

PERINATAL MORTALITY

In Calicut, Kerala

by

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Peller introduced the concept of perinatal mortality which combines viable foetal deaths (those occurring in the last trimester) and early neonatal deaths (in the first 7 days of life). In the medically sophisticated countries of the West, perinatal mortality accounts for as many deaths as in the next 40 years of life. Perinatal mortality has been reduced to half of what it was 25 years ago in this country. Despite this, on a conservative estimate it would appear that over one and a half million perinatal fatalities occur annually in India.

The recent developments in the field of neonatal pediatrics, with consequent improved rates of survival of grossly underweight infants, have largely rendered meaningless any arbitrary classification of such infants as nonviable. Accordingly all perinatal deaths have been included in this survey, without reference to the birth weights. It has rightly been suggested that perinatal mortality does not reflect the true picture of foetal loss, since it excludes the con-

siderable loss of nonviable foetuses. The World Health Organization recommends that foetal losses be classified as "Early (before 20 weeks), "Intermediate" (between 20-28 weeks), and "Late" (over 28 weeks) foetal deaths, and that the concept of perinatal mortality be further extended to its logical conclusion of including all foetal losses regardless of the duration of gestation in its purview.

Incidence of Perinatal Mortality

Based on the 3062 babies born during 1962-63 at the Medical College Hospital, Calicut, the perinatal mortality rate was observed to be 94.7 per 1000 births. Among the factors which presumably led to this high incidence were the fact that by far the large majority of maternity cases were unbooked, having received little by way of prenatal care, and that a considerable proportion of them had been admitted late in labour with various complications. Deadbirths and neonatal deaths contribute equally towards perinatal mortality in medically advanced countries. Where an equal division has not occurred, deadbirths form the larger fraction. There were 195 deadbirths and 95 neonatal deaths in the present series.

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The degree of approximation between the two values is a reliable index of the efficacy of the public health agencies in a community. The high incidence in the present series of dead births (63.65 per 1000 births) is in striking contrast to the figure of 18 per 1000 for England, and 20 per 1000 for Scotland in 1962.

TABLE I

Parity	Perinatal deaths		General in the hospital Per cent
	Number	Per cent	
Primi	84	29	26.25
2	25	8.62	14.9
3	24	8.27	12.55
4	16	5.5	9.8
5	31	10.69	8.65
6	29	10	8.85
7	27	9.31	7.05
8	23	7.93	5.35
9	13	4.48	3.6
10	9	3.1	1.7
over 10	9	3.1	0.85

Birth Order and Perinatal Mortality

The perinatal loss was higher in the offspring of primiparous women, being lower in second, third and fourth gravidae. The higher perinatal loss in primiparae is presumably a reflection of the frequency of

TABLE II

Age group in years	Perinatal deaths		General in the hospital Per cent
	Number	Per cent	
Below 15	—	—	.05
15-19	41	14.14	10.4
20-24	52	18.0	20.3
25-29	44	15.14	27.35
30-34	76	26.2	22.4
35-39	56	20.6	14.7
40-44	17	5.2	3.9
Over 45 or 45	4	1.2	0.9

premature births and of toxaeimias of pregnancy in these subjects.

Bearing of Maternal Age on Perinatal Mortality

Perinatal fatalities were more frequent under 20 and over 30 years of age, being minimal in the age group 25-29 years, which corresponds to the period of maximum fertility locally.

Perinatal mortality increases with poor socioeconomic status. Too long as well as too short an interval between pregnancies entails increased number of perinatal fatalities. It has been suggested that advancing age of the father is also associated with a rise in the perinatal mortality rate. The perinatal mortality is less in tall women. It has not been possible to evaluate these factors in the present study.

Prematurity and Perinatal Mortality

We are of the opinion that a lower weight standard of 4 lbs. be adopted locally as the index of prematurity. Judged by this standard, 161 of the 290 perinatal deaths occurred among premature infants. Over two-thirds (68 per cent) of infants were gestationally premature (198 cases). The term of gestation was less than 32 weeks in nearly a third (87 cases). While the consensus of opinion is that prematurity per se should not be considered to have caused a perinatal death, it is obvious that any scheme to reduce perinatal mortality must take into account the decisive role of prematurity in the genesis of perinatal fatalities. Deadbirths were more frequent among 'mature' in-

fants in comparison to premature infants. Neonatal mortality contributed to 28.7 per cent (37 cases), of perinatal loss in mature infants, and to 36 per cent (58 cases) among premature infants. Webster (1957) points out that advances in care of premature infants cannot supplant the intrauterine environment. The only satisfactory treatment is prevention of premature labour.

