2. Invited commentary: Can we reduce the incidence of stillbirth?

Stillbirth rate is an important indicator of the quality of care in pregnancy and childbirth. Internationally, the rate of stillbirth has reduced more slowly than the rates of maternal mortality or mortality in children younger than five years, which were explicitly targeted in the Millennium Development Goals.[1] Whilst we in Ireland have stillbirth rates comparative to the best rates internationally as outlined in this NPEC Perinatal Mortality Report 2014, there is room for improvement. The Irish stillbirth rate has been decreasing for the last 10 years, albeit with a slight increase in 2014. The potential improvements require us to think differently to achieve some, whilst additional resources will be needed to achieve others.

Public perception and expectation is that stillbirth is a thing of the past, yet approximately one baby in every 250 is stillborn. The effect on parents is devastating and long term, leaving intense grief and damaging psychological and social problems. Whilst bereavement care, clear communication and open disclosure for parents/families following stillbirth are vital components of care, I am not going to address these aspects of care in this commentary.

Every year in Ireland, we have approximately 300 stillborn babies: this compares to 160-190 road deaths and 20-25 babies who suffer Sudden Infant Death Syndrome (SIDS). It is quite common to hear road safety measures advertised in the media alerting and educating the public. There is much more limited public discussion and expenditure on stillbirths. It does not feature in public discourse anywhere near as often as road traffic deaths. When one assesses the scientific literature, the ratio of Sudden Infant Death Syndrome (SIDS) to stillbirth publications in PubMed is 67:1 (only 3% of these publications are derived from low income countries). Much less intellectual energy and research funding is given to stillbirth. [2] It is a hidden health burden, both in Ireland and internationally.

Most prospective parents remain unaware that stillbirth is a possibility at all and specifically that particular lifestyles e.g. smoking, increased BMI, drug misuse, etc. increase their risk of stillbirth. Parents have the greatest stake of all in the wellbeing of their baby and they must be part of the drive to reduce stillbirths. Through collaboration with the public, healthcare professionals have capacity to enhance the education of parents and push for prioritization of stillbirth in research and maternity services.

To reduce the incidence of this significant mortality burden, we must openly discuss stillbirth. The public, and especially potential parents, must be made aware that 'stillbirth is a fact of life'. Potential parents must be made aware of the lifestyle risks for stillbirth. This problem belongs to us all and is not just the responsibility of the maternity service. We can learn from the successful reduction in SIDS, with its simple achievable message to *sleep babies on the back*, which is testament to the value of public awareness and education.

Below, I have outlined six undertakings which are regarded by the scientific literature, by clinical practise and through personal experience as the best opportunities we have to reduce the rate of stillbirth.

1. Perinatal Audit

Internationally, the absence of quality data on stillbirths is a major impediment to stillbirth prevention. Improvements in investigation, reporting practices and consensus of definition and classification systems are urgently needed. There is international evidence that perinatal audit at a national level results in important reductions in stillbirth through improvement in quality of data and standards of maternity care.[4] Internal perinatal reviews are already undertaken in many maternity units in Ireland and indeed all units report to this

NPEC national audit, in keeping with the above evidence. The next step to enhance learning from perinatal audit is the development of a confidential enquiry for stillbirth. Confidential enquires have been shown to augment the learning from reviews of care, to identify sub-optimal care and to improve outcomes.[5,6] They offer tangible opportunities to reduce stillbirth.

2. Public Health Education

Effective patient education is a valuable tool towards reducing stillbirth. Changing the focus from what the maternity service can do for the pregnant woman to what the woman can do for herself, in partnership with her healthcare provider, will lend itself to a reduction in stillbirth. For example, any strategies that increase the proportion of women entering pregnancy within the optimum weight range or in smoking cessation programmes will impact not just on stillbirth rate, but other areas of poor perinatal outcome. A large proportion of stillbirths in high-income countries are attributable to risk factors that are partly or fully avoidable.[17]

Dedicated public awareness programmes also offer opportunities. One such innovative initiative is the SAFE programme[3] which advocates a simple achievable message: SAFE. SAFE stands for Sleep, Appointments, Fetal movements and Expert advice.

