

Understanding perinatal mortality

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Abstract

The term perinatal death is used to describe antepartum and intrapartum stillbirths, and early neonatal deaths. Although the overall rate of perinatal mortality is falling, a slower rate of reduction has been observed in stillbirth compared to neonatal death. Antenatal stillbirth contributes to a greater proportion of cases in high income countries and associated risk factors include maternal age, smoking, obesity and small for gestational age fetus. At term, intrapartum stillbirth and neonatal death are collectively referred to as delivery related perinatal death, and the incidence in nulliparous and multiparous women is approximately 1 in 1000 and 1 in 2000 births, respectively. Associated factors include advanced maternal age, small for gestational age, fetal macrosomia, breech labour and previous caesarean delivery. The impact of obstetric interventions in labour on delivery related perinatal death, including rising rates of caesarean delivery, is complex and unclear.

Keywords antepartum stillbirth; early neonatal death; intrapartum stillbirth; perinatal mortality; term births

Definition of perinatal death

The World Health Organization (WHO) defines a perinatal death as 'A death occurring at 22 completed weeks of gestation and over, during childbirth and up to 7 completed days of life'. This includes stillbirth (intrauterine fetal death) and early neonatal death (infant death occurring in the first 7 days of life). However, WHO also recommends a different definition for international comparison (≥ 1000 g birthweight or ≥ 28 completed weeks of gestation). This "international" definition exists for two main reasons: firstly because national registries use different gestational age thresholds to define stillbirth; and secondly due to the under-reporting of stillbirths below 28 weeks in selected regions. It is recognized that the "international" definition for comparisons underestimate the real burden of perinatal mortality as a considerable proportion of fetal deaths occur before 28 weeks of gestation (35–50% in high income countries). In the United

Kingdom, 24 completed weeks is used as the lower gestational limit to define a perinatal death (Table 1). Gestations at the limit of viability can pose difficult problems for classification of events with respect to the incidence of late miscarriage or early neonatal death. A CMACE report has indicated that 7.3% of early neonatal deaths in London were born at less than 22 weeks, whereas this figure is 18.8% in the West Midlands. This highlights the lack of consistency in defining type of death across the country. Global comparisons are challenging as there are inter-country, and indeed intra-country variations in definitions, data collection, neonatal care at the gestational age of viability, timing of death, and even legal requirements to report death. International comparisons can be further complicated by changes of definitions over time.

A global perspective

An estimated 98% of all perinatal deaths occur in countries of low income and the perinatal mortality rate is roughly five times greater than that of wealthier countries. This figure emphasizes low income countries should be the focus of improvement programmes to reduce the burden of perinatal mortality globally. Although the overall rate of perinatal mortality is falling, a slower rate of reduction has been observed in stillbirth compared to neonatal death. This enhanced reduction in neonatal death is likely to be related to the Millennium Development Goal 4, which aims to reduce the under-five mortality rate. Between 1990 and 2015 the under-five mortality rate declined by more than half, highlighting that targeting specific health outcomes can promote change. Stillbirth was not a specific target of the Millennium Development Goals, but recently the WHO launched the Every Newborn Action Plan (2014) which enhances and supports co-ordinated, comprehensive planning and implementation of newborn-specific actions with the specific goal of ending preventable stillbirth and neonatal death. Reduction in perinatal deaths requires financial, cultural and political will to implement universal access to good quality care in pregnancy, childbirth and the neonatal period. However, the strategy should vary according to local epidemiology. In low income countries, intrapartum death is a major component of perinatal mortality, reaching over 50% of stillbirth in specific areas (Table 2). Training healthcare providers to ensure appropriate management of deliveries and providing pregnant women with access to healthcare facilities are recognized measures that reduce intrapartum stillbirth. The remaining 2% of global perinatal deaths, which occur in countries of high income, are associated with different risk factors and causes, therefore different interventions are required to further improve outcomes (Table 3). In high income countries, intrapartum stillbirths account at most for 15% of all stillbirths (0.5–1.2 per 1000 births). A variation in the overall stillbirth rates is also observed between high income countries. If all countries had a low rate (2.0 per 1000 birth), approximately 20,000 late gestation stillbirths would be avoided. It is not clear the reason for those differences observed in high income countries, neither the best way to tackle antenatal stillbirth. In the UK, the stillbirth rate has fallen in the last decade from 5.7/1000 livebirths in 2004 to 4.7/1000 livebirths in 2014 (Figure 1). Some of the strategies being suggested to further improve this rate involve smoking cessation, increasing maternal

