MEDVIX PUBLICATIONS

Journal of Medical and Clinical Case Reports
Review Article | Open Access | ISSN 2997-6022 | Volume 01 | Issue 12

Safer National Maternity Care: Prospects and Challenges

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Received date: 04 November 2024; **Accepted date:** 19 November 2024; **Published date:** 29 November 2024

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Citation: Mohamed Ibrahim Ali Saleh, Safer National Maternity Care: Prospects and Challenges. Journal of Medical and Clinical Case Reports 1(12). https://doi.org/10.61615/JMCCR/2024/NOV027141129

Abstract

The delivery of safe maternity care has become an increasing focus of attention, especially in recent years due to high-profile serious failings in care at individual NHS trusts.**[1,2]** Preventable tragic adverse events in maternity care have devastating consequences for families, and the associated negligence claims create huge costs for the NHS.**[4]** Reducing harm in maternity care is a major priority to protect families and NHS sustainability.**[5]** Much work to date has focused on identifying what goes wrong in maternity care. Much has been learned from inquiries and investigations into adverse events in maternity care. **[1,35]** However, the resulting recommendations have not, as in other areas of quality and safety, always had impacts that are as powerful or consistent as might be hoped.**[21]**

This review article takes a fresh and positive perspective and shares learning on the key findings of the recent national maternal inquiries and investigations reports into adverse events in the care given to some mothers and babies. **[5,6]** It makes a case for the universal implementation of specific key measures in order to improve the quality of maternity care and its safety profile.**[35]**

It is now imperative that the health system shifts its focus from counting to acting and changing practice. Adequate resources and funding are required to ensure that recommendations of national maternity investigation reports are implemented and sustained to make care as safe as the best.**[11]** Serious incidents and harm sustained to mothers and babies when the care provided has fallen short are heartbreaking and catastrophic for the families. So we have a moral duty to do anything we possibly can to reduce them.

Introduction

In November 2015, the Department of Health announced a new ambition to reduce the rate of stillbirths, and neonatal and maternal deaths in England by 50% by 2030. The government has committed to working with national and international experts to ensure that best practice is applied consistently across the NHS and that staff can review and learn from serious incidents causing harm in maternity care.**[3]**

More women have children at an older age. More women have complex health needs that may affect their pregnancy, their well-being, and that of their baby. Despite the increasing numbers and complexity of births, the quality and outcomes of maternity services have improved significantly over the last decade.**[8]**

NHS hospital's maternity services are at capacity with some running at 100% occupancy too much of the time. Yet some community-based services are struggling to survive. Healthcare professionals working on the front line providing maternity care are too often working under pressure with passion and dedication. However, things do go wrong when the care provided has fallen short. The NHS spends over £560 million each year on compensating families for negligence during maternity care. When things do go wrong, the fear of litigation can prevent staff from being open about their mistakes and learning from them.**[4]** It is reported that the UK has poorer outcomes on some maternity care measures than our European peers, which is unacceptable.**[2]** We can and must do better.

Identification and Assessment of Published Evidence

The Cochrane Library and electronic databases (DARE, EMBASE, TRIP, MEDLINE, and PubMed) were searched looking for the following terms in the title or abstract ‘‘patient safety, maternity care, serious incidents, national investigations, performance indicators, maternity statistics, neonatal outcome, training, education.

Factors that Contribute to Preventable Adverse Events in Maternity Care: Review of Evidence

Many studies that have sought to determine the frequency of preventable adverse events in obstetrics have used retrospective designs. The overall frequency of preventable adverse events in a given obstetric unit cannot be determined from these studies.**[10]**

The existing literature suggests that multiple contributory factors are involved in the occurrence of a significant number of preventable major serious incidents in maternity care**.[1,2]** The RCOG's Every Baby Counts is a high-quality improvement program launched in 2014 with the ambition to reduce the number of stillbirths, neonatal deaths, and brain injuries as a result of serious incidents occurring during term labor.**[5]** This landmark program effectively opened a discussion on what had been a very difficult issue with a better understanding of the bigger picture of why things go wrong in maternity care. Its key impact was shared learning from the investigations and thematic analysis carried out.

