

Perinatal Mortality : A Hospital Based Review

Ramesh K. Agarwal , Krishna Goel , A.J Mehta , Usha Sharma , Mahesh Vyas

From Deptt. of Paediatrics, Sir Padampat Mother & Child Health Institute, S.M.S. Medical College, Jaipur.

Summary: The present study is designed to evaluate the perinatal mortality rate, its major determinants and trend at SMS Medical College Jaipur.

The study included 70629 babies born between Jan.91 to Dec. 1995.

Perinatal mortality was found to be exceedingly high. Still birth rate was 53.64 per 1000 births, Early Neonatal Mortality Rate 39.43 per 1000 births and Perinatal Mortality Rate was 93.07 per 1000 births.

Low birth weight babies, inadequate antenatal care, low socio economic status, mothers from rural and urban slum areas, abnormal mode of delivery, multiparity, multiple gestation were found to be associated with statistically significant higher perinatal loss. Asphyxial conditions arising in labour resulted in 42.21% of perinatal loss signifying the urgent need for antenatal care and efficient obstetrical management.

Increasing trend was observed in perinatal deaths over the study period.

Introduction:

The perinatal mortality serves as the most sensitive index of maternal and neonatal care in an area. It also reflects the general health and socio-biological features of mothers and infants of that area.

The high incidence of perinatal deaths in our country, especially in states of Rajasthan, Uttar Pradesh, Orissa, Bihar etc. warrants urgent reappraisal of factors responsible for it.

Simultaneously repeated evaluation of PNMR is very essential to study its magnitude and causative factors which shows the impact of MCH services as well as need for their further expansion.

Till date, variable reports are available on PNMR from different regions of the country. Studies from this part of country is relatively lacking so this study was undertaken to evaluate the incidence and factors responsible for perinatal deaths in eastern Rajasthan.

Material and Methods:

This is a retrospective study from Jan. 91 to Dec. 94 and then data documented prospectively from Jan. 95 to Dec. 95, conducted in State Zenana Hospital and Mahila Chikitsalya, SMS Medical College, Jaipur. These are the apex institutions of the state which provide first contact care to local population and nearby as well as act as

referral centres for eastern Rajasthan and nearby states.

All births weighing ≥ 500 gms, whether live or dead, during aforementioned period were included.

A uniform protocol is used to collect data retrospectively (1990-94) from record rooms and in prospective births during 1995, which were monitored and verified for quality control periodically. Neonates were followed for a period of 7 days in cases of prospective births.

Gestation age was judged by LMP in cases of still borns and by Dubowitz method/Expanded New Ballard Score in cases of live births.

The mode of death was assigned as per Wigglesworth classification (Wigglesworth, 1980). This is a useful classification, by which most perinatal deaths can be provisionally assigned in to 4 main groups (Vide infra) even if necropsy is not done.

All normally formed fresh still born of any birth weight and all early neonatal deaths in term infants, including cases of trauma were assigned to the asphyxial group unless a specific condition has been diagnosed. Birth asphyxia and trauma may have significant roles in neonatal deaths of pre-term infants, but such relationship can be established only with a skilled perinatal necropsy. Most such cases were classified as deaths associated with immaturity. Cases were assigned to the group of specific condition, only as a result of positive diagnosis.

Perinatal mortality rate (PNMR) was defined as total number of still births plus early neonatal deaths (deaths up to 7 days) per 1000 total births.

Data so gathered, were subjected to statistical analysis. Various tests for significance were applied to know the strength of association. Trend was calculated for the study period.

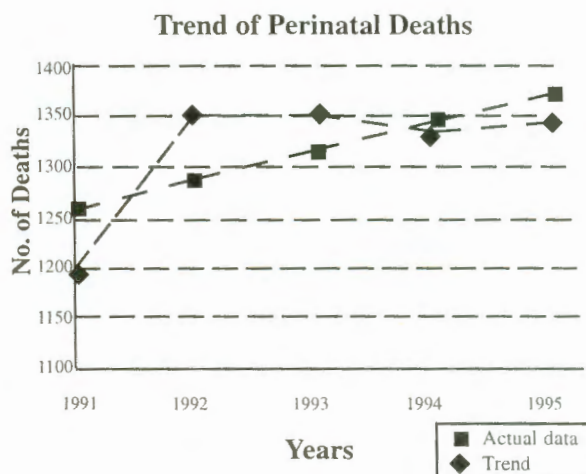
Results:

SMS Medical College is probably the largest institute in country where maximum number of births (average 14125 over study period) take place.

