Skin-to-Skin Cesarean Section. What's new?

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Recoverycongres, Out of the Box, Ede 12 Maart 2016
Challenges in Providing Optimal Care and Optimizing Patient Outcome
Agenda

- Historical perspectives
- Humanization of cesarean section and ERAS principles
- Why did we start?
- Implementation of skin-to skin cesarean section
- Does it improve outcome?
- Conclusions
Historical perspectives

Skin-to-Skin Cesarean Section, What's new?
Historical perspectives
Historical perspectives

- Julius Caesar geboren uit een sectio?
- Mooi verhaal maar onjuist
  - Zijn moeder is niet bij de geboorte overleden
  - Sectio’s alleen bij overleden vrouwen toegepast om kind te redden

- De oorsprong, twee theorieën:
  - *De naam komt van caedere, snijden* in het Latijn.
  - Uit de wet: "Lex Caesarea" of "Lex Regia": het verbod om een zwangere vrouw te begraven zonder het kindje uit haar lichaam te hebben gehaald. Iets dat teruggaat tot in het oude Egypte.
Historical perspectives

- 1581 eerste melding van een sectio in Parijs door Rousset
- 1733 Sorbonne: is de moeder overleden, dan direct een sectio om het kind te behouden voor de doop
- 1879 sectio met narcose en antisepsis (bananenlikeur)
- 1848 werden in Nederland 3 sectio’s gedaan
- Na 1900 betere anesthesie technieken

Kulsdom ME. NTvG 1962; 106: 1194: 1201
Humanization of cesarean section and ERAS principles

Skin-to-Skin Cesarean Section, What's new?
Humanization of cesarean section/ ERAS principles

- Vaginale bevalling: normaal en huiselijke sfeer
- Een sectio caesarea is een normale operatie
- De benadering was dus ook als een operatie
  - Zakelijk
  - Onpersoonlijk
  - Waar is de vader?
  - Waar is het kind gebleven? Oh die is bij de kinderarts
  - Weinig aandacht voor moeder kind relatie
Humanization of cesarean section/ ERAS principles

- Caesarean section is the most common surgical procedure
- Home in the hospital approach = new
- The women is a mother rather than a patient
- Improve neonatal and maternal outcome
- We need to innovate to reach that goal
Quality improvement is the combined and unceasing effort of everyone (healthcare professionals, patients and their families, payers, researchers) to make the changes that lead to improved patient outcomes, improved system performance and improved professional development.

Safety can be defined as avoidance of complications.

Risk management is the process that ensures better patient safety.
Innovation means different things to different people.
There is no single definition for innovation.
Innovation should provide a solution to a given problem.
Innovations are not just new medicines:
- New ideas (e.g. technologies/drugs/processes)
- Meet the anesthesiologist/surgeons needs (more effectively than alternatives)
- Proven to deliver value (create a better outcome for the patient and hospital)
- Improving outcomes/efficiency for the surgical team, patient, and/or the hospital.

Innovation is a dynamic process:
- Creating
- Adopting
- Adapting knowledge
New innovations are vital to improve anesthesia and surgical care including patient outcomes and processes

Innovation is critical to the future of anesthesiology/surgery as a specialty

Failure to recognize and apply new discoveries to patient care represent:
- Loss of opportunities
- Loss of trust in healthcare processes
- Involuntary reduction of anesthesia and surgical resources

Investment in innovation adds value to society and benefits patients:
- Every dollar spent on newer drugs in the US saves $7 in other costs
- Improves efficiency and patient safety
  - Changes in procedures (the use of surgical checklists or dedicated surgical suites/fast-track for particular operations)
  - Use of multimodal approach in enhanced recovery

Innovations are not limited to new drugs or devices.

Some of the most important healthcare innovations are in the way that delivery of care is organized.

