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PERINATAL MORTALITY AMONGST PRIVATE PATIENTS— A 14 YEAR SURVEY

by

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A 14-year survey of perinatal mortality, henceforth abbrivated as p.m., in a private hospital in Bombay, is presented. The period of study has been April 1960 to March 1974.

All patients belonged to the middle or higher social classes. In 80 per cent, the educational level was of the high school order (class 9 or more) at least, yet less than 5 per cent of the pregnant women were gainfully employed at the time of their pregnancies. Eighty-five per cent of women belonged to Gujarati Community, and 95 per cent were vegetarian by food habits. The health standard of pregnant women was generally satisfactory. The joint family system was the most predominant mode of living.

A single haemoglobin estimation, blood grouping and rhesus factor were the only routine investigations carried out, others being done only if the past obstetric history or the medical examination warranted. Only analgesia and sedation were employed during labours and no patient had formal anaesthesia during labour. Ninety-eight per cent of deliveries were conducted by a doctor. No modern investigational procedure or equipmen was available to assess foetal maturity, foetal health, placental insufficiency, or foetal distress, or to monitor foetal heart rate or uterine contractions, at any time of pregnancy or labour.

The new-born infants were looked after by obstetrician and were generally handled by nurse or nurse-aid. Paediatrician was summoned only when need arose and an anaesthetist was occasionally called to revive an asphyxiated baby. Premature infants were given special attendance but were not nursed in sophisticated incubators and were rarely handled by special personnel.

Material and Methods

Records of all consecutive deliveries in which the weights of the foetuses, born alive or dead, were 501 gms. and over, were accepted into study.

All still-births and all neonatal deaths upto 168 hours (7 days) of birth, in whom

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the foetal or new-born's weight was 501 gms. or more at birth, were considered as perinatal losses.

Premature delivery was the one in which the period of gestation at delivery was less than 38 weeks. Prolonged pregnancy was the one in which the period of gestation at delivery was 41 weeks and 3 days at least.

Perinatal mortality rates per 1000 deliveries (births) have been calculated, and relevant corrections have been shown in those figures. Relation of p.m. to maternal characteristics of age and parity, and antenatal visits have been brought out. Associated maternal medical conditions and relevant obstetrical events have been discussed. Causes of foetal loss or neonatal death have been established purely on close clinical observations and not at autopsy.

TABLE I

Total Births, Perinatal Losses, and Perinatal Mortality Rates

Years	Total Births	Perinatal Loss	Perinatal Mortality Rates
1960-1974	4320	145	33.3
1960-1967	2056	84	40.8
1967-1974	2264	61	26.9

The study was split into two large subdivisions of first 7-years period and the second 7-years period for comparison.

Analysis and Results

Incidence of Perinatal Mortality

The year by year distribution of total births and p.m. have varied with ranges of 240-380 deliveries and 14.1 to 54.00 p.m. rates. One hundred and forty-five deaths out of 4320 births in the 14 year period (Table I) meant that one in every 29 mothers lost her baby. During the years 1960-67, one in every 24 mothers, and in the next 7 years one in every 37 mothers went home without her infant. The drop in the p.m. rate during the second 7-years by 14 had been noteworthy.

The p.m. according to maturity of gestation is shown against the total births in Table II. Full term deliveries constituted nearly 4/5th of the total. The difference in the p.m. rates amongst the full term deliveries in the two 7-year periods is not marked. The p.m. rates amongst the premature group and that of the prolonged pregnancy group have indicated reductions by nearly ½ of the earlier rates.

TABLE II

Deliveries, Perinatal Loss, and Perinatal Mortality Rates According to Maturity in the two 7-Year Periods

Years	Full Term			Premature			Prolonged Pregnancy		
	T.D.	P.L.	P.M.R.	Prem. D.	P.L.	P.M.R.	Prol. Preg. D.	P.L.	P.M.R.
1960-67	1713	27	15.7	265	52	196.2	78	5	64.1
1967-74	2264	20	11.5	368	35	93.2	167	6	35.9

T.D.: Total deliveries. P.L.: Perinatal loss.
P.M.R.: Perinatal Mortality Rate.

