

Perinatal Mortality- What has Changed?

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The March 1966 issue of *Indian Pediatrics* published three observational studies (on perinatal mortality, intrapleural hydrocortisone instillation in pleural effusion and serum protein fractions in whooping cough), a case series (cholecystitis mimicking latent rheumatism) and regular items such as Current literature, News and Announcements. For this write-up, we shall be reviewing the observational study on perinatal mortality by Bajpai, *et al.* [1].

THE PAST

The scientific paper being reviewed for this write-up is a prospective observational study conducted at Queen Mary's Hospital, Lucknow in 1964 to determine the incidence of perinatal mortality and identify possibly responsible medical, biological and socio-economic causes. During the study duration (5.5 months), the outcomes of 1000 consecutive viable births and 114 perinatal deaths were studied. Maternal details, test results in the case of stillborns (Wassermann reaction, VDRL, blood sugar, urea, Rh typing), pediatric data, and autopsy findings (whenever feasible) were analyzed. The Aberdeen classification system, developed by Sir Dugald Baird in 1954, was used for determining etiology of stillbirths [2]. The incidence of perinatal loss was found to be 114/1000 births. Although only 38.2% cases were unbooked, they accounted for 93% of the perinatal deaths; a large number of them having being referred as 'complicated' once labour had started. Significantly higher perinatal loss was associated with maternal variables like low socio-economic strata (76%), maternal age ≥ 35 years (36.5%), and parity >3 (82.7%). It was also significantly higher in babies with birth weights below 2500 g, twins and abnormal presentations.

Analysis of 114 perinatal deaths revealed antenatal causes in 42%, intra-natal causes in 34.2%, post-natal causes in 5.3% and unknown causes in 13.2%. In the

analysis of stillbirths ($n=71$), it was observed that 42% were due to antenatal causes, 42% intra-natal causes, and 16% unknown causes. Maternal disease was the commonest antenatal cause (21%), that included anemia, pregnancy induced hypertension and antepartum hemorrhage in descending order of frequency. Trauma and asphyxia were the commonest causes of intra-natal death. The majority (79%) of neonatal deaths ($n=43$) were in premature babies, which were defined by low birth weight (<2.5 kg) rather than gestation according to the existing international standards in that era. Main causes of early neonatal death were prematurity (48.9%), asphyxia (18.7%), congenital defects (13.9%) and respiratory distress syndrome (11.6%). The autopsy reports of 21 neonates (14 stillbirth and 7 neonatal) demonstrated anoxia as the commonest finding (52.3%) followed by pulmonary lesions (23.9%), congenital malformations (14.2%) and maceration (4.8%).

The study findings were compared with available data from other hospitals. Perinatal mortality rate (PMR; per thousand births) ranged from 61.5 (Hyderabad) to 161 (Bombay) in India, and 13.8 (London) to 38.6 (Aberdeen) in the United Kingdom. The causes were similar in the Indian studies, however differed from the developed countries. When this data was compared with statistics from the same hospital ten years ago (1954), it was observed that PMR decreased from 131.2 to 114 per thousand births, primarily due to reduction in early neonatal deaths. The authors concluded that most of the causes of perinatal mortality were preventable and that this could be decreased by improving socio-economic conditions, providing adequate antenatal care, improving maternal nutrition, creating effective and early referral systems from the periphery to tertiary hospitals and improving early neonatal care.



Historical background and past knowledge: The term 'perinatal mortality' was coined by Peller in 1940s [3]. This denoted the number of stillborns and deaths occurring from the 28th completed week of pregnancy till the end of the first week of life. It was believed that similar pathological processes were responsible for both *in utero* and early neonatal deaths. Even at that time, it was recognized that besides causing immense social and economic loss, perinatal mortality could be used as an indicator of a country's health care status. In those days, national perinatal mortality surveys had started being conducted in developed countries. These had resulted in the identification of multiple contributory factors (obstetric, pediatric, pathological and social). The few existing Indian studies were hospital-based due to absence of a reliable national registry.

THE PRESENT

Immense progress has been made in the understanding of perinatal mortality over the last 50 years. Nowadays, collection, compilation, analysis and dissemination of reliable and standardized perinatal data are considered pillars of developing optimal quality perinatal care. The lower limit defining the perinatal period has kept changing, parallel to better fetal viability resulting from advances in neonatology. Nevertheless, there is still considerable inter- and intra-country variability (ranging from 22 to 28 weeks of gestation) in these definitions. To maintain uniformity, the World Health Organization defines a stillbirth as death of a fetus of birth weight ≤ 1000 g, gestational age ≤ 28 completed weeks (if weight unknown) or crown-heel length ≤ 35 cm (if both criteria unknown) [4].

Over last 50 years, several systems have emerged to classify causes and associated conditions of perinatal deaths. The main objectives are to enable comparison, help in health surveillance, improve quality of care by focusing on modifiable factors, and generate research [5]. Systems that work well in developed countries may not necessarily be effective in developing countries, for instance 'Cause of death and associated conditions (CODAC)' performs much better in developed countries, as it relies primarily on autopsy findings and placental histopathology. In contrast, the 'Extended Wigglesworth classification' that is considered inferior in the West is used in most Indian centers because it is simple, clinical-based, does not require an autopsy, and has clear implications for clinical management [6].

Almost 55 years after national registries were developed in Scotland, the Indian National Neonatology

Forum launched the National Neonatal-Perinatal Database initiative in 1995. In 2004, the program 'Save the Children's Saving Newborn Lives' was initiated which amongst other activities, periodically releases 'State of India's newborns (SOIN)' reports [7]. According to the 2014 report, the national PMR is 28/1000 (still-births 5/1000, early neonatal 23/1000) with marked inter-state variability (*e.g.* Kerala 10/1000 and Odisha 37/1000). The currently prevalent maternal factors resulting in increased perinatal loss include adolescent pregnancies, maternal undernutrition, poor socioeconomic status, iron-deficiency anemia and other micro-nutrient deficiencies, inter-pregnancy intervals <12 months or >60 months, lack of antenatal care, maternal infections, pre-eclampsia and type-2 diabetes. The three major causes of neonatal deaths are complications from preterm birth (35%), infections (33%), and intra-partum related conditions or birth asphyxia (20%).

To conclude, improving perinatal mortality in India is the need of the hour. Factors that were contributory to perinatal mortality in a hospital-based study in 1964 are still widely prevalent throughout the country even after fifty years. The silver lining is that awareness has been created from the data generated after the national registry was started, operational targets have been set, and strategies have been initiated with a strong political will behind them.

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