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Dr. Subhash Chauhan MS
Obstetrics and Gynaecology,
Kamla Nehru State Hospital
for Mother and Child (KNSHM
& amp; C), Shimla, Himachal
Pradesh, India

Dr. HK Premi
Principal, Rohilkhand Medical
College and Hospital, Bareilly,
Uttar Pradesh, India

Dr. Neena Rana MS
Obstetrics and Gynaecology,
Tenzin Hospital, Panthaghati,
Shimla, Himachal Pradesh,
India

Dr. Shruti Thakur MD
Indira Gandhi Medical College
and Hospital, Shimla,
Himachal Pradesh, India

Correspondence
Dr. Shruti Thakur MD
Indira Gandhi Medical College
and Hospital, Shimla,
Himachal Pradesh, India

Perinatal mortality in tertiary care institution- A prospective study

Dr. Subhash Chauhan MS, Dr. HK Premi, Dr. Neena Rana MS and Dr. Shruti Thakur MD

Abstract

Objective: The objective of this study was to determine perinatal mortality rate and to identify various factors influencing it.

Material and Methods: A descriptive observational study was done in a tertiary care institution of state for a period of one year.

Results: There were 3760 births, 233 perinatal deaths with perinatal mortality rate of 63.64/1000 live births. The major causes of perinatal deaths were prematurity, low birth weight and septicemia of baby.

Conclusion: Improving perinatal mortality is the need of the hour. Prematurity, low birth weight, septicemia and maternal hypertensive disorders were the leading causes of perinatal deaths. These deaths can be reduced by increased awareness and vigilance during antenatal period.

Keywords: Perinatal mortality, still birth, antenatal, obstetrics

Introduction

Our world is divided into developed and developing countries. There are basic differences in health status of these grouped communities in terms of social, cultural and economic influences. In addition, because of variable topography and cultural practices prevailing in India, all India health statistics are not truly representative of the whole population of the country. The single most hazardous period of life, unquestionably, is the neonatal period. Never again in life is the individual confronted with the more dramatic challenges than in the transition from dependant intrauterine existence to independent postnatal life. Perinatal mortality serves as the most sensitive index of maternal and neonatal care in an area and it also reflects the general health and the socio-biological features of mothers and infants of that area [1, 2]. The high incidence of perinatal deaths in our country warrants the urgent reappraisal of factors responsible for it. Simultaneously repeated evaluation of this problem is very essential to study its magnitude and causative factors, which shows the impact of existing medical facilities as well as need for their expansion. The great difference in the incidence of perinatal mortality among different countries, different states of a country and even in different hospitals in states indicate that potentially preventable deaths are occurring in many areas. If the reasons for these differences could be known, appropriate measures may be instituted to reduce the high perinatal mortality. The term "Perinatal period" extends from 28 weeks of gestation to seven days after birth [3]. Perinatal mortality continues to be high in India despite various measures taken to reduce the incidence. The statistical reports on perinatal mortality are disappointing. Though the leading causes of perinatal mortality are quite well known, still many of the challenges which are formidable have to be faced on socio-economic and health fronts. The great difference in the incidence of perinatal mortality rate in developed countries (10-20/1000 births) [4] as compared to our country (60-120/1000 births) indicates that preventable perinatal deaths are occurring which should be reduced with appropriate measures. The present study was undertaken to determine perinatal mortality rate and to identify various factors influencing it.

Material and methods

A prospective study was conducted in the department of Obstetrics and Gynaecology at Kamla Nehru State Hospital for Mother and Child IGMC, Shimla from May 2005 to April 2006 for a period of one year. A perinatal mortality was determined by adding the numbers of late fetal deaths (28 weeks of gestation or more) and number of neonatal deaths below 1 week of life and expressed as per thousand live births. All cases of previable fetuses and infants weighing less than 1000grams were excluded from the study. Total number of deliveries during the study period was noted. The study included cases of normal and high risk pregnancy beyond 28 weeks of gestation. Gestational age was determined by last menstrual period and ultrasonography if done during the antenatal period. In all cases a detailed history was recorded on a prescribed Proforma with special reference to