**ORGANIZATION**
- Cost Containment
- Staff Shortage
- Improved Profit & Productivity

**PATIENT**
- Safety
- Satisfaction

**PHYSICIAN**
- Acceptance
- Improved Outcome
- Improved Utility

**INFORMATION TECHNOLOGY**
- Prevention
- Diagnosis
- Treatment
- Education
- Research

Some of the most important healthcare innovations are in the way that delivery of care is organized.
Who Are The Stakeholders We Need To Reach?

- Anesthesiologists must be convinced to be involved in the peri-operative phase:
  - We should be able to collect professional funds for peri-operative implication
- Surgeons:
  - The involvement of anesthesiologists could provide them extra time in the OR and improve outcome
- Patients
- Professional associations:
  - Need to review the entire peri-operative process as one integrated stay
- Hospital decision makers:
  - We need to demonstrate that such involvements will decrease the rate of cancellation and shorten the duration of stay (improve efficiency and reduce costs)
The patient’s journey: ERAS aims to help lead the way to use of evidence based medicine

Integrated ERAS protocol

PRE-ADMISSION

CLINIC OP

PRE-

SURGERY / ANESTHESIA

POST OP

WARD

RECOVERY

HOME

FOLLOW UP

30 DAY

Interactive Team audit of outcomes & compliance

Ljungqvist JPEN 2014
Pre-Intraop key elements to postop recovery

ERAS team approach

Only through collaboration of Anesthesiologists and Surgeons and a multidisciplinary team approach, will we become stronger advocates for better patient outcomes and experience.
ERAS team approach

Only through collaboration of Anesthesiologists and Surgeons and a multidisciplinary team approach, will we become stronger advocates for better patient outcomes and experience.

Why not the same approach for cesarean section?
Why did we start

Skin-to-Skin Cesarean Section, What's new?
Why did we start?

The natural caesarean: a woman-centred technique

J Smith, a F Plaat, b NM Fisk a,c

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Correspondence: Prof NM Fisk, University of Queensland, Centre for Clinical Research, Brisbane, Queensland 4029, Australia.

Email n.fisk@uq.edu.au

Caesarean section rates are rising worldwide, and indeed, now exceed one-third of deliveries in many developed world centres such as our own. Given the negative effect that caesareans, whether indicated or discretionary, have on maternal satisfaction, bonding and breastfeeding, improving this experience while maintaining safety should be a priority. We describe an evolving approach, suitable for global export. Studies are now indicated on the effects of naturalising this most unnatural form of birth.
Implementation of skin-to-skin cesarean section

Skin-to-Skin Cesarean Section, What's new?
Who Are The Stakeholders We Need To Reach?

- Gynecologists, Anesthesiologists and pediatricians must be convinced to be involved in the peri-operative phase:
  - Protocol driven process
  - Consensus about the approach and Dedicated teams
- Midwives:
  - Professional commitment
- Parental participation
  - Increased satisfaction
- Professional associations:
  - Guidelines should be followed
  - Review of the entire peri-operative process as one integrated stay
- Hospital decision makers:
  - Commitment and sponsoring
  - We need to demonstrate that such involvements will decrease complication rates, shorten the duration of stay (improve efficiency and reduce costs)
The Protocol

Table 4. Recommendations for implementation of immediate skin-to-skin contact in the operating theatre

Pre-implementation:
- Write a protocol with the collaborative effort of staff, including midwives, managers, doctors, anaesthetists, paediatricians and other operating theatre/recovery staff
- Education of staff

Antenatal period:
- Education for mothers and their support people

Prior to commencement of the Caesarean section:
- Discuss with operating theatre staff and the mother the potential of having SSC
- Confirm with the mother whether she wants SSC and where (in the operating theatre, in recovery, on the ward)
- Have one nurse/midwife for the mother, and one midwife/nurse for the newborn
- Assess the operating theatre and determine if equipment needs to be moved to provide room for SSC
- Has the mother’s gown been undone, arms removed from the sleeves?
- Be aware of the placement of equipment: IV lines, oxygen saturation probe

After the newborn is delivered:
- Does the newborn appear to be responding appropriately? If so, commence SSC
- The newborn is placed in a transverse position on the mothers bare chest
- The newborn is dried
- Warm blankets cover the newborn
- Apgar observations made
- Teach the father how to help support the newborn
- Continually observe the newborn to determine if the newborns airway is patent – Are the newborns nares visible? Is the newborn centrally pink? Is the newborns respiratory rate stable?

