8. Invited commentary:

Auditing Perinatal Mortality Using the Robson 10 Group Classification

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The Robson Ten Group Classification system (TGCS) was first popularised in 2001 as a classification system for use in the audit of Caesarean Sections (CS) and to identify the groups of women in which CS were more prevalent. (1) It is endorsed by the WHO,(2) International Federation of Gynaecology and Obstetrics,(3) and European Board and College of Obstetrics and Gynaecology and also NHS England I will send reference. (4) The TGCS involves systematically categorising all deliveries into one of the ten groups as part of routine care. The TGCS method divides women into ten groups based on previous obstetric record, category of pregnancy (lie and presentation), pathway of labour and delivery and gestation. Importantly as opposed to other classifications the system is simple, clinically relevant, prospective and the groups mutually exclusive and totally inclusive. (1) The TGCS is valuable for monitoring trends over time, understanding the impact of clinical interventions, and identifying areas for improvement in labour and delivery management.

The reasoning behind the development of this classification system was to be able to compare different practices and outcomes; one of those being CS. (5) In 2015, the World Health Organisation issued a statement regarding CS and recommended that the Robson TCGS be used as a global standard for monitoring CS rates. In addition, this statement also acknowledged that this system could be utilised more broadly in assessing other perinatal outcomes and together it would be possible to assess and achieve an appropriate CS rate. An appropriate CS rate could be different in different settings.(2)

As this classification system categorizes all pregnant women into mutually exclusive groups with specific clinical and risk characteristics, the TGCS allows a more meaningful assessment of labour and delivery events and outcomes within the identified groups or subgroups. It opens the potential for greater learning. It is essential to consider the other parameters of perinatal care such as morbidity mortality and other perinatal outcomes. These outcomes can be evaluated using a robust classification system that identifies more suitable denominators and avoids averaging effects.

The full potential of the TGCS will only be realised when it is adopted as standard practice, enabling clinicians to learn from each other, with a common starting point for more detailed analysis. (6) The TGCS was intended as an overview tool for CS quality of care; more in-depth analysis into reasons behind all the outcomes is needed. It provides a common starting point for further analyses for all labour and delivery events and outcomes and its principles of simplicity and clarity of thought help to stimulate interest, discussion, and education. (7) Many institutions and countries remain unable to publish their results because of poor quality data collection. An unexpected benefit of using the TGCS has been the capacity to assess data quality.

It provides us with common ground to look at care in similar populations with consistent denominators to allow more in-depth analysis, assisting us to learn from each other. Variables such as the population, ethnicity, complexity and other information can then be analysed within classified groups, to allow real assessment of different outcome between units, regions, and countries. This invited commentary takes a national audit of perinatal mortality data and incorporates TGCS into the analysis.

Maternity services in Ireland are predominantly hospital based, with 99% of births occurring within a hospital. (8) The services in Ireland are managed by the Health Service Executive (HSE). There are 19 maternity units in Ireland, 15 are co-located within general hospital grounds and four currently are stand-alone hospitals. (9)

Methods:

The National Perinatal Epidemiology Centre (NPEC) collects perinatal mortality data. Within each maternity unit coordinators with the responsibility of submitting data to the NPEC have been identified. Pseudonymised data on perinatal deaths from births that occurred during the calendar years 2016 to 2022 were submitted to the NPEC by all 19 units using a standardised notification dataset. The notification dataset was constructed using data on fetal and maternal characteristics documented in clinical records. Stillbirth was defined as the birth of an infant weighing 500 grams or more, or with a gestational age of 24 weeks or greater, showing no signs of life. Early neonatal death was classified as the death of a live-born infant occurring within the first seven completed days post-birth. For the purposes of this study, cases involving congenital anomalies and terminations of pregnancy were excluded from the analysis. The rate was calculated per 1,000 births (babies delivered).

From 2016 to 2019, different numbers of units contributed data on all deliveries classified by the Robson Ten Group Classification System (TGCS). In 2016, 13 out of 19 units participated; in 2017, 14 units; in 2018, 16 units; and in 2019, 17 units took part. From 2020 to 2022, all 19 units were involved, enabling the classification of perinatal deaths according to the Ten Groups.(9–11).

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Groups 1 and 2, as well as Groups 3 and 4, were combined into single cohorts. Combining these two groups allows for analysis of outcomes in term, low-risk pregnancies with a cephalic presentation (Table 1). Since both groups are expected to have low perinatal mortality rates due to their low-risk nature, combining them allows for a clearer, more meaningful analysis of mortality outcomes without getting distracted by the specific method of labour onset. This simplifies the comparison with higher-risk groups, helping to better understand how factors like prematurity or other complications increase the risk of perinatal mortality. Combining Groups 6, 7, and 9 in the Robson Ten-Group Classification System for perinatal mortality cases is also useful because all these groups represent pregnancies with higher risk factors due to unusual fetal presentations. These groups involve non-cephalic presentations (breech or transverse), which are known to be associated with higher perinatal mortality and complications, combining them allows for a more cohesive analysis of perinatal mortality in pregnancies where the baby's position is a significant risk factor. Grouping them helps to better assess how non-cephalic presentations contribute to overall mortality and compare this with lower-risk groups.[66]

Results:

The total number of deliveries recorded for the years 2016 – 2022 was 411,591. The PMR was 4.18/1,000, for stillbirths it was 3.12/1,000 and Early Neonatal Death was 1.06/1,000.

