SECULAR TRENDS IN INFANT AND PERINATAL MORTALITY IN INDIA – IMPLICATIONS FOR CHILD SURVIVAL

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Despite the recent concerted efforts to improve child survival, the perinatal and neonatal mortality rates in the country continue to remain at unacceptably high levels. A fairly recent report(1) by the World Health Oganization (WHO) on perinatal morbidity and mortality in the South East Asian Region shows the current extent of the problem (*Table I*). It is apparent that the Indian statistics do not compare favorably with some of the other South East Asian countries. The last couple of decades have shown a virtual stagnation of the perinatal mortality rate (PMR) in our country. At the same time, some other developing countries have achieved mortality declines equal to or better than much richer states or countries(2). An analysis of the trends and variations in perinatal and neonatal care in our country would be incomplete without a pertinent description of the available data source on which inferences are based.

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Data Base

Inferences on the trends of reported mortality statistics are severely limited due to lack of reliable data(3-6). In the Civil Registration System in practice in rural areas, the person responsible for the recording of births and deaths is the Gram Panchyat Secretary (Gram Sevak) reportable to the Block Developmental Officer. As these functionaries are not directly related to the health department, the records are often deficient, both qualitatively and quantitatively.

In urban areas the recording of deaths has improved since the medical certification of the cause of death became mandatory (1969) before disposal of the body. The medically certified causes of death are coded and tabulated as per the WHO International Classification of Diseases and presented in the publications of Vital Statistics of some States and also India. However, in most publications only the cause of death is analyzed ignoring the vital underlying causes(3).

Depending on the training, meticulousness and accountability of the recording

TABLE I– *Perinatal Mortality in South East Asian Countries*

Country	Still birth rate	Perinatal mortality rate
Burma	17.4	51.2
India	27.2	48.6
Indonesia	13.7	45.0
Thailand	8.9	28.3

Source : Perinatal mortality and morbidity including low birth weight. A South East Asian Regional Profile. SEARO regional health paper No. 3, 1984(1).

officers, reliability of data differs from state to state, district to district and town to town, making comparisons difficult. The Sample Registration Scheme (SRS) functioning in rural areas since 1964 and based on data from 150 villages in each state analyzed by the Registrar General of India centrally is an attempt to bring some uniformity in the data so far as the quantitative aspect is concerned. So also is the Model Registration System (MRS) where medical officers and trained para medical personnel are responsible for recording causes of death at the Primary Health Centre and sub-centre level attempts at bringing credibility to statistics and causes of deaths(3).

A problem unique to the recording of perinatal mortality is the distinction between live and still births which sometimes is difficult for even para medical personnel. Realising the need for reliable data base, there have been concerted efforts in this direction. A Federation of Obstetrics and Gynecological Societies of India (FOGSI), Perinatal Mortality Survey was carried out in 123 centres over the years 1977-79(7). However, the shortcomings of hospital based data are well known. Micro community based studies are also available from various areas(8-13). Since the planning of strategies is inherently dependent on these vital statistics, basic ongoing reliable recording at the grass root levels in every village and town has to be strengthened immediately. Some of the innovative techniques being tried in this context include: (*i*) the preceding birth technique for rapidly assessing the early childhood mortality. This can be easily incorporated in the existing immunization or other programmes; and (*ii*) involving of health functionaries of the existing infrastructure(13).

Infant Mortality: Trends and Differentials

The secular changes in India in the infant mortality rate (IMR), neonatal mortality rate (NMR), perinatal mortality rate (PMR) and still birth rate (SBR) are depicted in *Figs. 1 to 3*. These changes have been analyzed for 15 years from 1970 to 1985. The data has been split up into three year averages except for 1985. There has been a slow but steady decline of IMR, particularly visible since 1976-78 for the combined Indian data (*Fig. 1*). However, there has not been a similar change in the NMR, PMR and SBR.

The differences in rural and urban India are marked, the former being particularly disadvantaged for IMR, NMR and PMR. The differential for SBR, however, is not striking (*Figs. 2 & 3*). Essentially similar inferences as the combined data are forthcoming with respect to the secular trends in IMR, NMR, PMR and SBR for both rural and urban areas.

