaths occurring due to mechanical factors [10]. Wide variation was seen in different studies; asphyxia resulting from the mechanical causes contributed to nearly 30 to 40% of perinatal deaths in some studies [7,10] while it contributed to only 8.7% of perinatal deaths in another study [12].

Of all the perinatal deaths, more than 63% were preterm, further 43% below 34 weeks of gestation. Similar results were observed in study done by Shrestha S in Nepal medical college [7]. Almost 75% of perinatal deaths were preterm in another study [12]. In our study major cause of the early neonatal death was respiratory distress syndrome (13.1%), a common complication of prematurity. Similar were the observations made by Shrestha M [6]. Prematurity and respiratory distress ranged from 7.6 to 48% of cause of early neonatal mortality in various studies [7,10,13]. Prematurity is another preventable factor in perinatal mortality. Preventing preterm labor could be possible in some cases by offering good antenatal care, timely identification of high risk cases and timely glucocorticoid therapy to hasten lung maturity. If it occurs, providing good neonatal care in intensive care set up with surfactant therapy and ventilator support would further lessen the number of cases of preterm perinatal mortalities.

Other causes of perinatal deaths were hypertensive disorders of pregnancy (12.1%), antepartum hemorrhage (7.5%), congenital anomalies (11.2%); maternal diabetes (0.9%) and isoimmunizations (0.9%) were minor causes of perinatal deaths in our study. Antepartum hemorrhage and hypertensive disorders were more common in the studies done abroad [10,12,14].

In our study, about a quarter (23.4%) of the perinatal mortalities remained unexplained. Most of these were cases of macerated stillbirths. Most of the times, intrauterine deaths are referred to our centre for obstetric management and delivery. Similar were the number of unexplained perinatal deaths in other two studies [10,12]. The number of unexplained intrauterine deaths still high in another study [11]. Determining the factor leading to death may be difficult in such cases. Sometimes the deaths could be due to some congenital anomalies that are not grossly visible externally. In such circumstances, autopsy is of help to find out what could be the cause of death. Since, autopsy is not performed routinely in our country for perinatal deaths, many a times the cause of death remains unexplained. Therefore, in selected cases autopsy to find out the cause of death would be of aid in preventing similar deaths in future.

The perinatal mortality rate of our center is 37.6 per 1000 births. The major causes of mortality are related the avoidable; mechanical factors during intrapartum period and neonatal factors like prematurity, being the major causes of perinatal deaths.

Good antenatal care not just in terms of number of antenatal visits but quality care with proper investigations, timely referral from the referring centers, strict intrapartum surveillance and good neonatal care is recommended for better results. Autopsy of the death baby in unexplained perinatal deaths would help in determining cause to make interventions possible for future.

Competing Interests

The authors hereby declare that there is no competing interest in the study.

Funding

No financial support for the research, authorship and/or publication of this article was received by the authors

References

- [1] Yu V. Global, regional and national perinatal and Neonatal mortality. *J Perinat Med* 2003; 31: 376-9.
- [2] Das SV, Agrawal A. A study of perinatal deaths at a tertiary care teaching hospital. *J Obstet Gynaecol India* 2008; 58 (3): 235-38.
- [3] World Health Organization. Neonatal and Perinatal Mortality: Country, Regional and Global Estimates. 2006.
- [4] Ministry of Health and Population, Government of Nepal. Nepal Demographic and Health Survey 2011.
- [5] Shrestha M, Manandhar DS, Dahal S, Nepal N. Two year audit of perinatal mortality at Kathmandu Medical College Teaching Hospital. *Kathmandu Univ Med J* 2006; 4: 176-81.
- [6] Shrestha M, Shrestha L, Basnet S, Shrestha PS. Trends in Perinatal Mortality in Tribhuvan University Teaching Hospital: 13 years review. *J Nepal Paediatr Soc* 2012; 32 (2): 150-54.
- [7] Shrestha S, Sharma A, Upadhyay S, Rijal P. Perinatal Mortality Audit. *Nepal Med Coll J* 2010; 12 (4): 257-59.
- [8] Sathian B, Sreedharan J, Baboo NS, Sharan K, Abhilash ES, Rajesh E. Relevance of Sample Size Determination in Medical Research. *Nepal Journal of Epidemiology* 2010; 1 (1): 4-10.
- [9] Winbo I G B, Serenius FH, Dahlquist GG, Kallen BAJ. NICE, a new cause of death classification for stillbirths and neonatal deaths. *International Journal of Epidemiology* 1998; 27:499-504.
- [10] Korejo R, Bhutta S, Noorani KJ, Bhutta ZA. An audit and trends of perinatal mortality at the Jinnah Postgraduate Medical Centre, Karachi. *J Pak Med Assoc* 2007; 57 (4): 168-71.
- [11] Allanson ER, Muller M, Pattison RC. Causes of perinatal mortality and associated maternal complications in a South African province: challenges in predicting poor outcomes. *BMC Pregnancy and Childbirth* 2015; 15: 37.
- [12] Bellad MB, Srividhya K, Kangle R, Dhaded SM. Factors associated with perinatal mortality: A descriptive observational study. *Journal of South Asian Federation of Obstetrics and Gynecology* 2010; 2 (1): 49-51.
- [13] Shrestha M, Manandhar DS, Dhakal S, Nepal N. Two year audit of perinatal mortality at Kathmandu Medical College Teaching Hospital. *Kathmandu Univ Med J* 2006; 4 (2): 176-81.
- [14] Das L, Satapathy U, Panda N. Perinatal mortality in a referral hospital of Orissa-A 10 year review. *J Obstet Gynecol India* 2005; 55 (6): 517-20.

5. Conclusion and Recommendations