According to Each Baby Counts report in 2020, the rates of babies reported year on year have increased slightly. However, there has been little change in the proportions of types of such cases **(Table I)**.

TABLE I: Reproduced with the permission of the Royal College of Obstetricians and Gynaecologists. Each Baby Counts. 2020 Final Progress Report. London: RCOG, March 2021

Table I Babies reported to Each Baby Counts over time

	2015	2016	2017	2018
Number of babies reported	1136	1123	1130	1145
Rate	1 in 637 (CI 600–675)	1 in 620 (CI 585–658)	1 in 599 (CI 565–636)	1 in 569 (CI 537–604)
Rate per 1000	1.57 (CI 1.48–1.66)	1.61 (CI 1.51–1.71)	1.67 (CI 1.57–1.77)	1.76 (CI 1.66–1.86)

95% confidence intervals presuming a normal distribution.

Figure I: Proportion of babies for whom different care might have made a difference to the outcome *(N=687)*

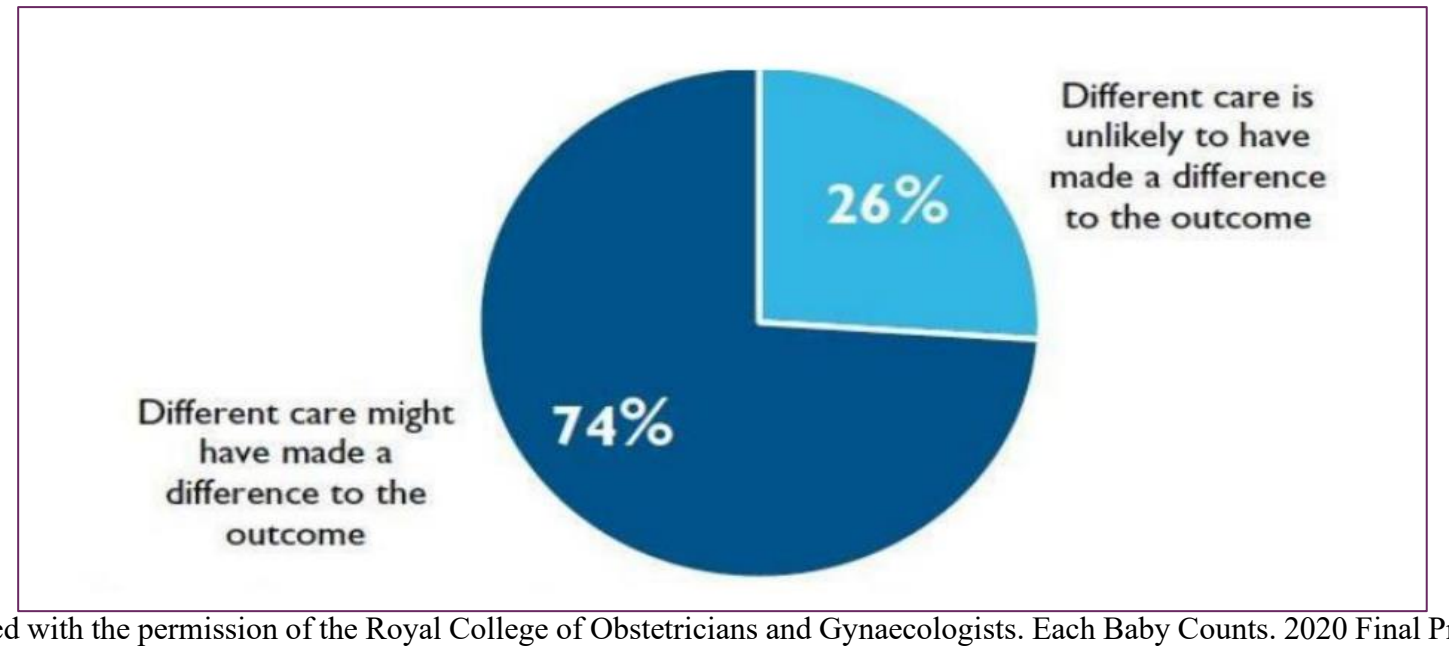

FIGURE I: Reproduced with the permission of the Royal College of Obstetricians and Gynaecologists. Each Baby Counts. 2020 Final Progress Report. London: RCOG, March 2021

The proportions in Each Baby Counts Report 2018 have seen relatively little variation in the number of adverse events across its previous reports in 2015, 2016 & 2017.

