Commentary

Ensuring the reliability of infant mortality rate comparisons: The impact of the management of pre-viable and peri-viable births

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The infant mortality rate is frequently used across the world as a key health indicator (https://data.oecd.org/healthstat/infant-mortality-rates.htm). It is assumed that lower rates are better and that variation both between and within countries reflects a range of factors including maternal health, access to and quality of antenatal and neonatal care, and risk factor prevalence such as socioeconomic deprivation. However it has been widely reported that some of this variation in mortality rates may arise due to the differential management of peri-viable births.[1-3] Although these births are rare, accounting for 0.4-0.5% of births before 28 weeks gestation, due to their extremely poor outcomes they account for 30-40% of infant mortality.[3,4] Some of the variation observed in infant mortality rates relates to differences in the approach to resuscitation and the active management of babies born at these early gestations leading to improved survival.[2,5] However, a major influence on infant mortality rates arises from differential reporting of deaths at 20 to 23 weeks of gestation as a fetal death or as a neonatal death shortly after birth. Since measures such as infant

mortality and neonatal mortality rates are based solely on live births, mortality rates can be inflated by up to 30% in areas where a high percentage of babies born at these early gestations are reported as live born, compared to areas where a higher percentage are reported as not showing signs of life.[3] Consequently Joseph and colleagues[1] have highlighted that comparisons of crude infant mortality may reward countries which register only infants as live born who survive or have a reasonable chance of survival.

Goyal and colleagues[6], in this issue of *Paediatric and Perinatal Epidemiology*, have further investigated this topic by exploring the impact of pre-viable births at 17 to 20 weeks gestation. Using data from the US National Center for Health Statistics for births in 2007 to 2013 across 2,391 US counties, they explore the variation in the proportion of fetal deaths compared to infant deaths at 17 to 20 weeks' gestation, and their impact on county-specific infant mortality rates. Again, while births at these gestations are even rarer at 0.05% of births, their inevitable mortality means they accounted for nearly 1 in 10 infant deaths. Consequently, their impact on mortality rates was not insubstantial: with every 1% increase in the percentage reported as a fetal death being associated with a 0.02 decrease in the infant mortality rate per 1000 live births.

Goyal and colleagues[6] call for further education on standard definitions of fetal and infant death to improve consistency of reporting. Variation in reporting of previable and periviable births as a fetal death or a neonatal death shortly after birth is likely to reflect a range of factors including legislation around registration of deaths, hospital practices, attitudes towards termination of pregnancy and views regarding viability – including decisions about whether to provide comfort care or perform neonatal resuscitation and initiate active

treatment. With recent changes in the American Academy of Pediatrics Neonatal Resuscitation Programme that recommended that resuscitation should be withheld when the gestational age is less than 22 weeks rather than 23 weeks (http://www2.aap.org/nrp/docs/15535_NRP%20Guidelines%20Flyer_English_FINAL.pdf accessed 22/03/2016) on the basis of improved reported survival in some countries, increased reporting of infants as live born and increased active management at earlier gestations is likely. Research has highlighted that extremely low gestation infants are more likely to receive active treatment in areas with improved outcomes for more mature infants[7]. Consequently, it is likely that this may also be reflected in the proportion of babies reported as showing signs of life at these early gestations.

Goyal and colleagues' work raises again the difficult question of how do we minimise the impact of differential reporting of previable and periviable births and ensure international and intra-national mortality rate comparisons are consistent, reliable and consequently informative. This isn't straightforward and requires some level of compromise. One option is to use a gestational age cut-off for reporting mortality rates, including births from a gestation where reporting of births as live or stillborn is less variable.[8] This is a useful strategy but is compromised by its inability to recognise the burden of these early gestation losses on parents and families and limits the contribution that reporting these deaths can make to help improve care in the future. An alternative is to monitor variation in mortality by using measures such as perinatal mortality that includes both stillbirth and short term survival such as neonatal mortality.[9] Such measures have the ability to control for this variation but may be less easy to interpret due to the different aetiology of stillbirth and postnatal deaths. One thing is certain from Goyal and colleagues' work, as reporting of

stillbirths, neonatal and infant deaths at early gestations improves across the world, particularly in high income countries, this problem is unlikely to disappear and we should be ever vigilant about artefactual influences on international and regional comparisons of mortality.

About the author

Lucy Smith is a Senior Research Fellow in The Infant Mortality and Morbidity Studies (TIMMS) research group at the University of Leicester, UK. Her work focuses on improving the outcomes for pregnant women, parents and babies by combining the strengths of statistical analyses using routine data with qualitative studies of health professionals' practice and parents' experiences. Currently funded by an National Institute for Health Research Career Development Fellowship, her work aims to understand variation in the management of babies born at the limits of viability and its impact on parents and healthcare providers. She is part of the collaborative team, MBRRACE-UK that undertake national surveillance of perinatal mortality in the UK.

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