

## Intrapartum Perinatal Mortality

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Intrapartum perinatal mortality, the deaths that occur during the period around birth, is a major problem in developing countries accounting for more than one million stillbirths and a similar number of neonatal deaths worldwide each year [1,2]. A number of authors have emphasized that the time encompassing labor and the 24 hours after birth is the most dangerous period for both the mother and fetus/neonate [3]. To begin to focus attention on these deaths, several authors have created a new measure of pregnancy outcome—the sum of intrapartum stillbirths and early neonatal deaths >2500g, with the denominator all births >2500g [4]. This measure, which considers mortality to fetuses alive on admission to the health facility (often determined by Doptone) through discharge of the neonate, typically at 6 or 12 hours of age, is an important concept, since it is only during this time period that care in the facility can influence the outcome. By eliminating births likely to be preterm, this measure should count only those births with a reasonable likelihood of survival – if the obstetric and early neonatal care were good. As such, some authors have advocated using this measure as an indicator of the quality of obstetric care [4,5]. In the study reported here, the authors have included fresh stillbirth as a surrogate for an intrapartum fetal death and only asphyxia-related neonatal deaths instead of all early neonatal deaths [6]. Considering only births occurring at >35 weeks or >2000g is also similar to the proposed indicator which only counts births of 2500g or more. Thus, we believe the authors have developed an appropriate outcome to measure the quality of intrapartum care [6].

We have been impressed that the same obstetric conditions that kill mothers are also responsible for most of the stillbirths and many of the neonatal deaths as well [7]. These conditions include preeclampsia/eclampsia, obstructed labor and the associated infection and hemorrhage, obstetric hemorrhage from other causes and especially abruption, as well as obstetric risk factors such as growth restriction, fetal distress, malpositions, and multiple pregnancies. We emphasize that most of the

precursors of stillbirth and many of the precursors of neonatal asphyxia are obstetric in origin.

From our perspective, there are two ways to reduce the mortality and long term morbidity associated with asphyxia. One is to treat the asphyxiated infant in the postpartum period through a combination of neonatal resuscitation, ventilation and other supportive measures. However, potentially more important, is the prevention of antenatal and intrapartum asphyxia in the first place. Appropriate obstetrical care, both in the prenatal but especially in the intrapartum period, is crucial to reduce intrapartum stillbirth and neonatal asphyxia. For example, regular screening of all women in the antepartum period for preeclampsia with blood pressure measurements, with an appropriately timed delivery, can prevent progression to severe preeclampsia/eclampsia. Since most cases of eclampsia occur at or near term, an indicated delivery should reduce both stillbirth and neonatal asphyxia without significantly increasing neonatal deaths from prematurity. Similarly, screening for fetal growth restriction with delivery close to term will have similar results. Close monitoring and appropriate care during labor to enable obstetrical providers to recognize conditions such as prolonged labor, placental abruption, placental previa, fetal malposition, and fetal distress, can allow for rapid intervention with cesarean section, to further reduce rates of stillbirth and neonatal asphyxia.

Reducing perinatal asphyxia on a population basis requires a health system in which every woman is screened for the conditions discussed above and is provided care for those conditions in a timely fashion. Since many of the conditions progress rapidly during labor, advanced planning for the treatment is often helpful. Regular obstetric drills for conditions like eclampsia, severe hemorrhage, and fetal distress will allow the staff to practice for these emergency conditions, and make sure that when presented with these conditions, there are adequate equipment, medications and trained staff available so that both the mother and fetus are

delivered safely. Perinatal death audits that evaluate both cause of death and potential for preventability are crucial to reduce preventable mortality. Finally, availability of sufficient staff and appropriate equipment to handle obstetric emergencies is crucial. Most important is the recognition that in order to reduce neonatal death and disability from intrapartum asphyxia, prevention and treatment of obstetrical conditions in the mother is better than resuscitation of an already asphyxiated infant. This paper is important because it focuses on the intrapartum factors related to perinatal asphyxia, and starts to address preventable causes [6]. Further work should evaluate methods to reduce perinatal asphyxia of obstetric origin.

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## Maternal Risk Factors Affecting Perinatal Mortality

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The term "perinatal mortality" includes deaths that are attributed to obstetric events, such as stillbirths and neonatal deaths in the first week of life. Perinatal mortality is an important indicator of maternal care, health and nutrition; it also reflects the quality of obstetric and pediatric care available. The vast majority of global perinatal deaths occur in the low- and middle-income countries. The perinatal mortality and stillbirth rates for India according to National Family Health Survey-3 (2005-06) are 48.5 per 1000 live births and 19.2 per 1000 pregnancies, respectively [1].

Stillbirths include intrauterine fetal deaths which occur prior to the onset of labor (ante-partum stillbirths) as well as those that occur during labor (intra-partum stillbirths). Ante-partum stillbirths are caused by maternal risk factors like hypertensive disorders, placental dysfunction, hemorrhage, and fetal or placental abnormalities, which

predispose the fetus to intra-uterine hypoxia and/or infection. In a recent meta-analysis, several interventions showed clear evidence of impact of interventions such as heparin therapy for certain maternal indications, syphilis screening and treatment, and insecticide-treated bed nets for prevention of malaria, on reduction of stillbirths [2]. Other interventions, such as management of obstetric intrahepatic cholestasis, maternal anti-helminthic treatment, and intermittent preventive treatment of malaria, showed promising impact on stillbirth rates but require confirmatory studies [2]. As of now interventions like antibiotics in prolonged premature rupture of membranes, anti-oxidant supplementation for deficient mothers, calcium supplementation to prevent PIH and pre-eclampsia in deficient populations, periodontal care for mothers as well cessation of smoking by pregnant females and reduction of exposure to smokeless tobacco have no definite impact on reduction of stillbirth or perinatal mortality rates. Protein-energy malnutrition and lack of