Prematurity was associated with (52 out of 84) 61.9% of p.m. in 1960-67 and with (35 out of 61) 57.4% of p.m. in 1967-74. Similar figures for full term deliveries were (27 out of 84) 32.1%; and (20 out of 61) 32.8% respectively. The distribu-

tion for prolonged pregnancy group was (5 out of 84) 6.0% and (6 out of 61) 9.8% for the years 1960-67 and 1967-74 respectively. There has thus been some reduction in the contribution by prematurity and some rise in the contribution by prolonged pregnancy, over the 14 years period, towards p.m.

If birth weight is considered, as criterion of prematurity, at 2250 gms. and 2500 gms., the percentages of prematurity would be (98 of the 145) 69.3% and (109 of the 145) 75.2% respectively, The role of prematurity in p.m. has been substantial.

The total neonatal death rate is almost the same as the total still-birth rate (Table III). These rates are similar among the full term and premature deliveries, in both the 7-year periods. The neonatal death rates are, however, significantly lower than the still-birth rates in cases of prolonged pregnancy, in each of the 7-years period. Reductions in neonatal deaths as well as still-births amongst the prematurely delivered women, during 1967-74 period have been remarkable. Small as they may be, the fresh still-birth rate in the full term deliveries, and the macerated still-birth rate in the prolonged pregnancy group, have shown increases during the second 7-years period. The rates of fresh still-births are not significantly different from those of macerated still-births, at any period of time and at different maturity levels.

Incidence Corrected for Foetuses Weighing 1000 Gms. and Less

Nearly 24 per cent of all foetuses were less than 1000 gms. in weight. About 34 per cent had weights of 1100 gms. to 2000 gms., 16 per cent were between 2001-2500 gms., 24 per cent had the weight range between 2501-3600 gms., and approximately 2 per cent were more than 3600 gms. This weight distribution was more or less the same between the two 7-years periods.

TABLE III

Perinatal Loss, P. M. Rate, According to Gesta-tional Maturity and Type of Death in the Two 7-year Periods

Maturity	Neonatal Death				Frensh Still Birth				Macerated Still Birth			
	1960-67		1967-74		1960-67		1967-74		1960-67		1967-74	
	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate
Overall	43	20.9	28	12.4	19	9.2	14	6.2	22	10.7	19	8.4
Full term	15	8.7	8	4.6	4	2.3	7	4.0*	8	4.7	5	2.9
Premature	26	98.1	18	47.6	13	49.0	6	15.9	13	49.0	11	29.1
Prolonged Pregnancy	2	25.6	2	12.0	2	25.6	1	6.0	1	12.8	3	18.0*

* Have increased over previous years.

TABLE IV

Perinatal Mortality Rates Corrected for Birth Weights of 1000 Gms. and Less

Years	No. of foetuses of 1000 gms. & less	No. after deduction	Perinatal loss after correction	P. Mortality Rate corrected
Over all	35	4285	110	25.7
1960-67	22	2034	62	30.5
1967-74	13	2251	48	21.2

Perinatal mortality rates corrected for foetuses weighing 1000 gms. or less (Table IV), for the years 1960-67 and 1967-74 were 30.5 and 21.2 respectively.

Maternal Characteristics and Perinatal Mortality

For epidemiological purposes some of the maternal characteristics have to be considered.

Age

The percentage of women between 21 and 35 years of age is on the increase in the recent seven years (Table V). There is correspondingly, lowering of percentages of women in the age groups above and below this range.

Within the women of 20 years and less, the fall in the p.m. rate is three times in the years 1967-74, and the drop in the rate within the age group of 36 years + is four times. These improved rates have essentially been due to the better management of the neonate. The reduction in the p.m. rate in the 21-35 years group is, however, rather small during 1967-74 period.

Parity

Whereas there has been some increase in the percentage of parity I (35.6% to 40.4%) and II (26.7% to 31.8%) deliveries in the second 7-years period, the parity III delivery percentage has dropped significantly (37.7% to 27.7%).