This is consistent with the MBRRACE-UK Perinatal Mortality Surveillance report for births in 2016 **[35]** which showed that overall, the national extended perinatal mortality rate in 2016 had not changed from 2015. Both reports and analyses have shown that a significant proportion of these serious incidents are preventable and that improvements in care have the potential to reduce death.

According to the data from the RCOG's Every Baby Counts Report 2020, critical contributory factors were identified in babies for whom different care might have made a difference to the outcome. These factors (excluding neonatal care) are categorized into themes, with the five most common themes being cardiotocography (CTG) understanding and interpretation, risk recognition and proper escalation when concerns arise during labor, team communication issues, individual human factors, and education/training **(Figure II)**

Figure II: Reproduced with the permission of the Royal College of Obstetricians and Gynaecologists. Each Baby Counts. 2020 Final Progress Report. London: RCOG, March 2021

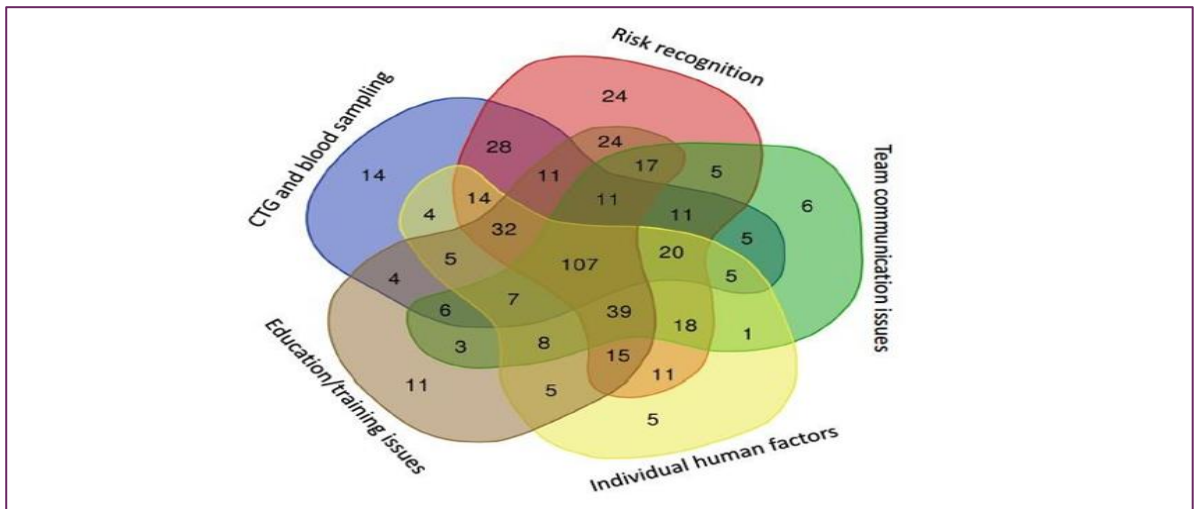

Figure II Interrelation of the five most commonly identified themes;
diagram produced using http://bioinformatics.psb.ugent.be/webtools/Venn

Key approaches to improve safety in national maternity care: overview

Attempts to enhance safety within maternity care have utilized several different types of modalities. Current evidence suggests that focusing on specific key measures could effectively improve clinical outcomes. **[22,38]**