1. Age, duration of amenorrhoea, history of present pregnancy with reference to antenatal care, obstetrics and menstrual history and referral from previous institution if any were carefully noted, any significant medical history was also noted.
2. Complete general physical examination, per abdomen examination and per vaginal examination was done to determine gestational age and any complication of pregnancy.
3. Laboratory investigations included hemoglobin estimation, urine examination for albumin, sugar and microscopy, -blood grouping, VDRL of husband and wife, O'sullivan and other special investigation if needed Labour was monitored according to partogram. Any complication and duration of labour was noted and mode of delivery, caesarean section, forceps, and ventouse were noted. After delivery placenta was examined for any abnormality. Placenta was weighed and sent for histopathologic examination in cases of still births. After delivery condition of neonate including one and five minute APGAR score was noted. Birth weight of baby was noted. Any complication and congenital anomalies were noted. The stay of the baby if any in the hospital during 7 days after birth and the events occurring during this period were recorded.

Results

The present study was conducted in the Department of Obstetrics and Gynaecology at Kamla Nehru State Hospital for Mother and Child IGMC, Shimla from May 2005 to April 2006 for a period of one year. There were 3760 births during the period of study. Of these, 3661 (97.36%) were live births and 99 (2.63%) were still births and 134 (3.56%) had early neonatal deaths. The total numbers of perinatal deaths were 233, giving a perinatal mortality rate of 63.64/1000 live births (Table 1). Out of the total births, 1961(52.15%) were males and 1799 (45.49%) were females giving perinatal mortality rate as 66.59 for males and 60.43 for females. There were 48(1.27%) subjects of twins and rest of the babies were singleton.

Table 1: Perinatal Indices.

Total no. of births	3760
Total no. of live births	3661
Total no. of Perinatal deaths	233
Total no. of Stillbirths	99
Total no. of Early Neonatal Deaths	134
Perinatal mortality rate (PMR)	63.64/1000 live births

Perinatal mortality rate was calculated in relation to maternal age, parity, gestational age, socio-economic status, residential background, maternal educational level, birth weight of the baby, congenital disorders and other factors comprising antenatal care. These factors were subdivided into maternal (Table 2) and neonatal factors (Table 3).

Out of 3760 total births during study, 1504 (40%) were booked cases and 2256 (60%) patients were unbooked. Further, out of 3670 total births, 2710 (72.07%) patients were of rural background and rest 1050 (27.92%) were of urban background.

As depicted in table 2, majority of the perinatal mortality rate was between the age group of 21-25 years that is 79.55 followed by age group of >35 years that is 68.49. The PMR varied between 49-79/1000 in the age group of 20-35 years. It was maximum in gestational age <36 weeks (266.36) and in term patients PMR was 21.46/1000. It was again increasing after 40 weeks of gestation. The PMR was high in low and middle socio-economic groups of patients varying 63-75/1000 and it was low (38/1000) in high socio-economic group. It was again high in patients belonging to rural background (74.31) and compared to urban (36.64). The PMR was 78.11 /1000 in unbooked cases as compared to booked cases (42.11) thus reflecting the importance of antenatal care. The mortality rate decreased steeply from illiterate to educated class of the society. Hypertensive disorder associated with pregnancy had high PMR; it was maximum in eclamptic patients. There were 15 cases of eclampsia out of which 6 were stillbirths and 6 had early neonatal deaths.

The rate was also high in association with cases of intrauterine growth retardation, APH and congenital malformation of the babies incompatible with life. It was high in twin gestation. The perinatal mortality rate had direct relation with birth weight of the baby. It was very high when the weight was <1500 grams. Then it started decreasing between 1500-2000 grams of birth weight and was comparable to the birth weight between 2001-3500 grams (25.32-20.93). The perinatal mortality rate had direct relation with the maturity of the fetus also. It was quite high in the premature babies (266.36). The perinatal mortality rate was high with Apgar score of <6 and came down when Apgar score was 7 and above.

Table 2: Maternal factors.