In recovery:
- Remember if injections are to be given to the newborn, ensure these are given while having SSC

Adapted from Hung & Berg (2011) and Crenshaw et al. (2012).
Need for an Optimal NMB Surgical Procedure

- Patient immobility – Neurosurgery, cardiac surgery, microsurgery (ENT), eye surgery
- Decrease in the tone of the abdominal muscles – Laparoscopy → GI surgery, gynaecology
- Prevention of high IA pressure → NMBAs limit increase in insufflation pressure
- May promote optimal surgical conditions
- Prevention of complications – Coughing, increase in IA and IT pressure, open eye surgery

Neuromuscular Blockade and Pneumoperitoneum

The impact of pneumoperitoneum
Post-op Shoulder Pain

“Reducing pneumoperitoneum pressure to 9 mmHg results in a significant reduction in both the intensity... and frequency with which it [pain] is reported.”

Sarli L, BJS 2000, 87, 1161-1165
Venous stasis and deep vein thrombosis prophylaxis during laparoscopic fundoplication

The femoral vein stasis in laparoscopic fundoplications can be minimized by reducing the intra-abdominal pressure during operation, and avoiding reverse Trendelenburg.
Laparoscopic procedures as a risk factor of deep venous thrombosis, superficial ascending thrombophlebitis and pulmonary embolism

Laparoscopic procedures may have an increased risk of thrombosis due to increased abdominal pressure and negative Trendelenburg. Family practitioners may be confronted with this complication more often since patients are discharged earlier from hospital.

The Physiologic Effects of Pneumoperitoneum in the Morbidly Obese

Physiologically, morbidly obese patients have a higher intra-abdominal pressure at 2 to 3 times that of non-obese patients. The increased intra-abdominal pressure enhances venous stasis, reduces intraoperative portal venous blood flow, decreases intraoperative urinary output, lowers respiratory compliance and increases airway pressure, and impairs cardiac function.

Effect of pneumoperitoneum on renal perfusion and function: a systematic review

The magnitude of the decrease in Renal Blood Flow and Renal Function is dependent on:
- Level of pneumoperitoneum
- Duration of pneumoperitoneum
- Preoperative renal function
- Level of hydration
- Patient positioning

Impact on Bowel Ischemia

Meta-analysis showed a correlation of increased IAP with:

- Pneumoperitoneum decreases splanchnic perfusion with resulting oxidative stress.
- The clinical significance of pneumoperitoneum-associated oxidative stress requires further exploration.

Increased Decreased
- Oxidative stress
- Ischemic bowel pressure

Splanchnic blood flow causing:
- Biochemical evidence of oxidative stress
- Histologic evidence of tissue injury

IAP = intra-arterial pressure.
Does it improve outcome?

Skin-to-Skin Cesarean Section, What's new?
Does it improve outcome?

SPECIAL COMMUNICATION

Promotion of Family-Centered Birth With Gentle Cesarean Delivery

Susanna R. Magee, MD, MPH, Cynthia Battle, PhD, John Morton, MD, and Melissa Nothnagle, MD, MSc

US cesarean deliveries. Based on our 5 years of practical experience, we believe gentle cesarean birth is a promising technique that may promote early mother–child bonding and successful breastfeeding, along with its associated improved health outcomes. Because this was not an empirical study, future research should evaluate the extent to which gentle cesarean programs supports these important family health outcomes. Given their expertise in

J Am Board Fam Med 2014; 27: 690-693
Does it improve outcome?