Enhancement of Communication and Teamwork

The existing literature suggests that communication failures and poor teamwork have consistently been found to be predominant factors in preventable major maternal adverse events.**[5]** Human factors science tells us that the inherent limitations of human memory, the effects of stress and fatigue, the risks associated with distractions and interruptions, and the limited ability to multitask ensure that even highly skilled, experienced individuals will make mistakes.**[46]** As such, effective communication that creates a well-understood plan of care greatly reduces the chances of inevitable errors that could cause harm to women and their babies.**[45]**

The complexity of maternity care, coupled with the inherent limitations of human performance, make it critically important that different team members have standardized communication tools, create an environment in which individuals can speak up and express concerns, and share common ‘‘critical language’’ to alert team members to unsafe situations.**[13]**

Many factors contribute to communication failures. First and foremost, healthcare professionals are trained to communicate quite differently. All too frequently, communication is situation or personality-dependent.**[44]** The commercial aviation industry has shown that the adoption of standardized tools and behaviors is a very effective strategy for enhancing teamwork and reducing risk.**[46]**

Embedding standardized tools and behaviors such as SBAR (a situational briefing model), appropriate assertion, and critical language can greatly enhance safety. These tools can effectively bridge the differences in communication style between multi-professional team members. Create a common mental model and help develop critical thinking skills.**[25]**

Situational awareness refers to the care team maintaining the ‘‘big picture’’ and thinking ahead to plan and discuss contingencies. This ongoing dialogue, which keeps members of the team up to date with what is happening and how they will respond if the situation changes, is a key factor in safety.**[27]**

Standardized communication for handover at shift changes is a key success factor for the best clinical outcome with the quickest learning curve. Briefings using the SBAR structure are effective in addressing all the relevant clinical issues and reassessing and prioritizing the workload. The care team can quickly ensure they are all ‘‘on the same page of the script’’ and with a care plan in place. **[13,43]**

Debriefing is the process of spending a few minutes at the end of the shift, to assess what the team did well, what were the challenges, and what they will do differently the next time. It is a great opportunity for the team members' learning curve while the events are fresh.**[27,45]** In a study of team learning in the adoption of minimally invasive cardiac surgery, debriefings were seen as one of the key success factors in the surgical team with the quickest learning curve and best clinical outcomes.**[14]**

Implementation of standardized communication processes throughout a maternity unit is an effective strategy for enhancing teamwork and reducing risk. A recommended approach to this intervention is crew resource management (CRM) training.**[26]** CRM seeks to engender effective communication through standardized language, situational awareness, briefing, debriefing, and a leveling of hierarchy that allows all team members to voice concerns over safety. Some evidence from both observational longitudinal studies and randomized trials suggests that communication training can significantly improve teamwork and communication and reduce risk.**[41]**

Clinical Algorithms, Protocols and Guidelines

Because of the complexity of Maternity care processes and the corresponding potential for errors, one way of improving safety has been to introduce standardized approaches to patient care.**[18]**

The use of a standardized risk assessment tool for the mother/fetus at the onset of labor in any setting to determine the appropriate care plan is a key measure for a safe birth.**[9]** All informed management decisions during labor should be agreed with the woman and comply with the NICE guidance.**[9]** Risk assessment during labor should be considered as a dynamic process with clear guidance for timely recognition, and escalation of concerns.**[31]**

Well-defined protocols, guidelines, and clinical algorithms have been shown to be effective in promoting learning and adherence to best practices in maternity care particularly in managing obstetric emergencies.**[18]** They provide a logical flow of thinking and help identify gaps in assessing and managing a clinical problem. They provide prompts to guide evidence-based clinical care, reducing the risk of adverse outcomes.**[29]** They can also serve as educational tools to help those with limited knowledge and experience to make more confident, current best practice decisions. **[36,37]**

The potential benefits of a standardized approach to the evaluation and management of pre-eclampsia have been demonstrated.**[16]** After establishing a set of best practices, this group of investigators introduced these practices for pre-eclampsia management in private hospital settings. Among women with pre-eclampsia who were managed after the standardized approach was put into place, 0.7% experienced the composite endpoint of maternal adverse outcomes, which was an 86% reduction compared with the pre-intervention frequency of 5.1% ($P < .001$). Adverse perinatal outcomes were also reduced, although this finding did not reach statistical significance (odds ratio [OR], 0.65; 95% CI, 0.37 to 1.16).