Regional variations in the mortality rates are also evident. The mortality rates (IMR, NMR and PMR) are least in Kerala and among the highest in Uttar Pradesh (*Figs. 4 & 5*). The remaining states are interspersed in between; all the mortality rates following the same trends. There is a tendency for the other states to form four clusters at same time periods(14).

Components of Infant Mortality

Figure 5 provides an idea of the relative contribution of mortality in the neonatal period to infant mortality over the years. It is obvious that neonatal mortality is responsible for at least half of the infant mortality. In fact over the years, there is a trend of *increase* in the proportion of neonatal deaths (NMR/IMR ratio expressed as a

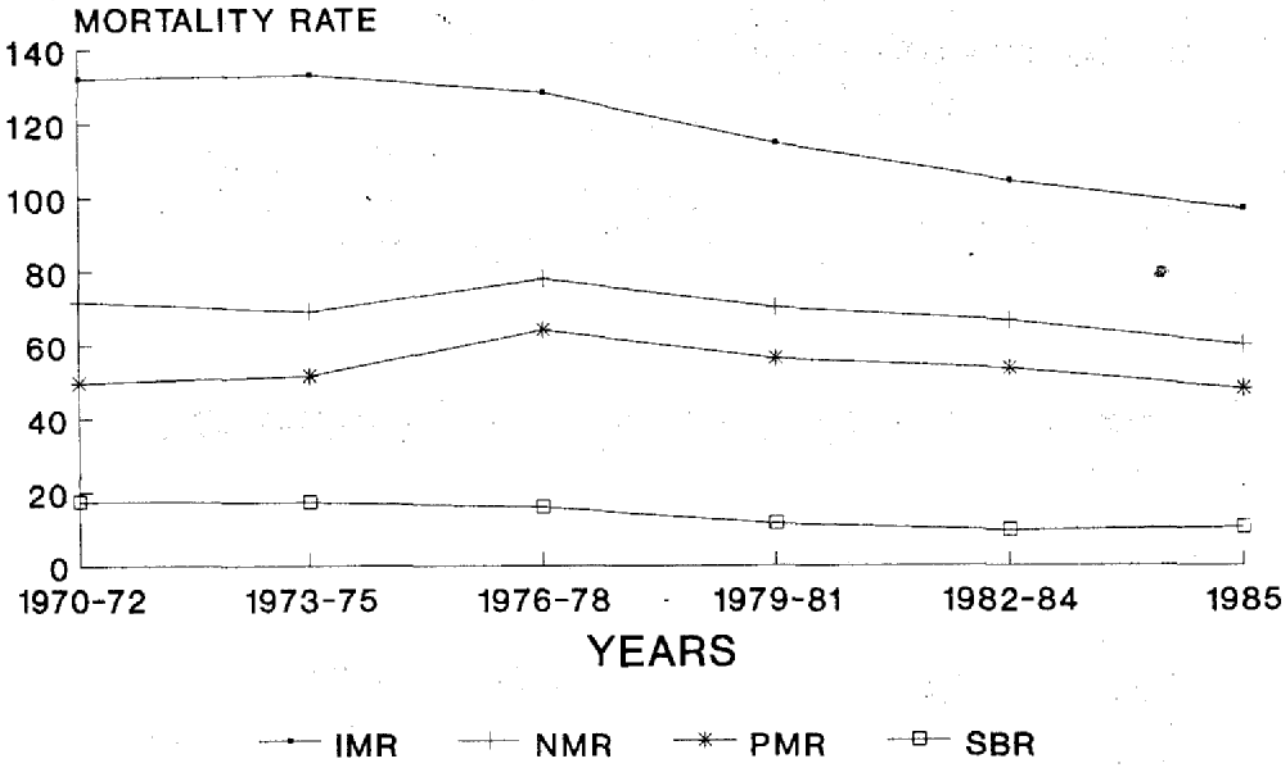

Fig.1. Secular Change in IMR, NMR, PMR and SBR for Combined India.