Birth Weight Patterns in Perinatal Deaths

The unfavourable influence of low birth weight on perinatal mortality is well brought out by Table 3. Near-

TABLE III

Birth-weight in lbs.	Total number	Perinatal deaths	
		Number	Per cent
1-2	25	24	96
2-3	94	59	62.8
3-4	164	60	36.6
4-5	286	38	13.3
5-6	456	30	6.58
6-7	1273	42	3.3
7-8	370	25	6.76
9-10	48	2	4.16
Over 10	6	1	16.6

ly a fifth (47 cases) of the subjects were from the allegedly nonviable group with birth weights less than 2 lbs. 2 ozs. The ideal birth weight was observed to be 6-7 lbs., in which

group the lowest perinatal mortality was recorded.

PERINATAL MORTALITY IN PARITY



Fig. 1

Perinatal Mortality and Foetal Presentations

The high frequency of perinatal deaths in breech, face, brow, and compound presentations is hardly surprising. However, of the three perinatal deaths associated with face presentation, one was a dead born anencephalic foetus. Browne and Carney (1964) opine that the obstetrician should lean towards achieving correction and subsequent vaginal delivery, if disproportion can be excluded, and the patient is seen early in labour. Our figure for gross perinatal mortality in breech deliveries of 22.65 per cent bears favourable comparison to those reported by other Indian authors. Rajani and Phatak, 1964 — (40%), Lahiri, 1964 —

TABLE IV

	Total	Deadbirths	Neonatal deaths	Perinatal deaths	Per cent P.N.M.
Vertex	2811	203	21	224	8
Face	12	2	1	3	25
Brow	13	4	—	4	30.8
Breech	181	31	10	41	22.65
Compound	20	9	2	11	55
Shoulder	25	5	2	7	28

(37.5%) and Rajaratnam, 1964 — (35.7%)³. There are hardly any grounds for complacency when it is considered that breech deliveries accounted for 5.9 per cent of all births. McLennan (1964) states 'If one really looks after breech presentations his figures would look after themselves'. Adequate assistance is desirable in extraction of the after-coming head. The association of prematurity with breech presentation is well documented. Mehta's (1941) contention that breech presentation may be responsible for prematurity than the other way around is relevant in this context. Other inimical factors associated with breech presentation include hydramnios, cord prolapse and compression, trauma to the unmoulded head, antepartum haemorrhage and toxæmias. Measures suggested towards reduction of foetal losses in these cases include more liberal resort to caesarean section, routine episiotomy, application of forceps to the aftercoming head etc. In transverse lie, Tamaskar (1964) pleads that resort be made to caesarean section more frequently from the point of view of the foetus as well as the mother. Too many cases of malpresentation are not recognized until they go into labour. The days of the casual obstetrician are now past, and good antenatal care and

skilled attention during labour must be ensured.

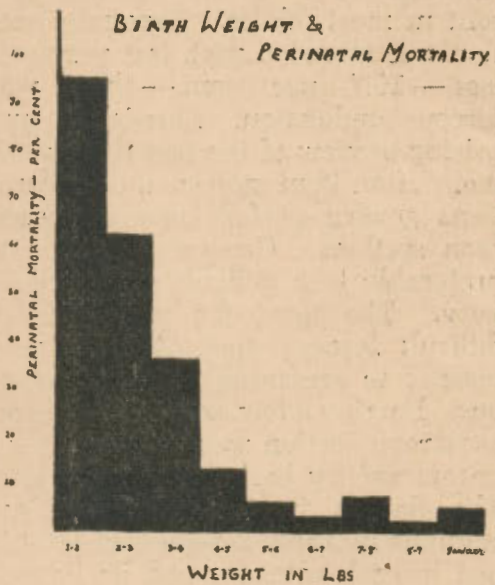


Fig. 2

Perinatal Mortality and Mode of Delivery

Pointing out that the application of midcavity forceps is attended with foetal mortality which is in direct proportion to the height of the foetal skull from the perineum, Sarojini (1961) opines that the mortality rate in low forceps deliveries should be practically zero. The perinatal loss in our forceps deliveries (high and low) was 16.4 per cent. In a considerable pro-

TABLE V

	Total	Deadbirths	Neonatal deaths	Perinatal deaths	Per cent P.N.M.
Forceps	177	15	14	29	16.4
Caesarean	131	4	10	14	10.7
I. P. version extraction	15	2	3	5	33.3
Breech & extraction	15	3	1	4	26.6

portion of these cases, the foetus was already dead at the time of admission, and marked foetal distress was present in most others. Caesarean section was attended with less perinatal loss — 10.7 per cent — than was forceps application. This is not surprising in view of the fact that foetal, more often than maternal, considerations govern performance of caesarean sections. Caesarean section is preferable to a difficult vaginal delivery. The need for avoidance of difficult forceps application in preference to caesarean section is obvious. Barring a few isolated instances, caesarean section was resorted to on an emergency basis in all our cases. The figures in the perinatal loss columns in Table 5 represent infants lost in each category and do not indicate foetal losses resulting from the procedure. As such it must be remembered that babies previously born dead or moribund with forceps are followed by live births with caesarean section, while those deadborn in spontaneous deliveries are in a succeeding pregnancy born alive with forceps.