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Summary of definitions related to perinatal mortality in UK

Stillbirth	A baby delivered at or after 24 ⁺⁰ weeks gestational age showing no signs of life, irrespective of when the death occurred.
Antenatal stillbirth	A baby delivered at or after 24 ⁺⁰ weeks gestational age showing no signs of life and known to have died before the onset of care in labour.
Intrapartum stillbirth	A baby delivered at or after 24 ⁺⁰ weeks gestational age showing no signs of life and known to be alive at the onset of care in labour.
Neonatal death	A live born baby (born at 20 ⁺⁰ weeks gestational age or later, or with a birthweight of 400 g or more where an accurate estimate of gestation is not available) who died before 28 completed days after birth
Early neonatal death	A live born baby (born at 20 ⁺⁰ weeks gestational age or later, or with a birthweight of 400 g or more where an accurate estimate of gestation is not available) who died before 7 completed days after birth.
Late neonatal death	A live born baby (born at 20 ⁺⁰ weeks gestational age or later, or with a birthweight of 400 g or more where an accurate estimate of gestation is not available) who died from 7 completed days but before 28 completed days after birth.
Perinatal mortality	A stillbirth or early neonatal death.

Table 1

awareness of reduced fetal movements and improved screening and follow up of small for gestational age fetus (SGA). The focus of the rest of this review is on the incidence and causes of perinatal mortality in high income countries.

Commonly reported maternal risk factors and causes of stillbirth, reported by ranking of importance and developed status of the country

Developing countries	Developed countries
Obstructed/prolonged labour and associated asphyxia, infection and birth injury (low availability of caesarean section)	Congenital/karyotypic anomalies
Congenitally acquired infections especially syphilis and gram negative infections	Growth restriction/placental thrombosis
Hypertensive disease, especially poor management of pre-eclampsia and eclampsia	Medical disease such as diabetes, systemic lupus erythematosus, renal disease, thyroid disorders, thrombophilias, cholestasis of pregnancy, hypertensive disease/pre-eclampsia
Poor nutritional state	Congenital acquired infections, especially group B Streptococcus and Parvovirus 19
Previous stillbirth	Smoking
Congenital anomalies	Multiple gestation
Malaria	—
Sickle cell disease	—

(From McClure EM et al. *Int J Gynaecol Obstet* 2006; **94**(2): 82–90.)

Table 3

Classification

There are over 30 classification systems of perinatal mortality. Many of these classification systems were designed for different reasons with different definitions and levels of complexity. In the UK in the 1950s, a classification system was developed to group

Global estimates stillbirth rates and proportion of intrapartum stillbirth according to region

	Rate of all stillbirth (per 1000 births)	Number of stillbirths	Number of intrapartum stillbirths	Proportion of intrapartum stillbirths
Developed regions	3.4 (3.4–3.5)	46,700	4,700	10.0 (5.5–18.4)
Eastern Asia	7.2 (5.6–9.7)	129,000	25,700	19.9 (6.6–32.3) ^a
Latin America	8.2 (7.5–9.2)	91,000	15,300	16.8 (15.8–41.1)
Caucasus and central Asia	11.9 (9.8–15.6)	23,400	4,700	19.9 (6.6–32.3) ^a
Southeast Asia and Oceania	12.2 (10.7–14.6)	154,900	70,800	45.7 (31.3–74.5)
Northern Africa and western Asia	14.5 (12.9–17.6)	148,300	62,300	42.0 (22.9–57.9)
Southern Asia	25.5 (22.5–29.1)	966,600	573,200	59.3 (32.0–84.0)
Sub-Saharan Africa	28.7 (25.1–34.2)	1,059,700	541,500	51.1 (33.8–81.8)

^a Estimation of proportion of stillbirth calculated together.

(Adapted from Lawn JE et al. *Lancet* 2016; **387**(10018): 587–603.)

Table 2

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