The perinatal mortality rates have significantly improved in both the parity I (50.5% to 33.8%) and III + (42.7% to 27.02%) groups, in recent years, compared to the previous years. The improvement seen in the parity II group is, however, small. (23.6% to 18.0%).

The salvage is greater proportionately amongst the neonatal group than the

TABLE V

Deliveries and Perinatal Mortality Rates According to the Age Groups in the two 7-years Periods

Years	Delivery	20 Years & Less				21 to 35 years				36 years & over			
		No. of D.	% of T.D.	P.L.	P.M.R.	No. of D.	% of T.D.	P.L.	P.M.R.	No. of D.	% of T.D.	P.L.	P.M.R.
1960 to 1967	2056	244	11.9%	10	41.0	1726	83.9%	60	34.8	86	4.2%	14	162.7
1967 to 1974	2264	188	8.3%	2	10.6	2001	88.4%	56	27.8	75	3.3%	3	40.0

D: Deliveries
T. D.: Total deliveries.
P.L.: Perinatal Loss.
P.M.R.: Perinatal Mortality Rate.

still-births group. Parity II has the least perinatal mortality rate at any time.

Antenatal Care and Perinatal Mortality

Randomly, 652 delivered women during the years 1960-67, and 601 in the years 1967-74 were analysed for the number of antenatal yisits made. This analysis was compared to a similar one of the study group.

Table VI indicates that the number of antenatal visits paid by women suffering perinatal mortality was significantly less than that in the randomly selected group. The antenatal care received by the former was less than adequate. Whereas less than 1 per cent of women in the larger population delivered as emergency cases, the group with perinatal mortality had 13 times and 6½ times greater number of emergency admissions during the respective seven-years period. A hopefully beneficial trend in recent times is the increasing awareness amongst pregnant women to the need of more frequent prenatal visits and thus to greater prenatal medical attention. The improvement in women paying more than five antenatal visits is almost 12 per cent.

A study of the time of the first antenatal examination requested by patients and its relationship with the perinatal mortality revealed, that, when women had regular check-ups from early pregnancy, the incidence of perinatal mortality in them was much less than amongst that group of women who started their pregnancy care at a later time (Table VII).

TABLE VI

Dipicting the Relationship of Antenatal Care (No. of Visits) in a Random Population of Pregnant Women and in the Study Group During the Two Study Periods

Years	Total Delivery	0		1-2		3-4		5+	
		No.	%	No.	%	No.	%	No.	%
1960 to 1967	Random 652	5	0.8	84	12.9	322	49.9	241	36.9
	Study 84	11	13.1	29	34.5	27	32.1	17	20.2
1967 to 1974	Random 601	5	0.8	55	9.1	246	40.9	295	49.1
	Study 61	4	6.5	19	31.1	22	36.1	16	26.0

TABLE VII

Showing the Distribution of Total Cases and those with Perinatal Mortality, in the Two 7-Years Periods, According to the Gestational Weeks at the First Ante-Natal Visit

1960-67 First Ante-natal visit	Total cases		Perinatal Mortality	
	No.	%	No.	Rate
20 Weeks	455	22.1	4	9.00
21-28 Weeks	1195	58.1	56	47.00
29 Weeks +	406	19.8	24	56.00
1967-74 First Ante-natal Visit	**Total cases**		**Perinatal Mortality**	
	No.	%	No.	Rate
20 Weeks	732	32.3	5	7.00
21-28 Weeks	1198	52.9	43	36.00
29 Weeks +	336	14.8	13	38.00

Maternal Conditions and Obstetric Events Associated with Perinatal Mortality

In 82 (56.55%) out of 145 total perinatal mortalities, at least one medical or obstetric condition was associated with the loss. (Tables VIII & IX) The important maternal conditions were toxaemia of pregnancy, genital infection, and diabetes mellitus. The chief obstetric events were accidental haemorrhage and other antepartum haemorrhages, premature rupture of membranes, incompetent cervix, postmaturity and multiple pregnancies. These conditions have existed with each type of foetal loss, and at each of the three gestational periods, almost to an equal extent barring full term deliveries.