But unfortunately, even at doorsteps of 21st century, when developed countries are able to achieve a PNMR of <10 (WHO, 1977), this part of country is still experiencing alarmingly high perinatal loss.

39.43 per 1000 and PNMR was 93.07 per 1000 over these 5 years. When we look at graph there is sharp increase in the perinatal deaths in 1992, then it remained at a constant level as per actual data.

Graph No. 1



But with the help of trend line, we observed that perinatal deaths are showing the increasing trend in these 5 years.

Table I

	Perinatal Mortality					
	1991	1992	1993	1994	1995	Total
No. of Births	13598	13989	14806	14032	14204	70629
Live Birth	12939	13246	14096	13193	13366	66840
Still Birth	659	743	710	839	838	3789
ENDs	534	608	639	497	507	2785
PNDs	1193	1351	1349	1336	1345	6574
SBR	48.48	53.11	47.83	59.79	58.99	53.64
ENMR	39.27	43.46	43.15	34.75	35.69	39.43
PNMR	87.73	96.57	91.10	94.54	94.68	93.07

Abb. END – Early neonatal deaths

PND – Perinatal deaths

Table No. II shows continuing high rate of LBW babies (39%).

Around 85% of total perinatal loss occurred in LBW-babies only. PNMR in LBW babies (<2500 gm.) was 201.69/1000 while babies weighing ≥2500 gm. carried PNMR of 23.62 per 1000 only ($x^2 = 6311.32, p < 0.0001$, OR 10.43, Highly significant, RR 8.5, AR 88.28% and ARp 74.62%).

As depicted in table I, SBR was 53.64 per 1000, ENMR

Babies weighing less than 1000 gm. were practically unsalvageable in our setup reflecting poor facilities

Table II

Perinatal mortality among different gestation and birth weight groups

	GESTATION (WEEKS)			BIRTH WEIGHTS (Gms)						
	Pre term <37	Term 37-42	Post term ≥42	<1000	1001-1499	1500-1999	2000-2499	2500-2999	3000-3499	>3500
No. of Births	9897	60373	359	1408	3121	10310	12708	27598	10818	4666
	(14.01)	(85.47)	(0.50)	(1.99)	(4.41)	(14.59)	(17.99)	(39.07)	(15.32)	(6.60)
Perinatal death	2862	3648	64	1275	1095	2054	1132	523	303	192
PNMR	289.17*	60.42*	178.27*	905.53*	350.84*	199.22*	89.07*	18.95*	28.00*	41.14*

* p<0.0001, Highly significant
Parentheses indicate percentage.

Table III.
Perinatal mortality in relation to various factors

	No. of Births	Perinatal Deaths	PNMR *	X ²	OR
(1) Locality					
Rural & Urban Slums	32194 (45.58)	5266 (80.1)	163.57*	3481.16	5.55
Urban	38435 (54.41)	1308 (19.9)	34.03	(df = 1)	
(2) Socio-economic Status					
Lower	25807 (36.54)	5477 (83.31)	212.23*	6839.62	10.74
Upper & Middle	44822 (63.46)	1097 (16.69)	24.47	(df = 1)	
(3) Parity					
>IV	8886 (12.58)	1349 (20.52)	151.81*	415.57	1.94
≤ IV	61743 (87.42)	5225 (79.48)	84.62	(df = 1)	
(4) Maternal Age (Years)					
<20 & >30	13002 (18.41)	1791 (27.24)	137.75*	376.99	1.76
20-30	57627 (81.59)	4783 (72.76)	82.99	(df = 1)	
(4) Antenatal Care					
Inadequate	46244 (65.47)	5851 (89.01)	126.52*	1786.87	4.74
Adequate	24385 (34.53)	723 (10.99)	29.64	(df = 1)	
(5) (Mode of Delivery)					
Abnormal	20300 (28.74)	2163 (32.90)	106.55*	61.49	1.24
Normal	50329 (71.25)	4411 (67.09)	87.64	(df = 1)	
(6) Multiple	907 (1.29)	264 (4.01)	291.06*	430.58	0.242
Single	69722 (98.71)	6310 (95.99)	90.50	(df = 1)	

* p < 0.0001, Highly significant

Parentheses indicate percentage

available for neonatal care. Even after excluding these deaths overall PNMR was 76.56/1000 births and babies between 1000-2499 gm. carried PNMR of 170.66 (x², df 1, p<0.0001, OR 8.5, RR 7.2, AR 86.15%, ARp 74.62%).