Review Article

Immediate or early skin-to-skin contact after a Caesarean section: a review of the literature

Jeni Stevens, Virginia Schmied, Elaine Burns and Hannah Dahlen
School of Nursing and Midwifery, University of Western Sydney, Penrith, New South Wales, Australia

There is some evidence, albeit minimal, demonstrating an increase in maternal and newborn emotional wellbeing, increase in parent/newborn communication, reduction in maternal pain/anxiety, stabilised physiological stability for the mother and newborn and improved breastfeeding outcomes with immediate or early SSC following a Caesarean section. This review highlights the urgent need for further research on facilitators, barriers, outcomes and experiences of immediate SSC during a Caesarean section, so that more evidence can be gathered on how to effectively and safely provide SSC in the operating theatre and to discover the short-term and long-term outcomes of providing it. If maternity services are not able
The results of our study

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Skin-to-skin (n=311, 44%)</th>
<th>Conventional caesarean section (n=403, 56%)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Obstetric history and baseline</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primiparity (n, %)</td>
<td>171 (55%)</td>
<td>218 (54%)</td>
<td>0.813 a</td>
</tr>
<tr>
<td>History of previous CS (n,%))</td>
<td>102 (32%)</td>
<td>119 (30%)</td>
<td>0.349 a</td>
</tr>
<tr>
<td>Dutch ethnicity (n, %)</td>
<td>272 (88%)</td>
<td>353 (88%)</td>
<td>0.957 a</td>
</tr>
<tr>
<td><strong>Current pregnancy</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maternal smoking — (n, %)</td>
<td>33 (11%)</td>
<td>31 (8.4%)</td>
<td>0.251 a</td>
</tr>
<tr>
<td>Singleton gestation (n, %)</td>
<td>298 (96%)</td>
<td>395 (98%)</td>
<td>0.085 a</td>
</tr>
<tr>
<td><strong>Conditions at Caesarean Section</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weeks of pregnancy at CS (w, ±SD)</td>
<td>39.4 (±1.2)</td>
<td>39.5 (±1.3)</td>
<td>0.545 g</td>
</tr>
<tr>
<td>Maternal age at CS (y, ±SD)</td>
<td>32.0 (±4.8)</td>
<td>32.2 (±5.1)</td>
<td>0.692 b</td>
</tr>
<tr>
<td>BMI at CS (kg/m², ±SD)</td>
<td>28.7 (±5.8)</td>
<td>28.7 (±5.9)</td>
<td>0.989 g</td>
</tr>
<tr>
<td>Elective CS (n, %)</td>
<td>131 (42%)</td>
<td>161 (40%)</td>
<td>0.626 a</td>
</tr>
<tr>
<td>ROM or in labour before date elective CS (n, %)</td>
<td>31 (10%)</td>
<td>35 (8.7%)</td>
<td></td>
</tr>
<tr>
<td>Emergency CS (n, %)</td>
<td>149 (48%)</td>
<td>207 (51%)</td>
<td></td>
</tr>
</tbody>
</table>

Percentages, standard deviation, p-value given according to available data. Characteristics with more than 5% missing data: Maternal Smoking (6.2% missing data); BMI at CS (13.4% missing data).

95% CI - 95% confidence interval; W – weeks; Y – years; SD – standard deviation; ROM - Rupture of membranes; CS – Caesarean Section. aχ²-test; b Independent T-Test, two-sided.
### The results of our study

