

## Quality of Services Need All Round Critical Appraisal for Decreasing Perinatal Deaths

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Received date: October 25, 2016; Accepted date: November 10, 2016; Published date: November 18, 2016

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### Abstract

**Background:** Perinatal mortality rates (PMR), index of quality of maternity, neonatal services, are still high in developing countries with regional variability.

**Material and Methods:** Present study was done by analysis of case records of mothers who had perinatal deaths (PD). During period of analysis, there were 81051 births, 5235 PD, [3923 stillbirths (SB) 1312 neonatal deaths (NND)] with decreasing trends of PMR, from 95.18 to 34.93. For analysis, cases were divided into 10 blocks.

**Objective:** Study was done to know trends of factors responsible for PD at rural referral hospital in Central India, so as to look into possible preventive strategies.

**Results:** More teenagers had more often PD in each block, 1203 (22.97%) mothers were severely anemic, problem persisted over years, 20.15% in Block A, 20.96% in Block J. Cases with hypertensive disorders with PD increased from 19.62% in Block A to 21.14% in Block J, with preterm births decreased from 52.52% to 41.26%, with antepartum haemorrhage (APH), mostly placental abruption, increased from 1.31% to 1.59%. Nine hundred twenty one (17.59%) women who had PD delivered between of 28 to < 34 weeks, 1274 (24.33%) between >34 to <37 weeks gestation, but 3040 (58.78%) were term births, Overall 41.92%. PD was preterm, significantly higher than over all 14% preterm births.

Of all cases with PD, 3753 (71.69%), were after vaginal birth [2274 (60.60%) term, 1479 (39.40%) preterm], 500 (9.55%) after elective caesarean sections (CS), 982 (18.7%) emergency CS. Overall 1482 (28.3%) babies lost were after CS. Analysis revealed that 218 (43.6%) PD were due to respiratory distress syndrome (RDS), 123 (24.6%) prematurity with low birth weight (LBW) with septicemia, 104 (20.8%) meconium aspiration, 30 (0.6%) sudden infant death syndrome, 25 (5.0%) congenital heart disease. Overall 89% babies were LBW. Major factors which lead to PD and were persisting over years were anemia, hypertensive disorders in mother, sepsis, prematurity with LBW. Of all cases of PD, 8% were after elective, 18% emergency CS, majority done in fetal interest.

**Conclusion:** PMR continues to be very high. Anemia, hypertensive disorders, preterm births, sepsis were major factors, persisting over years, almost all preventable. Of PD, 8% births were after elective CS, 18% emergency CS, majority CS done for fetal interest, a matter of real concern.

**Keywords:** Perinatal mortality rates; Labour; Low Born Weight; Neonatal care

### Introduction

The perinatal mortality rates (PMR), an index of quality of maternity services, are still very high in developing countries with regional variability. Further excessive medicalization, unregulated ultrasounds, labour inductions, caesarean sections (CS) with their spillover effects on perinatal outcome also seem to offset the gains from improved maternal/neonatal care. Each year, about 210 million women become pregnant and 140 million newborn babies are delivered –the sheer scale of maternal health alone makes maternal wellbeing and survival vital concerns [1].

These are the challenges to be faced by middle-income countries striving to achieve the MDGs/SDGs. PMR in India is still over 50 and

has shown virtually no decline during the past decade, with wide variations in urban/rural areas, different cities, hospitals. PMR is seen to correlate more with social/educational development than with economic development of the representative community [2,3]. The causes of perinatal deaths (PD) are many, some complex, some not so. Quite a few potentially preventable causes are related to functioning of health facilities too. Though the hospital based records do not provide the true status, they do provide information about every day happenings. Objective of the present study was to know the trends of maternal factors responsible for PD at a rural referral institute, so as to look into preventive possibilities.

### Methods

The article is based on the analysis of records of mothers who had PD in relation to age, parity, antenatal registration, disorders, gestational age, mode of labour (spontaneous/induced) and delivery

over 30 years (between 1985-2014). For the purpose of analysis the study period was divided into 10 blocks of three years each (A, B, C, D, E, F, G, H, I, J).

### Results

During the period of analysis there were 81051 births and 5235 PD with PMR of 64.58 [3923 still births and 1312 early neonatal deaths (NND)]. The PMR has decreased significantly over the years, from 95.18 in Block A to 34.93 in Block J, (p value <0.01), but is still very high (Table 1).