- **Sleep:** aims to encourage women to be aware of their body as they settle to sleep and if they wake during the night. There is a reported two-eight fold increase in stillbirth in mothers sleeping on their back or not on left side prior to stillbirth.[9,10,11] The evidence favours settling to sleep on the left side.
- **Appointments:** decreased attendance for care is associated with an increased risk of stillbirth.[12]
- **Fetal movement:** encourages the woman to be aware of fetal movements, on the basis that fetal movements have been shown to have decreased four-fold in mothers who experience stillbirth compared to women with healthy pregnancy outcomes.[13, 14, 15]
- **Expert Advice:** encourages the woman to monitor her own pregnancy and promptly seek early expert advice if she has any concerns.

The roll-out of SAFE or similar programmes in maternity units constitutes a step towards encouraging parents to take responsibility for their own care. The successful reduction in the rate of SIDS is testament to the value of patient education and public awareness and cannot be underestimated.

3. Risk Assessment and Provision of Individualized Care Plans

Every woman attending the maternity services should have a consistent and thorough risk assessment performed in order to identify her risk for stillbirth. The risk factors for stillbirth are outlined in Table 1. Subsequently, she should be provided with a detailed and individualized care plan, which would include the appropriate use of evidence-based treatments such as low dose aspirin, smoking cessation and monitoring of fetal growth. Additionally, all patients should undergo a dating scan to confirm dates; an anatomy scan to assess for anomaly; and at least one, but ideally two, scans in the third trimester to assess fetal growth, the latter in view of the significant risk of growth restriction for stillbirth.[8]

Identification of risk factors and provision of individualised care plans is already undertaken in Irish maternity units, but not as well as it might if sufficient resources and time were allocated within the maternity system. Proposals in *Creating a Better Future Together, Ireland's National Maternity Strategy 2016-2026*, will most certainly facilitate improvements in this area but education and guidance will be crucial.[7]

Table 1: Risk factors for stillbirth

Risk Factor	aOR (95% CI)	PAR (%)
Low socioeconomic Group	1.2 (1.0-1.4)	9.0
Previous Caesarean Section	1.2	20-30
Post-term Pregnancy (>42 weeks)	1.3 (1.1-1.7)	0.3
Primiparity	1.4 (1.3-1.4)	
Pre-eclampsia	1.6 (1.1-2.2)	3.1
Low education	1.7 (1.4-2.0)	4.9
Eclampsia	2.2 (1.5-3.2)	0.1
Hypertension – Pre-existing	2.6	
Previous Stillbirth	2.6 (1.5-4.6)	0.8
Assisted Reproduction (singleton)	2.7 (1.6-4.7)	3.1
Diabetes	2.9	3 - 5
No antenatal care	3.3 (3.1-3.6)	0.7
Small for Gestational Age (<10th Centile)	3.9 (3.0–5.1)	23.3
Ethnic Group	3-7 fold	variable

Note: data from Flenady *et al*, 2011, 2016[4, 26]. aOR = adjusted odds ratio. PAR = population attributable risk.

4. Avoidance of Post-Term Gestations

Table 2 highlights the increasing risk for stillbirth in late gestational age. Beyond 40 weeks gestation, the expectant risk increases to 1.2 and 1.4 at 41 and 42 weeks gestation respectively. One of the common proposals to reduce stillbirth is to avoid post-term pregnancies and that induction of labour at or before 41 weeks gestation will reduce late stillbirth. Induction prior to 41+ 3 days is the approach advocated in Irish maternity units.

There is some concern that induction leads to increases in other interventions, specifically caesarean section16. Clinical practice, supported by the evidence of well-defined denominator groups such as the Robson Ten Group Classification System indicates the same. Thus, whilst widespread induction is likely to lead to increases in other interventions with only a modest effect on the stillbirth rate, induction focussed on higher risk groups, such as post-term pregnancies, will likely lower the rate.