With recent advances in digital technology, clinical algorithms, guidelines, and protocols could be incorporated into maternity care. However, they should be reviewed on a regular basis so they remain up to date best practice. Although algorithms and guidelines provide guidance, they cannot be used as substitutes for careful critical thinking and clinical expertise or judgment, particularly in complex situations.**[9]**

Of note, the mere existence of clinical algorithms, protocols, and guidelines in a maternity unit cannot be assumed to automatically result in improved care. They may only enhance care when their components are up-to-date and evidence-based, and their use is championed by members of the maternity care team.**[18]**

Simulation Training

Simulation refers to the recreation of an actual event that has previously occurred or could potentially occur.**[23]** Simulation training is an evidence-based approach to enhancing patient safety and improving outcomes, particularly in obstetric emergencies.**[32]**

PROMPT (Practical Obstetric Multi-Professional Training) is an evidence-based program developed to reduce adverse maternal and neonatal outcomes

through local multi-professional training. A systematic approach to improving maternity safety, PROMPT encompasses knowledge and skills training, emergency simulation, and systems improvement.**[39]**

The training focuses on both the technical and non-technical skills required to manage different types of obstetric emergencies, emphasizing the importance of effective communication, teamwork, and interdisciplinary work. Training is envisaged to be compulsory for all maternity staff, led by local trainers, and bringing multi-professional clinical teams together in their normal working environment to rehearse, reflect, and improve on their collective practice.**[15]**

Multi-professional team members should train together within their organizations to build trust, understand, and respect each other 's skills and perspectives. Multi-professional training and learning should be a standard part of continuous professional development, both in routine Obstetric situations and emergencies. Current evidence suggests that this approach could be effective in the establishment of dynamic teams trained to function and be engaged specifically at the time of obstetric emergencies. **[23,39]**

Clinical outcomes associated with cord prolapse were improved after the introduction of an obstetric emergency training program that included cord prolapse drills.**[33]** It was found that after these drills, a significant reduction was reported in the diagnosis-to-delivery interval (25 to 14.5 minutes, $P <$ .001), although no significant difference was found in low Apgar scores or rate of admission to the neonatal intensive care unit (NICU).

The clinical outcomes were examined after the introduction of a training session that included fetal heart monitoring education and drills in shoulder dystocia, postpartum hemorrhage, eclampsia, twin deliveries, breech deliveries, adult resuscitation (including cardiopulmonary resuscitation), and neonatal resuscitation.**[39]** After this training, the frequency of hypoxic-ischemic encephalopathy (HIE) decreased by approximately half at their institution (27.3 to 13.6 per 10,000 births, $P = .03$). This decrease did not seem to be related to other pre-existing trends in the frequency of HIE or to changes in the population during the period.**[15]**

After a simulation training program, a significant increase was reported in the frequency with which appropriate maneuvers were used for shoulder dystocia, and a significant reduction was reported in neonatal injury at birth after shoulder dystocia (9.3% to 2.3%; relative risk [RR], 0.25; 95% CI, 0.11 to 0.57).**[24]**

Multifaceted Approach

The existing literature highlights that multiple factors contribute to harm in maternity care. As such efforts to improve safety may require multiple different approaches.**[12]** The potential need for a multifaceted approach is further suggested by the different levels within a maternity unit at which these factors can manifest. Specifically, key components required for the prevention of adverse events occur at (1) the individual level, such as the level of education or training provided to obstetricians and midwives (2) the multi-professional team level, as with team effectiveness and communication; and (3) the structural level, such as the standardization of systems and processes to enable implementation of improvement plans supported by a positive culture at all levels through the organization.**[22,29]**

The complexity within maternity care is such that improvements in the wider maternity safety sphere will come not through the use of one particular intervention but with a multifaceted approach that ultimately results in a fundamental culture change within the organization.**[40]**

A theoretically informed characterization of key features associated with safety in maternity care was examined through an ethnographic study of a high-performing maternity unit.**[19]** The identified synergistic features that appeared to be important for safety include collective competence; insistence on technical proficiency; monitoring, coordination, and distributed cognition; clearly articulated and constantly reinforced standards of practice, behavior, and ethics; monitoring multiple sources of intelligence about the unit's state of safety; and a highly intentional approach to safety and improvement.