Blocks	Deliveries	PD	PMR	SB	NND
A	3961	377	95.18	243	134
B	4098	387	94.44	300	87
C	4488	472	1105.17	259	213
D	6765	598	88.4	392	206
E	8223	592	72	532	60
F	8621	580	66.57	554	26
G	8663	596	68.8	544	52
H	9012	590	65.48	556	34
I	14110	585	41.45	298	287
J	13110	458	34.93	245	213
TOTAL	81051	5235	64.58	3923	1312

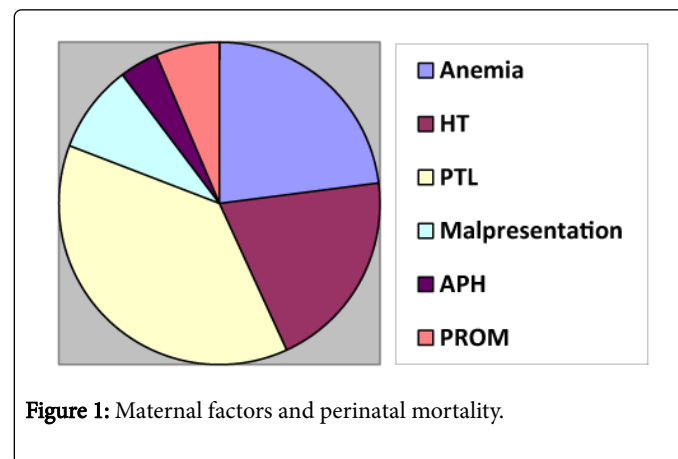
A-J: Three yearly blocks; PD: Perinatal deaths; PDR: Perinatal mortality (SB+ Early as well as late neonatal deaths/1000births); SB: Still birth

**Table 1:** Trends in perinatal mortality.

Of the 5235 mothers who had PD, 3591 (68.59%) were rural and 1644 (31.40%) urban, rural significantly more than over all 65% rural who seek maternity services (p value <0.01). Overall 3672 (70.40%) women who had PD reported in labour without basic quality care, but 1836 (35.07%) mothers had 1-3 prenatal visits at the place of study, 227 (4.33%) had more than 3 prenatal visits too. Of the 5235 mothers who

lost their babies, 2753 (52.58%) were primigravida, more than over all 42% primigravida, difference significant (P value <0.001), 1646 (31.44%) were second gravida, 836 (15.96%) third gravida.

Most of the mothers were of 25-29 years [1341 (32.00%)]. There was a decreasing trend of teenagers who had PD, 104 (21.88%) in Block A to 74 (1.41%) in Block J, (highly significant difference (P value <0.005)), however teenagers with PD were more in each Block (Table 2). Severe anemia was the only major disorder in the mothers in 1203 (22.97%) cases, persisting over the years, 20.15% of PD in Block A to 20.96% Block J (Table 3, Figure 1).



Hypertensive disorders with PD increased, little bit, 19.62% PD in Block A and 21.14% in Block J. Cases of preterm PD decreased significantly from 52.52% in Block A to 41.26% in Block J (p value <0.01), but cases of preterm pre labour rupture of membranes (PPLROM) increased from 4.57% in Block A to 10.04% in Block J. Contribution of PD due to antepartum hemorrhage (APH), (mostly placental abruption), also increased significantly from 1.31% to 1.59% (p value <0.01) [Figure 1]. Nine hundred twenty one (17.59%) births out of 5235 mothers who had PD were of gestation between 28 to <34 weeks gestation, 1274 (24.53%) between >34 to <37 weeks gestation and 3040 (58.07%) women had delivered at term (completion of 37 weeks), preterm PD were significantly higher, 41.92% than 14% over all preterm births (p value <0.01).

Block	Age	Primi		2nd & 3rd gravida		>3rd gravida		Total	Grand Total
		NO	%	NO	%	NO	%		
A	< 19	68	3.08	36	2.74	-	-	104	377
	20-29	153	6.92	34	2.6	10	1.49	197	
	>30	17	0.77	30	2.29	29	4.32	76	
B	< 19	56	2.53	28	2.14	-	-	84	387
	20-29	179	8.1	66	5.04	9	1.34	254	
	>30	3	0.14	31	2.37	15	2.23	49	
C	< 19	58	2.62	24	1.83	-	-	82	472
	20-29	191	8.64	64	4.89	13	1.93	268	