	Number of births (n=3760)	Number of stillbirths (n=99)	Early neonatal deaths (n=134)	Number of live births (n=3661)	Perinatal mortality (n=233)	PMR per 1000
Maternal age (years)						
<20	283	1	1	282	2	7.09
21-25	1937	64	85	1873	149	79.55
26-30	1176	25	38	1151	63	54.73
31-35	290	08	06	282	14	49.64
>35	74	1	4	73	5	68.49
Parity						
1	1785	45	69	1740	114	65.51
2	1097	24	38	1073	62	57.78
3	581	20	16	561	36	64.17
4	203	7	7	196	14	71.42
5 and above	94	3	4	91	7	76.92
Gestational age (weeks)						
28-32	162	23	38	139	61	438.84
33-36	319	15	42	304	57	187.5
37-40	2545	29	25	2516	54	21.46
Above 40	734	32	29	702	61	86.89
Socio-economic status						
Low	1504	46	68	1458	114	78.18
Middle	1316	38	45	1278	83	64.94
High	940	15	21	925	36	38.91
Residential background						
Rural	2710	86	109	2624	195	74.31
Urban	1050	13	25	1037	38	36.64
Antenatal Care						
Booked	1504	32	30	1472	62	42.11
Unbooked	2256	67	104	2189	171	78.11
Education						
Illiterate	188	7	14	181	21	116.02
Primary	526	23	26	503	49	97.41
Middle	1428	39	53	1389	92	66.23
High	1054	23	33	1031	56	54.31
Higher	564	7	8	557	15	26.92
Hypertensive disorders						
PIH and PET	188	15	15	173	30	173.41
Antepartum hemorrhage						
Abruptio placentae	35	10	3	25	13	520.0
Placenta Praevia	40	3	3	37	6	162.16
Mode of presentation						
Vertex	3611	75	113	3536	188	53.16
Breech	131	18	17	113	35	309.73
Transverse	18	6	4	12	10	833.33
Mode of delivery						
Normal vaginal	2706	78	96	2628	174	66.21
LSCS	940	13	31	927	44	47.46
Forceps	100	3	4	97	07	72.16
Others	14	5	3	9	8	888.88
Prom & Pprom						
PROM	301	09	05	292	14	47.94
PPROM	61	08	12	53	20	377.35

PIH= Pregnancy induced hypertension, PTE= Preeclamptic toxemia, LSCS = lower segment caesarean section, PROM = premature rupture of membranes, PPRM = preterm premature rupture of membranes

Table 3: Neonatal factors.

	Number of cases	Number of stillbirths	Early neonatal deaths	Number of live births	Perinatal mortality	PMR per 1000
IUGR						
	112	10	13	102	23	225.49
Congenital anomalies	56	19	8	37	27	729.72
Multiple gestation/ twins	48	7	13	41	20	487.80
Birth weight						
1001-1500	130	24	48	106	72	679.24
1501-2000	289	16	38	273	54	179.80
2001-2500	1079	13	14	1066	27	25.32
2501-3000	1301	16	16	1285	32	24.90
3001-3500	871	11	7	860	18	20.93
>3500	50					
Preterm	481	38	80	443	118	266.36
Low birth weight <2.5Kg	1538	72	111	1466	183	124.82
APGAR						
0-3	74		23	74	23	310.81
4-6	146		30	146	30	205.47
=/> 7	3441		81	3441	81	23.53

IUGR= Intrauterine growth retardation

Hypertensive disorders, antepartum hemorrhage (APH), IUGR and congenital malformations and cord prolapse were the causes in the still births (table 4). Whereas prematurity, birth asphyxia, septicemia and congenital malformations were the major causes of early neonatal deaths (table 5).

Table 4: Factors causing still births.

Hypertensive disorders	21
APH	13
Congenital anomalies	19
IUGR	10
Cord prolapse	12
Obstructed labour	9
Ruptured uterus	4
Unknown	15

APH = antepartum hemorrhage, IUGR= Intrauterine growth retardation

Table 5: Factors causing early neonatal deaths.