Maternity safety should be at the forefront of every healthcare service. Improvement in safety is traditionally built around the framework of prevention, identification, escalation, and response. The “prevention” element should focus on changes to clinical practice and service models to promote the development of a safety culture **[9]** The “identification” and “escalation” are crucial elements. However, the maternity outcome data alone does not provide sufficient information on the quality of care. There is a need to get beyond normal statistical variation into a more sophisticated understanding of what is happening in an individual trust. This could be achieved by specific maternity quality surveillance and governance modules to enhance the identification and escalation of concerns.**[11]** The “response” element is to ensure appropriate actions are taken to mitigate the identified key risk issues. This is the role of the NHS Improvement Maternity Safety Support Programme which should be strengthened to continue helping the identified poorly performing provider trusts.**[21]**

Discussion

Recent public inquiries into maternity care have identified clear areas for essential improvement in safety and quality. Human factors training focusing on effective teamwork and communication can provide tremendous clinical benefits and a safe climate. The experience to date has shown us the value of embedding standardized tools and behaviors into the maternity care process to improve safety in a progressively more complex care environment. **[44,46]**

A critically important element is to dissociate the inevitable errors and communication failures associated with human performance from the issue of clinical competency.**[45]** Approaching improvement from the perspective of correcting system flaws and using standardized communication tools to make the day go more smoothly and keep everyone safe is effective. The message of ‘‘good people are set up to fail in bad systems—let’s figure out how to keep everyone safe’’ is readily accepted. Spending time to educate the multi-professional team members about the prevalence of system error, and the inherent limitations of human performance, helps dissociate error from the common perception of mistakes being episodes of personal failure.**[43]**

The complexity within maternity care is such that improvements in the wider maternity safety sphere will come not through the use of one particular intervention but with a multifaceted approach that ultimately results in a fundamental culture change. **[12,40]**

Improving the understanding and interpretation standards of electronic fetal monitoring (CTG) in labor is a key element for safe birth.**[9]** This recommendation is underlined by data from the RCOG’s Each Baby Counts report,**[5]** showing that fetal monitoring was identified in 74% of babies as a critical contributory factor where improvement in care may have prevented the outcome. This is echoed in the 2017 MBRRACE-UK Perinatal

Confidential Enquiry.**[17]** NHS trusts should ensure that staff who care for women in labor are undertaking annual training and competency assessment on CTG interpretation and the use of intermittent auscultation. Training should be multidisciplinary including how to use CTG assessment tools and the buddy system and how to escalate accordingly when concerns arise or risks develop during labour.**[30]** The role of the Fetal Monitoring Lead in individual NHS trusts should contribute to building and sustaining a safety culture in the labor ward with all staff committed to continuous improvement in accurate CTG interpretation.**[31]**

A well-founded multi-professional obstetric training program is crucial to achieving safety, however, on its own does not provide full grounds for making a maternity unit safe. Broader social, organizational cultural, and leadership issues are equally important factors. **[36,37]**

Standardized risk assessment tools, clinical algorithms, and guidelines should be incorporated into intrapartum maternity care.**[9]** They provide a systematic standardized approach to guide clinical practice improve adherence to best practices and reduce the risk of adverse outcomes. The use of such tools should always be in the context of a holistic approach with the woman's wishes and needs at the center of each decision.**[31]**

A large body of evidence emerged from recent scandals and tragic events in maternity care investigations reports confirming the multifaceted nature of these incidents.**[5]** The shift from looking at individuals to a more systems approach has been viewed as a necessity. Improvement plans are linear processes and there is no ‘quick fix’ or solution for immediately improving safety in maternity care.**[11]**