	>30	25	1.13	63	4.81	34	5.06	122	
D	< 19	51	2.31	18	1.37	-	-	69	598
	20-29	213	9.64	87	6.64	12	1.79	312	
	>30	40	1.81	100	7.63	71	10.57	217	
E	< 19	35	1.58	16	1.22	-	-	51	592
	20-29	211	9.55	68	5.19	31	4.61	310	
	>30	4	0.18	80	6.11	157	23.36	231	
F	< 19	33	1.49	6	0.46	-	-	39	580
	20-29	225	10.18	108	8.24	34	5.06	367	
	>30	32	1.45	82	6.26	64	9.52	174	
G	< 19	32	1.45	7	0.53	-	-	39	596
	20-29	231	10.45	106	8.09	43	6.4	381	
	>30	36	1.63	85	6.49	55	8.18	176	
H	<19	12	0.54	3	0.23	-	-	40	590
	20-29	294	13.3	102	7.79	40	5.95	120	
	>30	18	0.81	66	5.04	55	8.18	94	
I	<19	32	1.16	6	0.3	-	-	38	585
	20-29	230	8.35	104	6.31	34	4.06	368	
	>30	33	1.19	80	4.86	66	7.89	179	
J	<19	54	1.96	22	1.33	-	-	76	458
	20-29	169	6.13	63	3.82	30	3.58	262	
	>30	25	0.9	61	3.7	34	4.06	120	
Total		2753	52.58	1646	31.44	836	15.96	5235	5235

**Table 2:** Age and parity.

Of the 5235 mothers who had PD, 3753 had vaginal birth (71.69%), [2274 (60.60%) term and 1479 (39.40%) preterm]. Five-hundred (9.5%) were elective CB and 982 (18.75%) emergency CB. Overall 1482 (28.30%) babies lost were after CB. Out of 500 elective CS, 167 (33.4%) were performed for inadequate pelvis, 158 (31.6%) for previous CS with inadequate pelvis, 76 (15.2%) for transverse lie and 99 (19.08%) for breech presentation.

Overall in 1482 cases it was induced labour, 879 (59.32%) for fetal interest and 603 (40.68%) for mother. Significantly more PD was after induced labour in recent past, 20.19% in Block A to 34.12% in Block J (p value <0.0001). CS rate increased from 23.08% in Block A to 30.17% in Block J (significantly more, p value <0.01).

Of all babies who died after elective CS, 218(43.6%) died because of respiratory distress syndrome (RDS), 123 (24.06%) due to prematurity with low birth weight (LBW) with septicemia, 104 (20.08%) due to meconium aspiration, 30 (0.6%) had sudden infant death syndrome and 25 (5%) due to congenital heart disease. RDS was the cause of PD in preterm babies in 44.60% in Block A and 43.24% in Block J, LBW 20.84% in Block A and 19.06% in Block J.

Five hundred and two (12.8%) babies weighed less than 1 kg {very very LBW}, 999 (23.8%) between 1.0-1.4 kgs (very very LBW), 1409 (33.6%) weighed between 1.5–1.9 kgs (very LBW), a total of 2910 (69.42%) weighed less than 2.0 kgs, 784 (18.7%) weight between 2-2.4 kg (LBW), so overall 89% were LBW, but 463 (11%) weighed 2.5 kg or more. Major factors responsible for PD were prematurity, 2237(53.44%), birth asphyxia 537 (12.88%), RDS 748 (17.88%), congenital anomalies, 347 (8.27%) nervous system (113(2.67%)), cardiovascular 105(2.51% and rest others) and septicemia 325 (7.83%).

## Discussion

Though perinatal services have improved in India, a lot of preventable PD continues to occur. Present analysis revealed an overall PMR of 68.80 at the rural institution, which caters to more of rural population than urban. Years back Indian Council of Medical Research [4] had reported PMR 57.7, Aras et al. [5] 46.32, Pillai et al. [6] 49.37, Swain et al. [7] 85.6, Permar et al. [8] 68.29, Verma et al. [9] 74 between 1982-1988 as well as 1989-1995 and Rao et al. [10] 51.86. In the present study, it was 68.80. Overall during analysis period there

were 3923 SB and 1312 NND. NND decreased significantly from 3.38% (134) in Block A to 1.62% (213) in Block J (p value <0.01). But a lot of

preventable loss, either as still birth or neonatal death continues. Bamji et al. [11] have reported 8.2% mortality in perinatal period.

Block	Maternal Disorders												Total %
	Anaemia		HT		PTL		Malpresentation		APH		PTROM		
	NO	%	NO	%	NO	%	NO	%	NO	%	NO	%	
A	76	20.15	0.74	19.62	198	52.52	11	2.91	6	1.59	17	4.57	377
B	96	24.8	80	20.67	196	50.65	4	1.03	-	-	17	4.39	387
C	104	22.03	104	22.03	206	43.64	26	5.51	10	2.12	27	5.72	472
D	112	18.73	109	18.23	229	38.29	70	11.71	26	4.35	58	9.7	598
E	104	17.57	111	18.75	221	37.33	62	10.47	19	3.21	36	6.08	592
F	160	27.59	118	20.34	200	34.48	48	8.28	12	2.07	48	8.27	580
G	154	25.84	124	20.81	178	29.87	77	12.92	48	8.03	33	5.54	596
H	152	25.57	120	20.33	174	29.49	70	11.86	41	6.95	26	4.41	590
I	149	25.47	118	20.17	182	31.11	72	12.3	36	6.15	28	4.78	585
J	96	20.96	97	21.14	189	41.26	24	5.24	6	1.31	46	10.04	458
Total	1203	22.97	1055	20.15	1973	37.68	464	8.86	204	3.9	336	6.41	5235