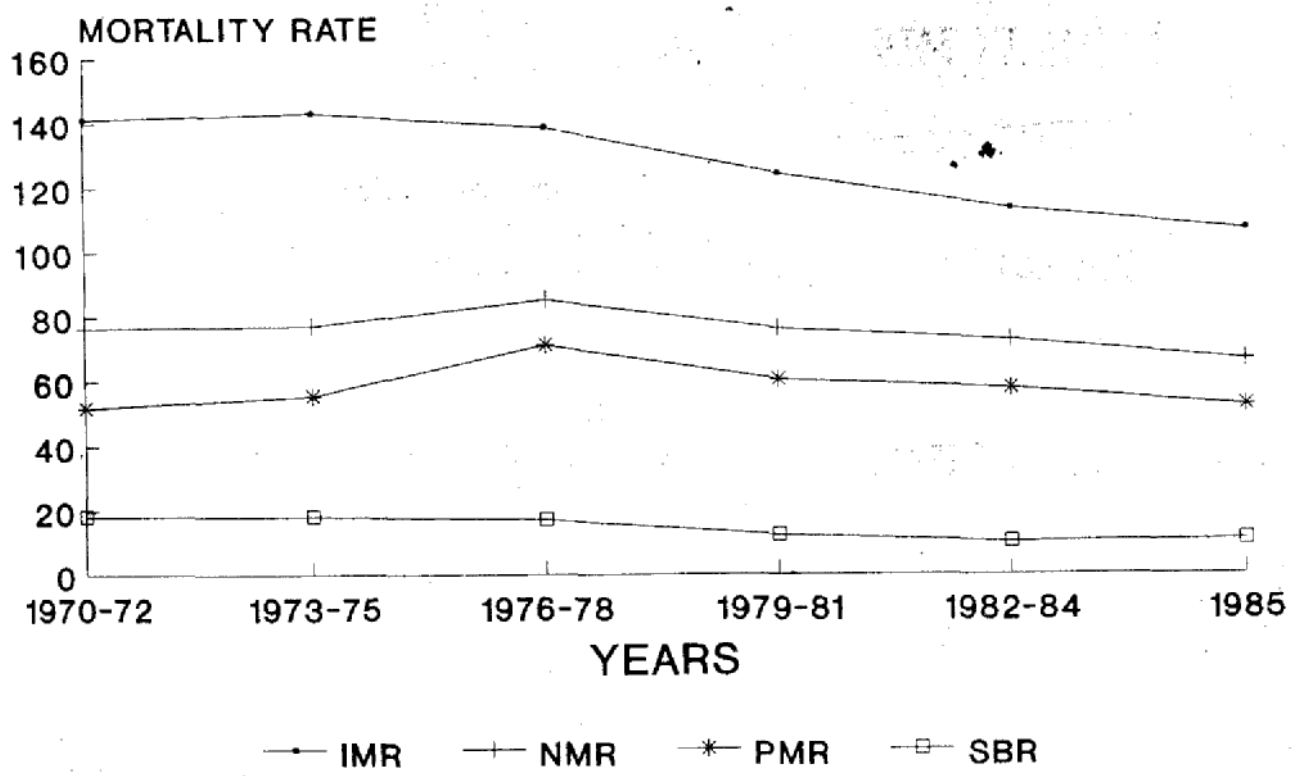

Fig. 2. Secular Change in IMR, NMR, PMR and SBR for Rural India.