Actual Causes of Perinatal Mortality

In absence of autopsy studies, the actual cause of foetal or neonatal death has been assigned after a careful clinical observation. These have been shown in Table X. Prematurity per sé which includes the respiratory distress syndrome played the most devastating role, being responsible for 19.3 per cent of all deaths. Foetal asphyxia was the next important cause responsible for 9 full term, 9 premature and 5 prolonged pregnancy still-

TABLE VIII

Medical Conditions Associated with Perinatal Loss

Medical Conditions	Total	%
Anaemia	1	0.68
Toxaemia	11	7.6
Diabetes mellitus	3	2.17
Syphilis	1	0.68
Rh. Incompatibility	1	0.68
Local vaginal infection	4	2.7
Total:	21	14.51%

TABLE IX

Obstetrical Events Associated with Perinatal Loss

Obstetrical Events	Total	Percentage
Accidental haemorrhage	12	8.16
Placenta praevia	1	0.68
Uncl. antepartum haemorrhage	4	2.72
Premature rupture of membranes	10	6.8
Post-maturity	6	4.2
Incompetent cervix	7	4.9
Multiple pregnancy	5	3.4
Breech delivery	3	2.1
Cord prolapse	1	0.68
Cord compression	8	5.4
Placental anomaly	4	2.7
Total	61	41.74

TABLE X

Actual Causes of Perinatal Mortality in the two 7-Years Periods

Causes	Total No.	Years 1960-67	Years 1967-74	Total %
1. Prematurity + R.D.S.	28	16	12	19.3
2. Foetal asphyxia	23	15	8	15.9
3. Neonatal asphyxia	13	10	3	9.0
4. Hypoxia	20	12	8	13.8
5. Congenital malformation	23	6	17	15.7
6. Infections	12	10	2	8.2
7. Asp. pneumonia	4	3	1	2.7
8. Trauma	3	2	1	2.0
9. Anaemia & Rh. Incomp.	2	0	2	1.4
10. Unexplained IUFD	17	10	7	11.7
Total :	145	84	61	99.7

births. Congenital malformations were lethal in 15.7 per cent, and unexplained intra-uterine foetal death also carried a substantial toll. Neonatal asphyxia has been largely controlled during the years 67-74. Foetal hypoxia was mainly associated with accidental haemorrhage and toxaemia of pregnancy. Intra-uterine growth retardation was often noted with hypoxia of the foetus. Infections of the new born, though responsible for a number of deaths in the first 7 years, was not a serious problem in the later years. The factors of birth trauma, aspiration pneumonia cardiac failure in Rhesus incompatibility, accounted for a total of 6.1 per cent of deaths.

While foetal and neonatal asphyxia, neonatal infections have been controlled in recent years, the problem of hypoxia, prematurity and unexplained intra-uterine foetal death have not been resolved. The alarming rise of gross congenital malformations responsible for perinatal death, is note-worthy, and a search into this factor in future is much needed.

Discussion

In a personal study conducted at N. Wadia Maternity Hospital, Bombay (a public hospital), between January 1963 June 1963 the author had noted a perinatal mortality of 73.8. In a similar prospective study over six months in the year 1975, at N. Wadia Maternity Hospital, the perinatal mortality rate was 56.3. These figures are two times greater than the rates of perinatal mortality quoted amongst private patients in the present study.

Perinatal mortality rates amongst Indian Community in Singapore, Malaysia, and Figi have always been higher than those in communities of other races, inspite of the Indians enjoying the same socio-economic standard. (Lancanster, 1972) poor standards of dietary habits and customs have been blamed for higher mortality rates amongst Indians. Probably these facts also exist in India to explain the higher mortality figures reported from different parts of India (Table XI).