HT: Hypertensive disorders; APH: Antepartum haemorrhage; PTL: Preterm labour; PPRM: Preterm pre labour rupture of membrane

**Table 3:** Major maternal disorders and perinatal mortality.

Ndaboine et al. [12] reported that in Tanzania 42.9% PD were caused by prematurity and birth asphyxia and 57.1% and 58.5% of these babies respectively had LBW. Saha [13] reported SB rate of 73.21, ENNM rate of 34.43 and PMR of 107.64. Maternal age above 30 years, multiparity, teenage were associated with highest perinatal loss. The most common cause of perinatal mortality was intranatal asphyxia (43.35%). Joshi [14] reported that socially and economically marginalized households were at a higher risk of having a perinatal/neonatal death. A higher educational level of the parents and an occupation with a steady source of income was found to be protective for the survival of the neonate. Among the various biomedical factors, higher maternal age, previous history of abortions and child deaths in the family, untrained birth attendant, preterms and low birth weights had a higher chance of mortality [14].

DeReu et al. [15] have reported hypertensive disorders of pregnancy, placental abruption, diabetes mellitus, intrapartum foetal distress and lethal congenital anomalies as the leading causes of stillbirths. Bassaw et al. [16] reported RDS (57.8%), birth asphyxia (22.2%) and sepsis (13.5%) as major causes of perinatal loss. Mikulska [17] reported the most common causes of intrauterine deaths as placental, umbilical cord, and fetal membrane complications (30.7%), maternal disorders (29.3%) and developmental anomalies (23.0%).

Forssas [18] reported increased risk for PD for eight maternal characteristics, of which the major factors were higher maternal age (38%), maternal diabetes (50%), lower socioeconomic status (27-44%) and first birth (75%). Hassan et al. [19] from Egypt reported a positive association between PD and maternal age, obstetric history and utilization of health services. Study by Berhan et al. [20] demonstrated a small effect on the increased risk of perinatal mortality among women who were pregnant during teenage age and gave birth too

frequently or after long intervals. Early diagnosis & timely appropriate interventions is the key to prevention but prevention is failing. Chalumeau et al. [21] have reported PMR of 42 (with 62% stillbirths), with the principle risk factors being vaginal bleeding (antenatal and intrapartum), hypertension (especially during labour), labour dynamics (prolonged labour and use of oxytocin), mechanics (non-cephalic presentation), infection (prolonged rupture of the membranes) and intrapartum fever. In the present study also birth asphyxia was in 14.6%, septicemia in 9.3%, RDS in 16.88%, congenital anomalies 8.1% cases. The still births with very LBW contributed to 12.8 % of PD. Of intrauterine deaths, 30% were unexplained preterm, 38% intrauterine deaths were preterm (40%), with anemia and hypertension, 40% other maternal disorders. In preterm births many times there is no identifiable cause for prematurity. DDT (1, 1, 1-trichloro-2, 2-bis (p-chlorophenyl) ethane) use is very common and it increases preterm births, which many times are believed to be idiopathic and are a major factor in PD. So such associations should be included in any assessment of the costs and benefits of vector control with DDT [22]. Prematurity continues to kill many babies and more studies are needed.

In the present analysis, it was revealed that there is very slow decline in PMR. Women continue to deliver without quality prenatal care and more mothers with first pregnancy lose their babies. Overall teenage births decreased but more teenagers lost their babies. Runsewe-Abiodun et al. [23] have also reported the same. Berhan et al. [20] also reported increased PD with placental abruption. In the modern era of interventions, it was disheartening to know babies dying after elective CS and a significant number of babies died after induced birth for foetal interest and numbers increased. It is more worrisome, when first birth is by CS and baby dies. In the present analysis there was a

decrease in early neonatal death rate, 32/1000 between 1985-1987 to 16/1000 between 2012-2014, mainly due to improved survival of preterm babies with better life supportive measures available in the later part of analysis.

## Conclusion

PMR continues to be very high in this rural part. Anemia, hypertensive disorders, preterm births, sepsis were the major factors responsible for PD persisting over the years. Of total PD with CS deliveries, 8% were after elective CS and remaining 18% after emergency CS, in which majority of CS were done for fetal interest. This is a matter of concern. Despite the network and resources, many preventable PD continue to occur. Only positive thing observed was significant decrease in teenage mothers with perinatal deaths.

## Acknowledgement

I would like to thank the patients and my co-workers for their cooperation. There is neither any financial support or benefit, nor any conflict of interest regarding the article.

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