Prematurity was strongly correlated with perinatal mortality, a relationship that was particularly evident through the application of the TGCS. Group 10, which includes all preterm, singleton, cephalic pregnancies, accounted for 4% of deliveries and exhibited the highest perinatal mortality rate (PMR). Almost half of the national PMR is due to group 10.

Table 1: Incidence of stillbirth and early neonatal death by Robson Ten Group Classification System in Irish maternity units, 2016-2022

Group	Group description	Number of babies delivered*	Stillbirths		ENND		Perinatal Deaths		Group contribution to rate
			N	Rate	N	Rate	N	Rate	
All*		411,591	1284	3.12 (2.95-3.30	436	1.06 (0.96-1.16)	1720	4.18 (3.98 -4.38)	
1	Nulliparous, singleton, cephalic, >37/40, spontaneous labour	139,096	122	0.88 (0.73-1.05)	27	0.19 (0.12-0.28)	149	1.07 (0.96-1.25)	0.36
2	Nulliparous, singleton, cephalic, >37/40 induced or elective CS								
3	Multiparous (excluding previous CS), singleton, cephalic, >37/40, spontaneous labour	157,420	181 (0.99-1.33)	1.15 (0.99-1.33)	31	0.20 (0.13-0.27)	212	1.35 (1.17-1.54)	0.51
4	Multiparous (excluding previous CS), singleton, cephalic, >37/40 induced or elective CS								
5	Previous CS, singleton, cephalic, >37/40, induced or elective CS	64,848	46	0.71 (0.52-0.95)	4	0.06 (0.01-0.15)	50	0.77 (0.57-1.06)	0.12
6	All nulliparous deliveries with a single breech pregnancy	17,593	181	10.29 (8.84-11.90)	91	5.17 (4.16-6.35)	272	15.46 (13.6-14.41)	0.66
7	All multiparous breech (including previous CS)								
8	All women with a single pregnancy with a transverse or oblique lie, including women with previous uterine scars								
9	All multiple pregnancies (including previous CS)	15,067	114	7.57 (6.24-9.09)	94	6.24 (5.04-7.63)	208	13.80 (11.99-15.81)	0.58
10	All singleton, cephalic, <37/40 (including previous CS)	17,568	640	36.43 (33.66-39.37	189	10.76 (9.27-12.06	829	47.17 (44.03-50.51)	2.01

Note: Rate is per 1,000 babies delivered; CS=Caesarean Section

[66]Robson Classification: Implementation Manual. Geneva: World Health Organization; 2017.

Table 2: Relative risk of perinatal mortality across the Robson Ten Group Classification System

10Groups		Rate (95% CI)	Rate ratio (95% CI)	p-value
1	Nulliparous, singleton, cephalic, >37/40, spontaneous labour	1.07 (0.96-1.25)	0.80 (0.64-0.98)	0.032
2	Nulliparous, singleton, cephalic, >37/40 induced or elective CS			
3	Multiparous (excluding previous CS), singleton, cephalic, >37/40, spontaneous labour	1.35 (1.17-1.54)	Reference	
4	Multiparous (excluding previous CS), singleton, cephalic, >37/40 induced or elective CS			
5	Previous CS, singleton, cephalic, >37/40, induced or elective CS	0.77 (0.57-1.06)	0.57 (0.42-0.78)	<0.001
6	All nulliparous deliveries with a single breech pregnancy	15.46 (13.6-14.41)	11.48 (9.59-13.74)	<0.001
7	All multiparous breech (including previous CS)			
8	All women with a single pregnancy with a transverse or oblique lie, including women with previous uterine scars			
9	All multiple pregnancies (including previous CS)	13.80 (11.99-15.81)	10.25 (8.47-12.41)	<0.001
10	All singleton, cephalic, <37/40 (including previous CS)	47.17 (44.03-50.51)	35.04 (30.13-40.75)	<0.001

In relative terms compared to the combined Groups 3 and 4, the PMR was 20% lower in Groups 1 and 2 and 43% lower in Group 5. In contrast, the PMR was 11.5 times higher in the combined Groups 6, 7 and 9 and ten times higher in Group 8. However, by far the highest risk was associated with Group 10 with a 35-times higher PMR. Table 2 illustrates the relative risk of PMR by obstetric group, highlighting the variation in risk based on clinical and obstetric factors. It emphasizes the groups where targeted interventions could most effectively reduce perinatal mortality. Specifically, Group 10 stands out as the highest-risk category, suggesting that addressing risk factors associated with this group could significantly improve overall outcomes.