The most important factor in delivering safe care is a dynamic multi-professional team working effectively within and across organizational boundaries to provide safe quality maternity care.**[43]** Multi-professional teams should get together regularly to review performance indicators and other clinical outcomes and patient experience data to understand how they can improve services. The data should be considered alongside other sources of information, such as training, practice improvements, perinatal mortality review tools, risk management meetings, and audits. They should proactively share their data with other teams to benchmark and understand how they can learn, improve, or innovate, working across their Regional Maternity Clinical Network.**[21]**

Strong leadership is the key determinant of the maternity organizational culture in which front-line maternity professional teams operate. It is vital for a collective leadership to create a multi-professional working and learning culture, focussed on the needs of the women and babies in their care.**[43]** Effective leaders need to actively encourage, support, and monitor the culture, systems, and processes within their organizations to ensure the provision of high-quality and safe care. It is the ultimate responsibility of the leadership to review and analyze the clinical data on quality and outcome to drive improvement.**[11]** The leadership of all NHS organizations must take responsibility for and attach priority to the safety of their maternity services. They should have a board-level champion for maternity services, regularly reviewing the measures of quality. Safety should be a priority item at Board meetings. The Board should take action where it is necessary.**[21]**

Serious incidents in Maternity care causing harm are rare occurrences, but the results are extremely serious and have a lasting catastrophic impact on women and their families. This lasting damage for parents can be made worse by poor communication, and failure to investigate properly and to learn. Staff involved in the incident can be emotionally damaged too and feel unsupported in dealing with the aftermath. **[7,8]**

When things go wrong, safety investigations should be carried out with learning lessons to improve services and reduce the risk of future recurrence. In the meantime, the staff involved should be supported with openness and honesty with the family, and provision made for their needs.**[35]**

Safety is inconsistent across NHS maternity services, and there is scope for significant improvement in many units. The open culture that welcomes learning is also inconsistently distributed, with many units missing the opportunities for improvement that are needed. There is a need to understand the unwarranted variation in care at the national level to ensure improvements to maternity care are being made universally.**[42]**

Identifying provider trusts where care is falling well short of the standard that is expected is a key element, alongside strengthening the Maternity Safety Support Programme so that individual trusts have the support they need.**[11]** Every maternity service being supported should have a well-formulated, appropriate, and meaningful maternity safety and quality improvement plan that has been developed by robust engagement with all of the maternity MDT workforce and service users. Each plan should ensure appropriate actions are taken to mitigate the identified key risks, understood by all stakeholders, and delivered utilizing all available resources efficiently and effectively.**[21]**

The MBRRACE-UK confidential perinatal mortality surveillance report (2018) found that documentation indicating that an internal review had taken place was present in only one-quarter of cases following serious incidents, and the quality of these reviews was highly variable and some of them were of poor quality.**[6]**

There needs to be much greater consistency in the standard of local investigations of serious incidents causing harm. As The Healthcare Safety Investigation Branch (HSIB) is continuing the legacy of Each Baby Count, they should ensure a nationally standardized process for these investigations by experienced experts. Listening to bereaved parents’ experiences is vital in understanding why babies die in labor and learning from every baby’s death is an integral part of continual improvement in care.**[7]** With recent advances in digital technology, learning from these reviews should be nationally collected and benchmarked so that the learning is shared widely.**[8]**

To support this process and for the sharing of data and information between professionals and organizations, the use of an electronic maternity record should be rolled out nationally. Maternity care providers should ensure that women can share and access the information that is important to them.**[35]**

Every woman deserves safe, personalized, and compassionate care throughout their pregnancy. Continuity of care models, following NICE guidance, and empowering women to be involved in decisions about their care through effective communication and information sharing should be rolled out nationally across all clinical areas. This key element is based on best practices and could have a significant impact on making care safer.**[31]**