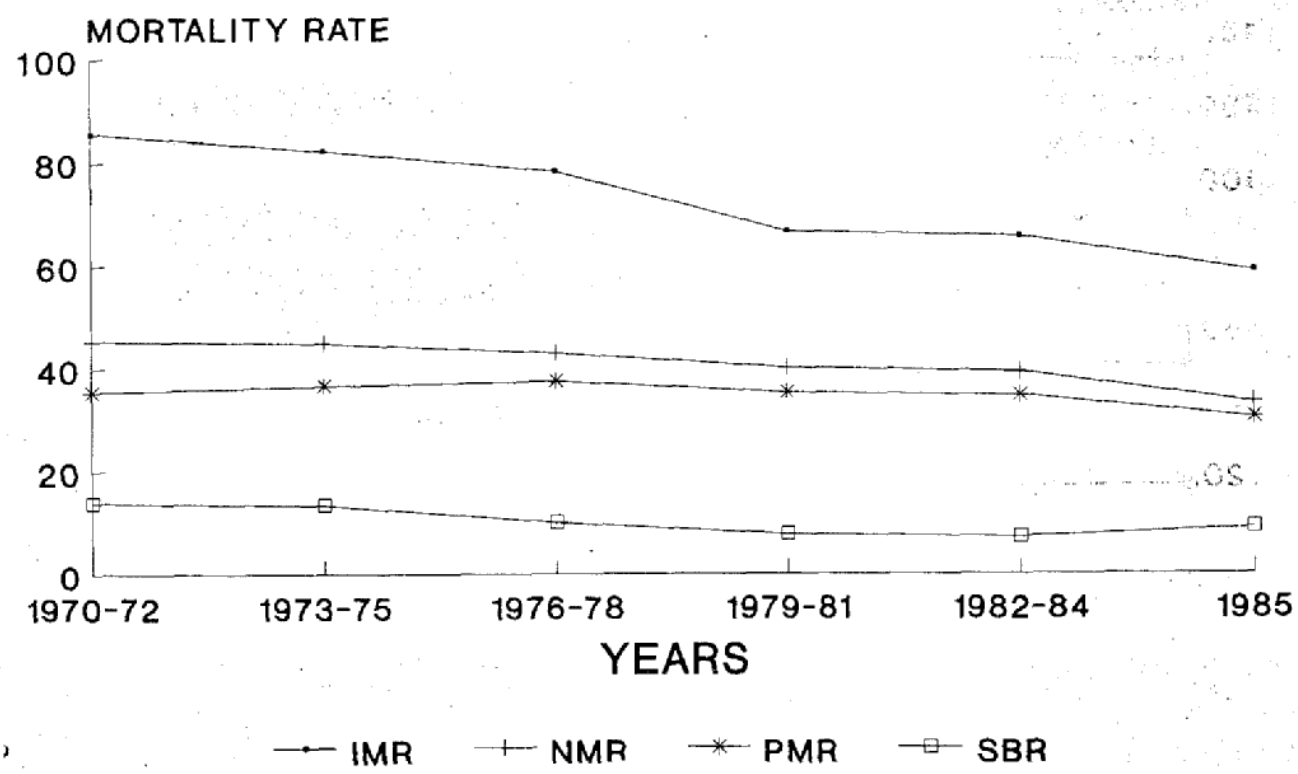

Fig. 3. Change in IMR, NMR, PMR and SBR for Urban India.