Discussion:

The TGCS is a feasible system for monitoring perinatal outcomes other than CS.(12–18) It is evident that this system is very effective in assessing several outcomes in the classified groups; more importantly linking all events and outcomes together and interpreting them together. However, assessment of common outcomes is a struggle in studies due to different definitions and incomplete data.(18) The variables needed to classify women according to TGCS are routinely collected on admission to hospital.

Previous studies have assessed various perinatal outcomes including perinatal mortality using the TGCS. (18) They found that nulliparous singleton cephalic term pregnancies (groups 1 and 2) had higher combined rates of perinatal mortality than multiparous singleton cephalic term pregnancies (groups 3 and 4) combined. Groups 1 and 2 had a rate of 1.3, 1.4 and 1.2 per 1000 whereas groups 3 and 4 had 0.1, 0.8 and 1.2 per 1000 in 3 geographically distinct regions (Norway, Ireland and Slovenia). Group 5 (multiparous with previous CS) had a disproportionately elevated rate in Norway at 5.5/1000. (18)

Perinatal mortality (Neonatal death and stillbirth) was twice as high in the preterm non-cephalic group when compared to the preterm cephalic infants, with no significant difference was noted in term pregnancies.

In the study by Litorp et al noted that preterm and all non-cephalic deliveries (groups 10, 7, 6, 9) had the highest perinatal mortality ratio. However overall, that ratio has decreased across the span of this study, between 2000 and 2011, in nulliparous single cephalic and breech term deliveries, multiparous single cephalic with previous CS and multiple pregnancies (groups 1, 2, 5, 6, 8). (14)

The philosophy of the TGCS in assessing maternity care is based on the premise that all epidemiological information, maternal and fetal events and outcomes will be more clinically relevant if analysed within the 10 groups or their subgroups . (19) The TGCS is not widely used for auditing perinatal events other than CS, therefore the current literature is limited. This paper uses it on a large cohort of perinatal deaths and shows value in the analysis of such deaths. There is little doubt that reference models (good quality, classified and adjusted perinatal audit) continually refined, will be used as the guide to the quality of perinatal care provided in the future. Furthermore, the most valuable reference models may be in individual groups of women rather than in an overall population (20).

However, the TGCS needed to be modified in some incidences due to a lack of information or if it was deemed unsuitable for the population. As Rossen et al. concluded, non-cephalic presentations make up a small minority of deliveries, so these should be recommended to represent one Robson group. Robson groups were modified in this group by combining all single non-cephalic presentations into one group and separating induced labour and CS

prior to labour into separate groups. Modifications to the TGCS were also necessary for Liang et al. because the database used for analyzing and categorizing women didn't routinely collect information on the course of labour, i.e., spontaneous or induced. For this reason, eight groups were used without distinction of course of labour. (15)

A range of populations has been studied in 10 countries (Ireland et al.) across four continents. This diverse array of studies proved that the Robson TGCS is applicable in most countries worldwide. Even though the countries included varied significantly in socioeconomics and health care, similar results were shown in each study. All non-cephalic presentations had dramatically higher rates of adverse outcomes, followed by the preterm delivery and multiple pregnancy groups.

Our study on a national population shows a very significant contribution to the perinatal mortality rate from groups 6-10 – non-cephalic presentations, multiple pregnancies and preterm deliveries. By acknowledging these women to be at risk universally, it is possible to justify more focussed care in these cases. A significant variation in PMR was observed across the obstetric groups. These findings emphasise the profound impact of clinical and obstetric factors on perinatal outcomes. Targeted strategies to mitigate risks in this group could significantly reduce overall perinatal mortality and improve outcomes across the population.

Conclusion - impact on health policy

The TGCS has a significant impact on health policy by offering a standardised classification for analyzing and addressing perinatal outcomes. It facilitates improved monitoring, data-driven policy-making, and targeted interventions. This approach supports broader objectives in maternal health, such as improving care quality and reducing health disparities across different regions and populations. While the TGCS has its predominant use in assessing CS rates, which most previous studies analysed, the classification is gaining increasing momentum in other areas of perinatal audit. By comparing outcomes between different units and connecting them to practice allows for a greater understanding to take place and may lead to a change in practice. (20) More research needs to be carried out in using this system to examine other outcomes. Shakuntala et al (2024) comment that there is a need to intensify actions to improve labour management, and the categories supports the review of labour progress. (21) In addition to mortality and morbidity, areas such as maternal satisfaction, healthcare costs and resource use could also be assessed using the TGCS. The Robson TGCS may reach its full potential it is fully supported by national organisations and used by all.

Our findings emphasises the insights offered by applying the Robson ten group classification system to perinatal outcomes, particularly in highlighting PMR variations between groups. By identifying these high-risk groups and understanding the challenges, this work provides data that shows where targeted interventions may improving outcomes.

Overall, this piece of work explores the value of this classification system in perinatal care, not only as a tool for monitoring trends but as a catalyst for informed decision-making and resource allocation.

There is a need for continued research and collaborative efforts to refine interventions and ultimately reduce perinatal mortality rates across all groups.

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