#### Table 2 | Maternal outcome

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Skin-to-skin caesarean section</th>
<th>Conventional caesarean section</th>
<th>Relative risk (95%CI)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infection</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surgical site infection (n,%)</td>
<td>6* (1.9%)</td>
<td>6 (1.5%)</td>
<td>1.3 (0.42 - 3.9)</td>
<td>0.650</td>
</tr>
<tr>
<td>Non-surgical site infection (n,%)</td>
<td>6 (1.9%)</td>
<td>15 (3.7%)</td>
<td>0.52 (0.20 - 1.3)</td>
<td>0.160</td>
</tr>
<tr>
<td>Infection with positive blood culture (n,%)</td>
<td>2 (0.64%)</td>
<td>0 (0.0%)</td>
<td>N/A</td>
<td>0.107</td>
</tr>
<tr>
<td>Total of infections (n,%)</td>
<td>13 (4.2%)</td>
<td>21 (5.2%)</td>
<td>0.80 (0.41 - 1.6)</td>
<td>0.521</td>
</tr>
<tr>
<td>Blood loss</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Haemoglobin post-operative ≥ 1.2mmol/l diminished (n,%)</td>
<td>107 (37%)</td>
<td>119 (32%)</td>
<td>1.1 (0.92 - 1.4)</td>
<td>0.244</td>
</tr>
<tr>
<td>Transfusion (n,%)</td>
<td>4 (1.3%)</td>
<td>11 (2.7%)</td>
<td>0.47 (0.15 - 1.5)</td>
<td>0.182</td>
</tr>
<tr>
<td>Maternal death (n,%)</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Percentages, standard deviation, relative risks, p-value given according to available data. Characteristics with more than 5% missing data: Haemoglobin post-operative (7.8% missing data). 95%CI – 95% Confidence interval; SD – Standard deviation; N/A – Not applicable; NICU – Neonatal Intensive Care Unit; * One surgical site infection resulted in a septicaemia and was counted double.
# The results of our study

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Skin-to-skin caesarean section (n=322)</th>
<th>Conventional caesarean section (n=410)</th>
<th>Relative risk/mean difference (95% CI)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Neonatal outcome</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Birth weight (gram, ±SD)</td>
<td>3261 (±511)</td>
<td>3330 (±475)</td>
<td>69.7 (-2.14 - 141)</td>
<td>0.057</td>
</tr>
<tr>
<td>Apgar score &lt;7 at 5 min (n,%)</td>
<td>7 (2.2%)</td>
<td>6 (1.5%)</td>
<td>1.5 (0.50 to 4.4)</td>
<td>0.470</td>
</tr>
<tr>
<td>Umbilical artery pH &lt;7.0 (n,%)</td>
<td>2 (0.7%)</td>
<td>0 (0.0%)</td>
<td>N/A</td>
<td>0.100</td>
</tr>
<tr>
<td><strong>Neonatal morbidity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hyperbilirubinaemia (n,%)</td>
<td>4 (1.2%)</td>
<td>8 (2.0%)</td>
<td>0.64 (0.19 to 2.1)</td>
<td>0.453</td>
</tr>
<tr>
<td>Hypoglycaemia (n,%)</td>
<td>6 (1.9%)</td>
<td>11 (2.7%)</td>
<td>0.69 (0.26 to 1.9)</td>
<td>0.465</td>
</tr>
<tr>
<td>Hypothermia (n,%)</td>
<td>2 (0.6%)</td>
<td>6 (1.5%)</td>
<td>0.42 (0.09 to 2.1)</td>
<td>0.278</td>
</tr>
<tr>
<td>Suspected infection (n,%)</td>
<td>8 (2.5%)</td>
<td>35 (8.5%)</td>
<td>0.29 (0.14 to 0.61)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Neonatal sepsis</td>
<td>1 (0.3%)</td>
<td>0 (0.0%)</td>
<td>N/A</td>
<td>0.259</td>
</tr>
<tr>
<td>Neonatal death (n,%)</td>
<td>1 (0.3%)</td>
<td>0 (0.0%)</td>
<td>N/A</td>
<td>0.259</td>
</tr>
<tr>
<td><strong>Neonatal admission</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maternity ward</td>
<td>288 (89%)</td>
<td>330 (81%)</td>
<td>1.11 (1.05 to 1.18)</td>
<td>0.001</td>
</tr>
<tr>
<td>Neonatal ward</td>
<td>32 (9.9%)</td>
<td>76 (19%)</td>
<td>0.54 (0.36 to 0.79)</td>
<td>0.001</td>
</tr>
<tr>
<td>Transfer to NICU (n,%)</td>
<td>2 (0.6%)</td>
<td>4 (1.0%)</td>
<td>0.64 (0.12 to 3.5)</td>
<td>0.598</td>
</tr>
</tbody>
</table>

Percentages, standard deviation, relative risks, p-value given according to available data. Characteristics with more than 5% missing data: Apgar score <7 at 5 min (8.1% missing data).