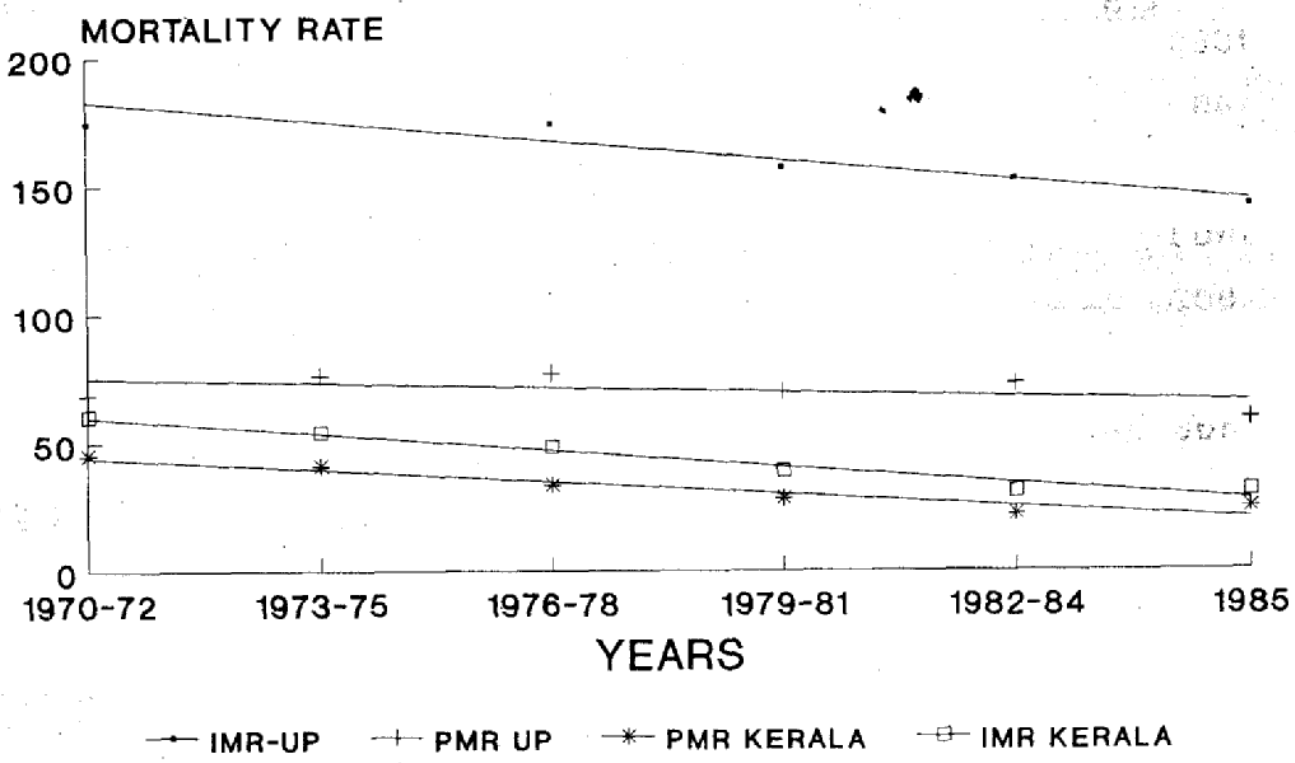

Fig. 4. Relation Between IMR and PMR Comparison of UP and Kerala.