Table 2: Comparative risk for stillbirth by late gestational age

Gestation (Weeks)	Stillbirth Rate	Expectant Risk
37	1.0	1.0
38	1.3 (1.2-1.4)	0.9 (0.8-1.0)
39	1.6 (1.5-1.8)	1.0 (0.9-1.1)
40	2.0 (1.8-2.2)	1.2 (1.1-1.3)
41	2.9 (2.6-3.2)	1.4 (1.2-1.6)
42	5.1 (4.4-6.0)	-

Note: data from Rosenstein *et al*, 2012[15]

5. Detection of Fetal Growth Restriction

Detection and management of Fetal Growth Restriction (FGR) and Small for Gestational Age (SGA) has high potential to impact the stillbirth rate. Table 1 illustrates that SGA has the highest risk factor amongst all other measureable factors for stillbirth.[4]

The NPEC Perinatal Mortality Annual Report 2012 highlighted the prevalence of FGR and SGA associated with stillbirths using customized growth charts: this finding remained even after the data was corrected for congenital anomaly.[18] In a recent study by Gardosi et al, which examined 92,000 deliveries, there were with 389 stillbirths and a stillbirth rate of 4.2 per 1000 births.[19] When pregnancies without diagnosed FGR were assessed, the stillbirth rate was 2.4 per 1000 births, thus illustrating the power of detection and management of FGR.[19] Additionally, while the risk of stillbirth in pregnancies with prenatally identified FGR is 1% (9.7 per 1000 births), pregnancies with unrecognised FGR carry an over 8-fold increased risk when compared to pregnancies without FGR (19.8 versus 2.4 per 1000 births).[19]

Unfortunately, antenatal recognition of FGR is poor, reported to be as low as 31% to 50%.[20,21,22,23] There is also wide variation between maternity units, ranging from 12.5% to 50.0%.[23] These variations have been associated with the availability and efficacy of staff training and the adherence to protocols. Such findings emphasize the importance of a standardised and quality assured approach to antenatal surveillance of fetal growth in routine clinical practice.

The use of customized birth weight centile charts as an assessment tool for fetal growth is advocated.[19,20,25] Customized birth weight charts should be generated for every woman during her pregnancy by staff who have been formally trained to use them to plot symphysis fundal height and scan weight estimates. This will have resource implications in the context of staff training but will most certainly lead to higher detection rates of FGR and a concomitant decrease in stillbirth rates.

6. Perinatal Pathology Service

This is a highly specialist area with a rapidly evolving knowledge base which facilitates a greater understanding of causation and association with stillbirth. The value of perinatal pathology was previously outlined by Dr Eoghan Mooney in the invited commentary to the NPEC Perinatal Mortality Annual Report 2011.[17] In Ireland, we have a very disparate perinatal pathology service throughout the country with an insufficient number of specialist perinatal pathologists. Optimally, there should be a national perinatal pathology service, with multiple sites, allowing a coherent, quality and expert service for the entire country. This should be established with input and expertise from the Faculty of Pathology. Such a service would facilitate the introduction of an agreed approach and classification for autopsy, placental histology and cytogenetics for all stillbirths in Ireland. It would enhance diagnostics and the identification of causation required by parents and medical staff to assist the management of future pregnancies. This service would also offer the opportunity to develop research output with the potential to enable earlier identification of at-risk patients and reduce future stillbirths.

A centralised standardised perinatal pathology service would not just have benefit in the stillbirth space. Placental findings map to other areas of poor outcome in perinatal medicine such as brain injury, and thus may confer benefit to effect outcomes such as Hypoxic Ischaemic Encephalopathy (HIE).

Conclusion

To reduce stillbirths we need to believe we can – there is absolutely room for further improvement. Examining the risk factors and identifying ways of ameliorating those risks, especially those with a population attributable risk, such as FGR, would go a long way to achieving further reductions in the stillbirth rate, both nationally and internationally.

Thanks to all the women, couples and families who have known bereavement following stillbirth – for the lessons and humility they have thought me. Lest we forget.

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