Table No. III gives an idea regarding interplay among maternal and neonatal variables and perinatal mortality.

Urban slum and rural mothers had statistically significant higher perinatal loss than urban mothers (RR 4.8).

Socio-economic status (SES) was found to have significant impact on perinatal survival. PNMR was much higher in lower class than in middle and upper class (RR 8.67, AR 88.47%, ARp 88.27%).

Multiparity (more than 4) carried statistically significant higher perinatal loss compared to ≤ 4 parity (RR 1.79, AR 44.26%, ARp 9.07%).

PNMR was lesser between 20 and 30 years of age than

at extremes of reproductive age group (<15 and >30 years) (RR 1.99, AR 49.7%, ARp 4.4%).

Antenatal care had strong correlation with perinatal survival. Around 90% of perinatal deaths occurred in cases with no or inadequate antenatal care (<3 visits), who presented as emergency, advanced in labour with complications.

There was low level of adequate antenatal care in this part (34.53%). These mothers carried much higher PNMR (RR 4.27, AR 76.57, ARp 68%).

Abnormal modes of delivery were associated with higher perinatal loss. (RR 1.22, AR 17.7%, ARp 5.8%). Interestingly, liberal use of caesarean section (caesarean section rate 19.5% in 1991 to 25.76% in 1995. x² 155.23, df 1, p<0.0001) had hardly any impact on perinatal survival.

Multiple gestation also carried higher PNMR (RR 3.21, AR 68.9%, ARp 2.7%).

Table No. IV
Causes of perinatal deaths

Conditions	Perinatal deaths	Percentage
Asphyxial condition developing in labour	2755	42.27
Conditions associated with immaturity	2228	33.89
Normally formed macerated still births	583	8.86
Congenital malformation	352	5.32
Specific conditions other than above	636	9.67

Table IV classifies the causes of perinatal deaths. There is high incidence of perinatal deaths due to asphyxial conditions developing in labour (42.21%), which reflected poor standard of MCH facilities available at peripheral centres and failure in timely referral since most of these deaths were unbooked and emergency cases.

Discussion:

The present study indicates that perinatal mortality is exceedingly high in this part of country. PNMR is very high compared to SRS data for Rajasthan (45 in 1990). The status still appears far away from the goal of achieving PNMR of <30 by 2000 AD.

PNMR in various teaching hospitals are: Delhi-57.3 (Singh, 1986), Patna-50 (Singh et al, 1996), Shimla-68.29 (Parmar, 1994), Varanashi-95 (Agarwal, 1995), Bombay-34.16 (Gaurang, 1994), Ajmer-95.9 (Singhal, 1995), Udaipur-105.78 (Bhandari, 1983), Karnataka-49.37 (Pillai 1995) and Pondicherry-57.7 (Kameshwaran 1993), Kerala-38.5 (Pradeep, 1995).

So this can be deduced that states of Rajasthan, UP and Himanchal Pradesh are having much higher perinatal mortality compared to Southern part of country.

The PNMR of this institute was 171 in 1978 (Acharya, 1982), 128.9 in 1983 (Bairawa, 1990), 96.93 in 1988 (Bairawa, 1990) and there was rather increasing trend observed over the study period. So after initial substantial decline, PNMR has now come to almost at stand still over last 10 years.

The high perinatal loss could be explained by high LBW rate (39% in present study), low level of antenatal care (34.53%) because of inadequate MCH services available

at peripheral centres as well as inefficient co-ordination in existing system and low level of female literacy (<20% in Rajasthan, SRS, 1990) resulting in decreased awareness regarding family welfare and low socio-economic development in the state (36.43% mothers were from lower SES).