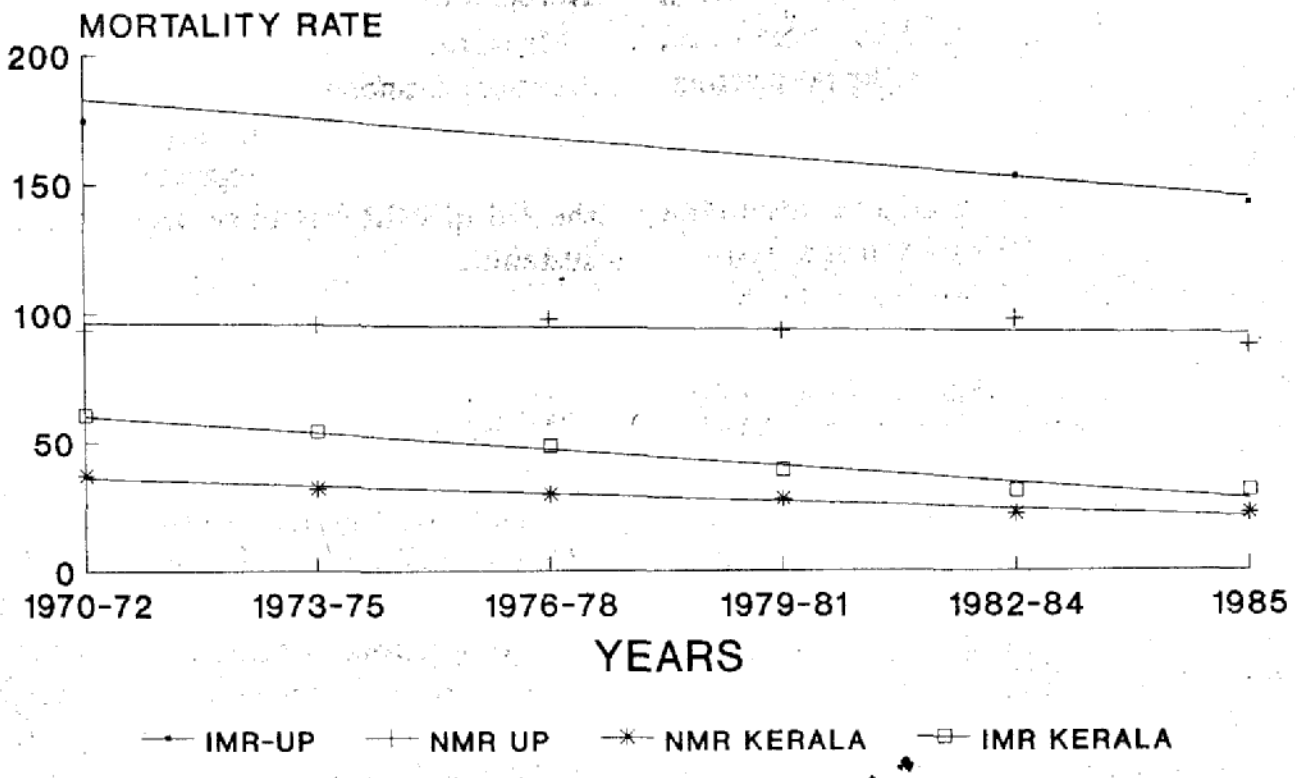

Fig. 5. Relation Between IMR and NMR Comparison of UP and Kerala.

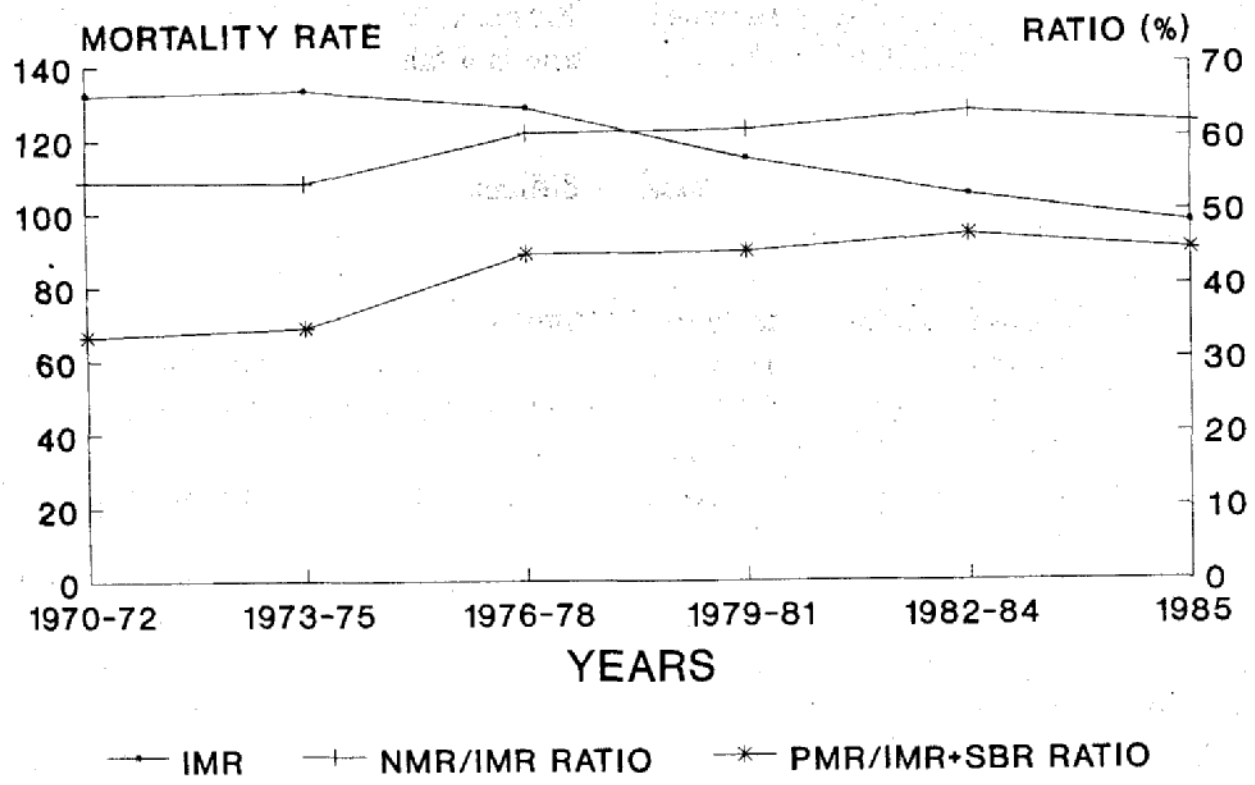

Fig. 6. Relation Between IMR and NMR/IMR(%) Comparison of UP and Kerala.

percentage) despite a decline in the IMR (*Fig. 6*). The impact of the Child Survival Programme in operation has, therefore, been felt almost entirely in the post neonatal period; the neonatal period being more or less neglected. Essentially similar conclusions are obvious on analysing the data separately for the rural and urban areas.