Prematurity	80
Birth asphyxia	53
RDS	23
Aspiration syndrome	10
Congenital anomalies	08
Septicemia	22
Hypothermia	
Jaundice	7
Neonatal seizure	3
Pneumonia	1
Intracranial hemorrhage	1
Hemolytic disorders	2
Hypothermia	4

RDS= respiratory distress syndrome

Discussion

Perinatal mortality comprises of still births and early neonatal deaths and it is one of the important parameters which reflect the health services provided to the population of that area. The term “perinatal mortality” includes both late fetal deaths (stillbirths) and early neonatal deaths. The ninth revision of ICD (1975) added that-

1. Baby chosen for inclusion in perinatal statistics (this means late fetal deaths, live births and early neonatal deaths) should be those above minimum birth weight, that is, 1000gram at birth (a birth weight of 1000gram is considered equivalent to gestational age of 28 weeks).
2. If the birth weight is not available, a gestational period of at least 28 weeks should be used.
3. Where both 1 and 2 are not available, body length (crown to heel) of at least 35cm should be used. But the preferred criterion is birth weight.

According to WHO “Perinatal Mortality Rate (PMR) is the ratio of perinatal deaths in a given year to the total number of live births in the same year, usually expressed as rate per 1000 live births”.

In spite of the advancements made in maternal and child health care, including better antenatal care and intranatal fetal monitoring and better obstetrics and neonatal intensive care services, perinatal mortality rate is still alarmingly high in developing countries like India as compared to the developed countries. In the present study an attempt has been made to discuss the relation of perinatal mortality to age, parity, gestational age, residential background, birth weight of the baby and antenatal care.

Lucy *et al* (2005) ^[5] in their study in the age group of below 20 years have found the perinatal mortality rate as 50.71. Agarwal *et al* (1982) ^[6] in their study have found the perinatal mortality rate in the same group of mothers as 120. Paul *et al* (2003) ^[7] have shown the perinatal mortality rate as 8.14 where as in the present study the perinatal mortality rate is 7.09 which is comparable with the study conducted by Paul *et al* (2003) ^[7]. Perinatal mortality rate in both these studies is low because the sample size in this age group is small. Perinatal mortality rate in the age group of 21-25 years in the studies conducted by Lucy *et al* (2005) ^[5] was 84.74. This is comparable to the findings of the present study. Further perinatal mortality rate is 55 as found by Agarwal *et al* (1982) ^[6] in the same age group is comparable to the present study. Overall perinatal mortality rate in the age group of mother between 31-35 years was 141.94 by Lucy *et al* (2005) ^[5], 103 by Agarwal *et al* (1982) ^[6] and it was 49.64 in present study which is lower than the studies conducted by Lucy *et al* (2005) ^[5] and Agarwal *et al* (1982) ^[6]. High perinatal mortality rate in the study by Lucy *et al* (2005) ^[5] can be explained by the fact that the study was conducted in the population with poor socio-economic background, where the health facilities either are not available or poorly availed by the people. Further the study conducted by Agarwal *et al* (1982) ^[6] was 25 years back. Over the years, there has been marked improvement in the health facilities and awareness for antenatal, intranatal and neonatal care. The trend of perinatal mortality rate is increased as the age of mother increases which is evident from the studies conducted by Lucy *et al* (2005) ^[5], Agarwal *et al* (1982) ^[6] and the present study.

The findings of the study conducted by Kamat *et al* (2001) ^[8] and Parmar *et al* (1994) ^[9] are comparable with the present study which shows perinatal mortality rate in relation to parity. In all these studies the perinatal mortality rate is high in the primipara and in para 4 and above. Perinatal mortality rate in relation to gestational age shows that preterm remains the main cause of perinatal mortality. PMR in the group <37 weeks in the studies conducted by Bhandari *et al* (1983) ^[10], Parmar *et al* (1994) ^[9] and Saha *et al* (2002) ^[11] is comparable to the present study. These studies show that PMR in term pregnancies is very low. PMR is also increased in post term pregnancies. Perinatal mortality rate is extremely high in the birth weight group of 600-1000grams as observed by various workers. It decreases drastically after the birth weight of the baby is more than 2 kg since the baby at this birth weight is reasonably mature and has thrived better exutero.