High incidence of LBW babies is hardcore of perinatal mortality. More than three fourth of perinatal deaths were in LBW babies. This is a really grave situation which needs separate evaluation to find out its etiology and invention of low cost strategy to decrease its incidence.

The problem basically seems multifactorial. Socio-economic cultural factors e.g. maternal malnutrition, low female literacy, poor status of girl in society as well as wide prevalent medical disorders viz malaria, tuberculosis, asthma, UTI and obstetric complication such as toxemia, haemorrhage etc.

High perinatal loss in rural and urban slum mothers, LBW, low SES, multiparity, multiple births, abnormal labour are consistent with other authors for the obvious reasons. These factors are interrelated, mothers from rural or slum areas are usually poor, do not have access to health care system, multiparous, having medical disorders, present advanced in labour with complications, tend to deliver still births or low weight babies.

LBW and inadequate antenatal care had very high Population Attributable Risk (74.62% and 68%). So another thing which needs serious considerations is antenatal care of mothers, since more than two third deaths can be prevented as a result of improvement in antenatal care especially in rural areas and urban slums.

This will require strengthening of "at risk approach". Role of community health worker has to be made a real one, and function of each level of health care system has to be defined so that proper co-ordination among them can be achieved and the problem is effectively tackled. This, in turn, requires political commitment which unfortunately is totally out of scene.

There is a great role for obstetricians to play in decreasing PNMR since significant perinatal loss (42.27%) occurs because of asphyxial conditions arising during labour. So, there is need of identifying predisposing factors and

managing them properly.

Conclusions:

Thus we conclude that continuing high perinatal loss alarms against existing faults in the system. Rate of LBW babies has to be reduced drastically by improving maternal nutrition, adopting family welfare practices, strengthening of primary health care and motivation of expectant mothers for antenatal registration. The peripheral and referral centres have to be equipped for proper obstetric and neonatal care.

Above all, female literacy needs serious attention. In the developing countries where the female literacy is high as in Srilanka, Thailand and Kerala in India, PNMR has been significantly low. In Kerala, where over 85% women are literate, the PNMR is 3 times lower than in Orissa and UP where female literacy is <15-25% (Ratnam 1991). So, if we want to improve our progeny, female literacy has to be improved by all means.

Acknowledgement

Authors thank Principal SMS Medical College for allowing to conduct this study and to Superintendents Zenana Hospital and Mahila Chikitsalya to allow use of hospital data.

We acknowledge contributions of residents and staff

members of depts. of paediatrics and obstetrics.

Bibliography

1. Acharya U, Saxena S, Sarin D, Rungata NK. *J. Obst and Gyn, India* 32; 56, 1982.
2. Agarwal A, Swain S, Ojha KN, Bhatia BD. *J. Obst and Gyn, India* 145; 210, 1995.
3. Bairawa A, Verma C., Sharma U, Mehta AJ, Miglani N. *SDMH Jour.*, 3(4): 297, 1990.
4. Bhandari B, Mandowara SL. *Indian Pediatr.*, 20; 599, 1983.
5. Gaurang S, Mehta A. *J. Obst and Gyn. India*: 44; 107, 1994.
6. Kameshwaran C, Bhatia BD, Bhatt BV, Oumachigui. *Indian Pediatr.* 30; 997, 1993.
7. Parmar VR, Grower N, Randhawa I, Behal L, Kaushal RK. *Indian Pediatr.* 31; 833, 1994.
8. Pradeep M, Rajam L, Sudevan P. *Indian Pediatr.* 32; 1091, 1995.
9. Pillai N.V, Rao K, Kumar V.R., Kushtagi P. *J. Obst and Gyn India*: 45; 940, 1995.
10. Ratnam S.S., K Bhaskar Rao, Arun K, 1st ed 1991, P256. Orient longman ltd, Madras.
11. SRS 1990, Health monitor, P. 137; 1994.
12. Singh M. *Indian Pediatr.* 23; 579, 1986.
13. Singhal P, Sharma S, Garg R. *J. Obst and Gyn. India*: 45; 751, 1995.
14. Singh UK, Srivastava SP, Kumar A, Thakkar AK, Prasad R, Chakraborty B. *Indian Pediatr.* 33; 1057, 1996.
15. Wigglesworth J.S. *The lancet*: 2, 684: 1980.