The higher perinatal mortality associated with multiple births has been commented upon in a previous paper (Nair and Abdulla, 1964). The most significant factor in foetal mortality in twin deliveries is prematurity, ancillary factors being toxæmias and hydramnios.

Clinical Causes of Perinatal Mortality

Due to diverse factors directly or indirectly involved, classification of the factors in the aetiology is by no means an easy task. The hazards that face the baby in its passage through

'The valley of the shadow of birth' are many, and it has been stated that very often the battle is lost before it is even joined. The autopsy findings are usually negative in macerated foetuses. Bhoumik and Datta (1961) state that postmortem studies tell us how the babies died, rather than why they died. Morrison (1962) ruefully admits that autopsy fails to explain the cause of death in 40 per cent of cases. In Table 6 are shown the clinical causes of perinatal fatalities in the present series. There were only 27 autopsies in this series, too small a figure to draw inferences. Toxaemias of pregnancy and accidental haemorrhage were common causes of premature perinatal fatalities. On the other hand trauma and stress of labour were the most significant factors in mature perinatal deaths.

TABLE VI

	Pre-mature	Mature	Total
Hydramnios	4	6	10
Trauma-stress of labour	22	39	61
Toxaemias of pregnancy	41	17	58
Abruptio placentae	51	21	72
Malformations	10	7	17
Maternal anaemia/ malnutrition	1	10	11
Infections in infant	3	4	7
Postmaturity	—	2	2
Placenta praevia	6	9	15

Toxaemia of pregnancy was the most important of the maternal diseases. The cause of death in toxæmia is placental ischaemia with or without infarct or retroplacental haemorrhage. Contributory factors presumably include intrauterine growth retardation and the higher

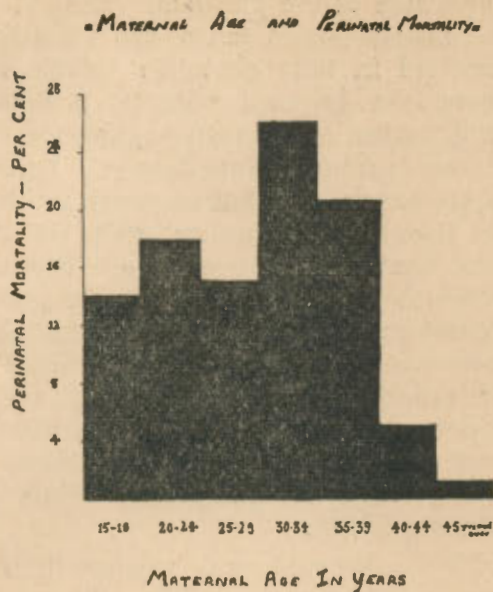


Fig. 3

frequency of premature births. In eclampsia the anoxaemia which occurs with convulsive episodes and sedatives administered are contributory factors. The deleterious effect of toxæmia on birth weights was apparent in a previous study (Nair *et al.*, 1963). Once born the toxæmia infant is no more susceptible to risk than any other infant of like weight; in fact it has better resistance.

Mortality could be attributed to accidental haemorrhage in 72 subjects, 31 being of the toxæmic variety. The high foetal mortality in abruptio placentae may be due to the fact that the large majority of cases met with belonged to Grade 11 in Page's classification, the prognosis for the foetus being poor in these cases. In the rare cases where the baby is born alive, early neonatal death is the rule.

It has been pointed out that a basic requisite for the normal growth and

development of the foetus within the uterus is a normal placenta, normal in structure, normal in function and normal in situation. The perinatal loss was lower in placenta praevia, prematurity being the most significant factor in these cases. In the solitary case of vasa praevia met with, the baby was born exsanguinated due to foetal blood loss. The significant contribution of haemorrhages in late pregnancy in the causation of perinatal deaths is worthy of note. Indeed as Gordon (1951) lamented, 'The red torrent still inundates our statistics'. Dewhurst's (1964) statement that an antepartum haemorrhage, however small, calls for specialist consultation or immediate hospitalization is relevant in this context.

Gross congenital malformations were responsible for 5.86 per cent of the perinatal deaths. These included cases of anencephalus, hydrocephalus, exomphalos and meningomyelocele. By bringing to light internal anomalies as well, routine autopsies would probably have demonstrated a higher frequency of malformations in the present study. In a recent study of malformations, it was observed that more than half the infants with congenital malformations succumbed during the perinatal period (Nair and Mathai, 1964).