The frequent prevalence of medical conditions (Table XII) of anaemia, 23.05%, and genital infections, 16.15%, during the 14 years, did not, to any extent, contribute to p.m. Three to four of every 100 toxaemic mothers, however,

TABLE XI

Showing the Incidence of Perinatal Mortality as Quoted by various Authors in India

Author	Place	Year	Perinatal Mortality Rate
1. Mehndi et al	Hyderabad	1961	79.6
2. Engineer	Lucknow	1962	124.7
3. Rajgopalan	Lucknow	1964	114.00
4. Srivasta	Kanpur	1969	100.45
5. Ghosh	New Delhi	1970	62.00
6. Author (Mehta)	Bombay (NWMH)	1963	73.8
	Bombay (NWMH)	1975	56.3
7. Present series	Bombay	1960-67	40.8
		1967-74	26.9

TABLE XII

Showing the Incidence of Maternal, Obstetric nd Foetal Conditions in the Total Study Population of 4320 Cases and Amongst those with perinatal mortality

Items	Total cases	% of T. Cases	Perinatal loss	% in Perinatal loss
1. Anaemia	1017	23.05	1	0.097
2. Toxaemia	342	7.45	11	3.21
3. Diabetes mellitus	38	0.60	3	7.89
4. Syphilis	9	0.20	1	1.11
5. Genital infections including vaginitis	694	16.15	4	0.58
6. Rh. Negative	129	2.70	1	0.77
7. Accidental haemorrhage + Unclassified APH.	56	1.25	16	28.57
8. Placenta praevia	147	3.40	1	0.68
9. Premature rupture of membranes	850	19.85	10	1.17
10. Incompetent cervix	58	1.05	7	12.07
11. Twinning	26	0.65	5	19.23
12. Breech delivery	53	1.20	3	5.66
13. Congenital malformation	277	6.40	23	8.30
14. Cord prolapse	18	0.35	1	5.83
15. Placental anomaly	395	9.00	4	0.01

lost the foetus or the new-born. Inspite of the low incidence of diabetes mellitus in the study population (0.6%), one in 13 diabetic mothers lost her child. The only obstetric problem presenting itself frequently was premature rupture of membranes. It hardly added directly to the p.m. rate. Accidental haemorrhage occurred in only 1.25% of total patients, but more than 1 in 4 women suffering from it did not take a live baby home. The three obstetric problems, the incidence of which do not generally change considerably over periods of time, namely, incompetent cervix, twin pregnancy, and breech delivery add substantially to p.m. rates. Of increasing concern is the fact that 1 out of every 12 congenital malformation was lethal to the foetus or the new born.

The p.m. due to asphyxia and hypoxia have reduced in later years of study. Obviously, the moderate escalation of caesarean section and forceps rates from 3.8 and 5.5 per cent during 1960-67, to 7.3 and 8.8 per cent respectively in 1967-74, have paved the way for these improved figures. Further reduction in asphyxia will be possible by (a) timely induction of labour at term or immediately thereafter, and (b) better and early appreciation of cord compression.

Clearer understanding of foetal growth and its supply line, of the factors leading to onset of labour, and application of modern tests for the same, will resolve in future, the problems of unexplained intra-uterine foetal death and prematurity.

Summary

A 14 year survey amongst private patients showed a reduction in p.m. rate from 40.8 to 26.9 during the latter 7 years. Substantial reduction was noted both amongst premature and prolonged pregnancy deliveries; the same could not be said of the full term deliveries. The

neonatal death rate and the still birth rate have shown parellel declines over years. The age of 36 years + has been unfavourable. The p.m. is twice as high in the parity groups I and III + than in parity II. Early prenatal care and minimum of 5 antenatal visits have proved more fruitful for foetal salvage.

Toxaemia of pregnancy, diabetes mellitus, syphilis, genital infection and Rhesus incompatibility were the common associated maternal conditions. Ante-partum haemorrhage, postmaturity, incompetent cervix, multiple pregnancy, breech delivery and cord compression were contributing obstetrical events.

Prematurity, asphyxia, congenital malformation and unexplained intra-uterine foetal death were the principal causes of perinatal mortality.

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