No one action alone will deliver the change we all need to see for safer national maternity care in the UK. The framework for improving safety in maternity care will require greater teamwork, more and better dialogue, and a willingness to break down professional boundaries; all in the best interests of women, babies, and their families.**[2]** It will require openness and inclusiveness so that all services can work together. The role of a motivated

staff who are supported to deliver care that is women-centered, working in high-performing teams, is vital.**[11]**

Equally important is the role of organizations that are well-led and in cultures that promote innovation, and continuous learning, and break down organizational and professional boundaries. With the leadership of the RCOG, the right support from national organizations, and the inspiration of local leaders, we could make the vision of Safer Births a reality on the ground.**[5]**

Conclusion

Each tragic incident in maternity care has a profound and life-changing effect on so many people. we must make sure that no family has to experience the pain of an outcome that with the right care might have been different.

To date, we are seeing that human factors training and embedding a few basic tools and behaviors can provide tremendous clinical benefit and, in the attitudes, surrounding teamwork and safety climate.**[46]**

The themes emerging from learning nationally on safety should be turned universally into Changes to clinical practice, behavior, and service models.**[11]** The Maternity and Neonatal Safety Improvement Programme (MatNeoSIP) in its role should help trusts universally to build on learning from areas of best practice, develop a local improvement plan, and assess their safety culture.**[21]**

Universal implementation of a personalized care model nationally is a key element for safer care. Making care more personalized is built around a number of tools and processes to support and empower women to make decisions about their care, including continuity of care and support planning.**[9]**

Effective multi-professional team working is fundamental to the delivery of high-quality, continually improving, and safe maternity care. Teams should agree on clear, challenging, shared objectives with data on performance in relation to these objectives; roles must be clear within the team; and they must take time out on a regular basis to review their performance and how it can be improved. Moreover, multi-professional groups should train together within their organizations to build trust, respect, and collaboration.**[43]**

Cultural change is at the heart of this quest. For this cultural change to be successful, senior leadership involvement is critical. Changes need to be embedded in the clinical work, and perceived as providing benefits not more work to do. Projects need to be clearly focused, so people doing the work can see the benefit of their efforts. This is not a linear process, so flexibility and the ability to adapt to operational pressures and local cultures are important.**[40]**

As a maternity community, we should reflect on what has gone before, build on what has worked, and implement these key measures and recommendations to change practice and make maternity care safe. We can catalyze faster improvement using the new opportunities afforded by big data, new innovations, digital technologies, broader academic collaborations, and the skills and expertise of our clinical workforce, with families at the center.

Key Learning Points

- This study provides important insight into clear areas for essential improvement in maternity care and safety culture. These key measures are based on themes emerging from learning nationally on safety and its universal implementation underpins improved care.
- Implementation of a personalized care model on the national level is a vital element for safer care. It is crucial to create a culture that listens to women, values learning, and builds a multi-professional team working through a common vision for safety.
- There is a need for the development of a robust safety and quality improvement plan in maternity services that has clearly defined measurable outcomes, demonstrates impact for women, families, and the maternity MDT workforce, and moves through improvement, to sustainable change and to business as usual.
- Support and advice on monitoring and establishing accountability on the overall progress of the plan is vital to ensure completion within an agreed timescale.
- Positive safety culture within maternity organizations through inclusive leadership and role modeling adaptive leadership is crucial for the implementation of improvement plans and their success.
- Using a robust methodology, research is required to elucidate barriers to the implementation of essential interventions and initiatives for driving improvements in maternity safety. We need to understand better what practical approaches are required to overcome such barriers and how to bridge the gap between the intervention and improvement logic.

Author Contributions

MIS: Contributed to conception and study design, planning, acquisition of data, drafting the article, revising the article, final approval of the version to be published, and agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated or resolved.

Acknowledgments

The Author expresses his sincere thanks to the Royal College Obstetricians and Gynaecologists, London for the permission given to use previously published data in Each Baby Counts.2020 Final Progress Report (London: RCOG, March 2021).

Funding Information

This study received no specific grant from any funding agency in the public, commercial, or private sectors.

Conflict of Interest Statement

The Authors declare that there is no conflict of interest.

Ethics Approval

Not required due to study design.

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