Hydramnios was observed in 6 deadbirths and in 4 neonatal deaths. Associated congenital anomalies, premature births, liability to breech presentation and for cord prolapse contribute towards the high perinatal mortality in hydramnios. Gross maternal malnutrition and anaemia were present in 11 cases. Prematu-

rity was an important factor in maternal anaemia. Perinatal mortality could be attributed to postmaturity in two cases. Walker and Turnbull (1958) have demonstrated a fall in oxygen saturation in the umbilical vein which is fairly marked at the 42nd and the 43rd weeks. They point out that the unborn baby in the later weeks of pregnancy, and even more so after term, is living in an oxygen environment worse than would be found on top of Mount Everest. Judicious induction of labour would seem feasible in such cases, granting that the dates given are reliable, and menstrual cycles regular.

Cord prolapse was observed in 23 cases. Of these, 13 resulted in perinatal deaths. Prolapse of the cord spells drama and danger in obstetric practice, and constitutes a very grave emergency (Browne and Carney, 1964). Malpresentations were an important predisposing factor in cases of cord prolapse. Even a contributory factor could not be detected in 12.64 per cent of cases.

It has been well documented that premature rupture of the membranes, protracted labour and long intervals between rupture of membranes and the birth of the child have a deleterious influence on perinatal mortality. Routine administration of prophylactic antibiotics to the infants in such cases is the practice in this institution, and the results vis a vis intrauterine and neonatal infections and deaths have been most gratifying.

Discussion

The present study, by drawing attention to the high perinatal losses locally, has made us aware of the

magnitude of the problem. The fact that nearly one in ten of the women admitted in the obstetric services leaves the hospital without a live child, makes an objective reappraisal of the problem mandatory. One happy conclusion that emerges is the fact that a large number of the perinatal deaths are preventable. There seems to be need for a greater appreciation of the concept of prenatal pediatrics, and for expanded facilities for antenatal care. The crux of modern antenatal care is the assessment of all unfavourable factors during pregnancy and prior to labour (Menon, 1964).

Obviously maternal malnutrition and anaemia are curable. Duncan (1952) opines that the fall in the dead birth rate in England and Wales from 38 per 1000 births in 1940 to 28 in 1945 was mainly due to improved nutrition of pregnant women. Burke *et al.*, (1948) recorded a rise in birth weight by 0.5 lb. with every increase of 10 gms. in the protein content in the maternal diet. Platt (1947) has suggested that the poor birth weights in some oriental communities are due mainly to poor nutrition. Antenatal care has much to offer towards reducing the risks attendant on antepartum haemorrhage. The frequency with which the presence of placenta praevia is suspected before bleeding occurs has been regarded as an index of the quality of antenatal care. A notable advance in the treatment of placenta praevia is the reduction of perinatal deaths as a result of caesarean section and conservative regime of management. The management of prematurity revolves around prevention of the condition, and the mea-

asures to be adopted towards this end are well-known. Avoidance of physical exertion towards term, freedom from emotional stress of any kind, efficient antenatal care and provision of various medico-social amenities for pregnant women will undoubtedly reduce the prematurity rate. In toxæmia of pregnancy, measures towards mitigation of the disease would pay rich dividends. Lawson (1964) emphasizes that if maternal and foetal deaths are to be prevented, antenatal care must be of the highest standard. Early detection of preeclampsia has been considered a sine qua non of good antenatal care.

Institutional facilities should be used to full advantage wherever they exist, but the feasibility of this approach is open to question in areas where the ratio between available obstetric beds and pregnant women in the community leaves much to be desired. Ideally all domiciliary confinements should be normal deliveries and the slightest variation from the normal warrants hospitalization. In our country however, the laying down of priorities as regards hospitalization are clearly needed, particularly from the point of view of the rural population. It would seem that preference should be given to primiparous women, those with a tendency to premature onset of labour, the very young and the older mothers, and subjects with late pregnancy bleeding.

In an unconventional paper, McKay (1961) questioned the hitherto unassailed concept that a reduction in perinatal mortality would benefit mankind. He decries the 'Unreasonable reduction of mortality statistics

and the blind preservation of life per se' on two counts—the high frequency of handicaps among infants who are helped to survive premature birth or major anomalies, and the fact that reduction of perinatal mortality associated with genetically determined disease in mother or infant, may lead to perpetuation of genes which are lethal when fully expressed. While the grounds on which he bases his provocative opinions are not tenuous, and merit serious consideration, they seem hardly adequate to justify a major reorientation in our concepts of pediatric mortality at present.

Summary

The perinatal mortality associated with 2,971 deliveries in 1962-63 at the Medical College Hospital, Calicut, is reviewed in some detail. The need for reduction of perinatal deaths is emphasized, and attention drawn to measures to be adopted towards this end.

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