95%CI – 95% Confidence interval; SD – Standard deviation; N/A – Not applicable; NICU – Neonatal Intensive Care Unit
The results of our study

Table 4 | Procedural outcome and maternal admission

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Skin-to-skin caesarean section</th>
<th>Conventional caesarean section</th>
<th>Relative risk/mean difference (95%CI)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anaesthesia</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spinal (n, %)</td>
<td>226 (73%)</td>
<td>305 (76%)</td>
<td>0.96 (0.88 to 1.05)</td>
<td>0.360</td>
</tr>
<tr>
<td>Spinal and epidural (n, %)</td>
<td>85 (27%)</td>
<td>98 (24%)</td>
<td>1.12 (0.88 to 1.44)</td>
<td>0.360</td>
</tr>
<tr>
<td>Duration</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surgery time (mm:ss, ±SD)</td>
<td>39 (±12)</td>
<td>35 (±10)</td>
<td>3.06 (1.30 to 4.42)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Total operating time (mm:ss, ±SD)</td>
<td>57 (±13)</td>
<td>53 (±12)</td>
<td>4.42 (2.54 to 6.36)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Recovery time (mm:ss, ±SD)</td>
<td>114 (±64)</td>
<td>128 (±77)</td>
<td>-13.42 (-24 to -3.06)</td>
<td>0.012</td>
</tr>
<tr>
<td>Total operating and recovery time (mm:ss, ±SD)</td>
<td>172 (±64)</td>
<td>181 (±77)</td>
<td>8.57 (-20 to 1.42)</td>
<td>0.098</td>
</tr>
<tr>
<td>Maternal admission</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length of admission after CS (days, ±SD)</td>
<td>4.0 (±0.8)</td>
<td>4.4 (±1.23)</td>
<td>-0.37 (-0.53 to -0.22)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Maternal admission &gt; 4 days (n, %)</td>
<td>55 (18 %)</td>
<td>121 (30%)</td>
<td>0.59 (0.44 to 0.78)</td>
<td>&lt; 0.001</td>
</tr>
</tbody>
</table>

Percentages, standard deviation, relative risks, p-value given according to available data. No characteristic had more than 5% missing data.

95%CI – 95% Confidence interval; SD – Standard deviation.
Confirmation by another study

The Charité cesarean birth: a family orientated approach of cesarean section

Robert Armbrust, Larry Hinkson, Katharina von Weizsäcker & Wolfgang Henrich

Conclusions: The CCB leads to a significantly better birth experience. The procedure seems to be safe for both mother and infant. Patients become an active part of the CS by direct visualization of the birth and cutting the umbilical cord. The presented modification is a useful and safe option when a CS is medically indicated and necessary. It improves the breast-feeding and the early mother-infant interaction.
Skin-to-Skin Cesarean Section
Conclusions

Skin-to-Skin Cesarean Section, What's new?
Conclusions

Key messages

- Skin-to-skin contact can be facilitated in the operating theatre during Caesarean surgery.
- Barriers to providing skin-to-skin contact in the operating theatre can be overcome.
- Skin-to-skin contact in the operating theatre has the potential to improve breastfeeding outcomes and maternal satisfaction.
- Skin-to-skin contact may reduce maternal pain, improve parent/newborn contact and communication, and keep the mother and newborn physiologically stable.
- Further research is needed to explore the provision of skin-to-skin contact in the operating theatre during Caesarean surgery, and the short- and long-term outcomes.
Thank you