Perinatal mortality rate according the sex of the baby shows that it was higher in males as compared to females as shown in our study and studies conducted by Gupta *et al* (1985) ^[12], Parmar *et al* (1994) ^[9], Kapoor *et al* (1996) ^[13]. Perinatal mortality rate is lower in case of booked patients as observed by Lucy *et al* (2005) ^[5] 88.81, Kamat *et al* (2001) ^[8] 14.9, Khurana *et al* (1987) ^[14] 37.8, Agarwal *et al* (1982) ^[6] 28.6 in comparison to unbooked cases that is 115.07, 123.6, 73.3, 103.3 respectively. These studies are comparable to the present study. Lower perinatal mortality rate by Khurana *et al* (1987) ^[14] as compared to present study is due to the fact that the study has been done in a Public Sector Hospital which caters to the limited group of the patients as compared to present study which is conducted in a tertiary care Government hospital where high risk patients are being referred form all parts of the state.

Ghosh *et al* (1971) ^[15] in their study found that perinatal mortality rate was higher in twin pregnancies as compared to singleton pregnancies. Same observations have been made in the studies conducted by Agarwal *et al* (1978) ^[16], Gupta *et al* (1985) ^[12] and Agarwal *et al* (1982) ^[6]. The present study is comparable to studies conducted by various authors. PMR in the present study in twin pregnancies is slightly higher than the studies conducted by other workers because most of the studies have been conducted in public sector hospitals where majority of the patients were of higher socio-economic status with urban background where the literacy rate was higher and facilities of health care were easily accessible. The perinatal mortality rate in preterm births as observed by Kapoor *et al* (1996) ^[13] was 273 and is comparable with the present study of 266.36.

Kamat *et al* (2001) ^[8] in their study observed perinatal mortality rate of 128.3 in low birth weight babies which is comparable with the present study i.e. 124.82. Kumar *et al* (1996) ^[17] observed the various factors leading to still birth. Among the major factors were hypertensive disorders, obstructed labour, congenital malformations and were in comparison with the present study. The major factors leading to stillbirth in the study by Lucy *et al* (2005) ^[5] are the same as in the present study except that, cord prolapse and ruptured uterus were not noticed in their study. Perinatal mortality rate according to the factors causing early neonatal deaths are broadly comparable with the studies conducted by Kameswaran *et al* (1993) ^[18], Kumar *et al* (1996) ^[17] and Lucy *et al* (2005) ^[5]. Perinatal mortality rate in normal vaginal delivery was 62.43 found by Gupta *et al* (1985) ^[12]. Santhanakrishan *et al* (1986) ^[19] found PMR in this group of patients as 53.16 and Khurana *et al* (1987) ^[14] found PMR as 32.7, where as in present study it was 66.21. Increased perinatal mortality in the present study is due to the fact that there was mostly high risk cases referred from peripheral institutions, which included extreme premature cases also. In breech deliveries the PMR was 157 in the study conducted by Santhanakrishan *et al* (1986) ^[19]. It was 241.9 in the study conducted by Khurana *et al* (1987) ^[14], where as it was 309.73 in the present study. High PMR in breech deliveries in all these studies is because of complications which occur during the delivery. The PMR in the group of patients where the delivery of the baby was undertaken by lower segment caesarean section was 42.43 in the study conducted by Gupta *et al* (1985) ^[12] where as PMR in present study was 61.79. High PMR in our study was because most of the patients were unbooked and reported late in labour along fetal distress. PMR in forceps/vacuum delivery was 116.67 in the study conducted by Gupta *et al* (1985) ^[12]. It was 57 in the study conducted by Khurana *et al* (1987) ^[14] whereas perinatal mortality in present study was 49.64 which is comparable with the study conducted by Khurana *et al* (1987) ^[14]. The other modes of delivery included craniotomy and vacuum which had PMR of 125 in the study conducted by Santhanakrishan *et al* (1986) ^[19] whereas in present study the PMR in other mode of delivery was 833.33. The reason for high perinatal mortality in present study is because of referred cases which underwent destructive operations and the cases with major congenital anomalies.