The problem of reporting a birth as alive or dead has already been referred to. The control for this factor as well as to get an idea of the immediate period in relation to the birth process (perinatal period), a similar trend was analysed for the ratio of PMR to the total of IMR and SBR (*i.e.,* the total deaths occurring till 1 year of age). This ratio also shows a steady rise (parallel to NMR/IMR ratio) despite a steady decline of IMR. Thus almost 40% of the deaths are occurring in relation to the perinatal period (*Fig. 6*). Essentially, a similar profile is seen for the data analysis of rural and urban India separately. The perinatal period, therefore, appears to have been relatively neglected.

An analysis between Uttar Pradesh and Kerala in this context would be interesting (*Figs. 4 & 5*). The slope of decline of IMR for Kerala appears sharper. However, the NMR and PMR for Uttar Pradesh are showing no appreciable trends of decline. In contrast, in Kerala there is a definite slope of decline for NMR and PMR. The conclusion, therefore, appears inescapable that the perinatal/neonatal period has to be tackled aggressively to make a significant dent in the infant mortality. This statement is reinforced by an examination of the ratio of NMR/IMR in the state of Kerala. This ranges between 61-71% with an increasing trend. The fall in IMR in Kerala though associated with a slow (but definite) decline in NMR/PMR, is still disproportionate. In the near future, it is not difficult to predict a plateau in IMR of Kerala if the current trend continues.

It is, therefore, obvious from the aforementioned analysis of the secular trends that the perinatal and neonatal periods have to be the focus of aggressive efforts if the fall in IMR has to be accelerated and sustained.

Causes of Perinatal Mortality

The reported causes of perinatal mortality have varied widely depending on the community or hospital source, collection and interpretation of data. In most urban hospital studies(3,7,15-17), the leading causes of perinatal deaths recorded were birth asphyxia and trauma, low birth weight (prematurity and intrauterine growth retardation), bacterial infections and jaundice. It is relevant that neonatal tetanus still accounts for a substantial (25-30%) proportion of infant deaths in Uttar Pradesh but less than 2% in Kerala, and is a fairly infrequent cause of death in most hospital studies. The causes of perinatal mortality from the rural areas are difficult to interpret but report of trained workers(8,13) indicate a predominance of preventable causes amongst both stillbirths and early neonatal deaths (*e.g.,* birth asphyxia and trauma, infections). Low birth weight, too, is a major problem.

Determinants of Neonatal Mortality

A detailed review of this aspect is beyond the purview of this focussed review. However, a few pertinent aspects are enumerated.

The majority of studies on this aspect have been conducted in the micro-environment and subjected to univariate analyses. The relationship of neonatal mortality with

mother's age and parity, birth weight, gestation and antenatal care has been exhaustively documented in the Indian literature(6). However, attempts to deliniate factors at the macro-level using appropriate multivariate methodology have been recent.

Data from rural India indicates that determinants of neonatal and post neonatal mortality are indeed different(14). Poverty and medical care received at birth are the two most important independant determinants of neonatal mortality. These two factors explain 62% of the regional variation in neonatal mortality. The neonatal mortality rate decreases with an increase in the percentage of births attended by trained medical personnel and increases with the poverty level. The effect of adult female literacy on neonatal mortality is transmitted through an increase in the per cent of births attended by trained medical personnel; and the effect of village level factors is transmitted through the household and individual level factors(14).

A leading cause for explaining the mechanism of an independent effect of poverty on neonatal mortality is the eating habits of mothers influencing their nutrition level during pregnancy, *i.e.,* non-medical prenatal care. The poverty level is likely to be associated with the low nutrition level of mothers during the prenatal period, which is likely to be associated with low birth weight, and thus with high neonatal mortality(14). Whatever be the possible mechanism of action of poverty, one thing is certain that there is no foreseeable solution to this problem in the near future.

It is, therefore, concluded that efforts to improve the trained perinatal care coverage in the existing infrastructure should be an immediate thrust area in planning strategies to improve child survival in India.

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