Conclusion and recommendations

In the present study, majority of the patients were unbooked primigravidae belonging to low socio-economic status and

rural background. The various factors responsible for perinatal mortality were identified and many of these were preventable. An adequate provision of antenatal, intranatal and neonatal care with timely identification and referral of high risk cases will be helpful in reducing the perinatal mortality rate. All expectant mothers should be covered by services of trained community health workers providing health care. They should screen all high risk pregnancies and refer them at the earliest to the institution, equipped to handle such cases. Apart from the clinical causes of perinatal deaths, other factors like illiteracy and poverty contribute to the lack of health education amongst the socio-economically weaker section. A low perinatal mortality rate can be achieved by adequate health education, registration of all pregnant women, compulsory antenatal check-ups and mandatory hospital delivery of all pregnant women. Perinatal mortality rate can be reduced by observing and promoting small family norms, reinforcing nutritional supplement programs and above all good, prompt and immediate initiation of medical treatment for both mother and baby at referral hospitals. Further, by providing adequate and appropriate transport facilities for timely transfer of patients from peripheral hospitals to tertiary care institutes would go a long way to reduce perinatal mortality rate. Maternal and child health services need improvement for providing better domiciliary as well as hospital care by training the Auxiliary Nurse Midwives (ANM). Lastly, attention may be given to the targeted area identified in the study to improve the perinatal mortality, an important health parameter of human population.

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. Sharmila Mukherjee B. and Tapas Bandyopadhyay. *Indian Pediatr.* 2016; 53:242-43.
4. Shrestha J, Shrestha R, Tuladhar R *et al.* Ascertaining cause of perinatal deaths in a tertiary care hospital. *American Journal of Public Health Research.* 2015; 3(4A):87-91.
5. Das L, Satapathy U, Panda N. Perinatal mortality in a referral hospital of Orissa- A 10 year review. *J of Obstet & Gynec of India.* 2005; 55(6):517-20.
6. Agarwal VK, Gupta SC, Chowdhary SR, Narula RK *et al.* Some observation on perinatal mortality. *J of Paed India.* 1982; 19:233-8.
7. Paul KM, Bhat VB, Sharma S, Ferns S *et al.* Perinatal Mortality – Identification of Risk Factors. *J of Obstet & Gynec of India.* 2003; 53(3):240-43.
8. Kamat AA, Jindal MV. Perinatal mortality in Goa Medical College. *J of Obstet & Gynec of India.* 2001; 51(4):115-117.
9. Parmar VR, Grover N, Randawa I, Bahl L *et al.* Perinatal mortality in Shimla (Himachal Pradesh). *Indian Pediatrics.* 1994; 31:833-836.
10. Bhandari B, Mandowara SL. Perinatal mortality in South East Rajasthan. *J of Paed India.* 1983; 20:559-62.
11. Saha A, Saha S. Clinical Audit of Perinatal Mortality- A Reappraisal of Major determinants and its prevention. *J of Obstet & Gynec of India.* 2002; 52(3):83-86.

12. Gupta PKAP. Perinatal Mortality. Indian Pediatrics. 1985; 22:201-205.
13. Kapoor RK, Srivastava A, Mishra PK *et al.* Perinatal mortality in urban slums in Lucknow. J of Paed India. 1996; 33:19-22.
14. Khurana O, Warey P, Dave AB, Saikhedhkar R. Perinatal mortality trends in steel plant hospitals. J of Paed India. 1987; 24:633-37.
15. Ghosh S, Bhargava SK, Sharma DB, Bhargava V *et al.* Perinatal mortality – A preliminary report on a hospital based study. Indian Pediatrics. 1971; 8(9):421-426.
16. Agarwal S, Bhorchi GR, Kaur A, Jain S. Perinatal mortality in an Industrial Hospital. Indian Pediatrics. 1978; 15(12):1001-1006.
17. Kumar MV, Bhat BV, Oumachigui A. Perinatal mortality trends in referral hospital. J of Paed India. 1996; 63:357-61.
18. Kameswaran C, Bhatia BD, Bhat BV *et al.* Perinatal mortality: A hospital based study. Indian Pediatrics. 1993; 30:997-1001.
19. Santhanakrishnan BR, Gopal S, Jayam S. Perinatal mortality in a referral teaching hospital in Madras city. Indian J Pediatr. 1986; 53:359-363.