Simulation Training in Obstetric Emergencies

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Consultant Anaesthetist, Rotunda and Mater Misericordiae University Hospitals
CMACH/CMACE/???

• Longest running and most successful medical audit in history
• Likely improvement in mortality from the report itself...
• Analysis of mortalities
• Approximately 2/3 “substandard care”
• Suggested improvements?
Long-running recommendations to conduct skills and drills obstetric emergency training for all units...

Chapter 16: Critical Care Saving Mothers’ Lives:

Critical care: specific recommendations

- Early protocol-driven care should be adopted in the management of severe sepsis.
- The management of severe obstetric haemorrhage is complex and requires multidisciplinary input. Guidelines for the rate and composition of fluid administration should be reviewed.
- Simulation training should be explored further as a method of improving performance in the management of life-threatening emergencies.

“Simulation and training should be patient-facing not good enough for those working in the management of life-threatening emergencies”
Outline

1. What’s available in obs emergency training?
2. Experience in Ireland
3. Evidence that any of this works?
4. Where to from here?
Obstetric emergency training

• Common scenarios:
  – Maternal haemorrhage
  – Failed intubation/ anaes!
  – Eclampsia/ severe pre-eclampsia
  – Maternal cardiac arrest
  – Cord prolapse
  – Shoulder dystocia

• Delivery/Setting:
  – High/low/medium fidelity simulation
  – Multidisciplinary/multiprofessional
  – Sim-centre/lab-based or *in situ* (hospital/ labour ward)
Modified from: *A systematic review of training in acute obstetric emergencies.* Black RS, Brocklehurst P. BJOG 2003;837-41

<table>
<thead>
<tr>
<th>Date/country</th>
<th>1999 UK</th>
<th>1996 USA</th>
<th>2000 Canada</th>
<th>2003 UK</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Course</strong></td>
<td>MOET</td>
<td>ALSO</td>
<td>ALARM</td>
<td>PROMPT</td>
</tr>
<tr>
<td><strong>Personnel</strong></td>
<td>OB/Anaes</td>
<td>OB/ midwifery</td>
<td>OB/ midwifery/family physicians</td>
<td>OB/ midwifery/Anaes +++</td>
</tr>
<tr>
<td><strong>Individual/team</strong></td>
<td>Individual</td>
<td>Individual</td>
<td>Individual</td>
<td>Team</td>
</tr>
<tr>
<td><strong>Distant/in situ</strong></td>
<td>Distant</td>
<td>Distant</td>
<td>Distant</td>
<td>In situ*</td>
</tr>
<tr>
<td><strong>Local/national</strong></td>
<td>National</td>
<td>National</td>
<td>National</td>
<td>Local</td>
</tr>
<tr>
<td><strong>Duration</strong></td>
<td>3 days</td>
<td>2 days</td>
<td>2 days</td>
<td>1 day</td>
</tr>
<tr>
<td><strong>Models</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>Lectures/ actor moulage/ models</td>
<td>Lectures/ models</td>
<td>Case-based/ workshops</td>
<td>Lectures/ actor moulage &amp; model team drills</td>
</tr>
<tr>
<td><strong>Assessment</strong></td>
<td>MCQ, scenario with individual feedback</td>
<td>MCQ, scenario with individual feedback</td>
<td>Written exam, skills stations</td>
<td>Individual and team feedback*</td>
</tr>
</tbody>
</table>
Rotunda Hospital Obstetric Emergencies Training (RHOET) Programme Evaluation

Maria Garstka, Niamh Hayes, Mary Whelan

• 2008 – current...
• 24 courses, 236 participants
• Examine impact on adverse events in our hospital since introduction?

• Significant decrease in major transfusion since introduction*

(*unpublished data)
• Pre- and post-course assessment:

<table>
<thead>
<tr>
<th>Knowledge/understanding</th>
<th>high level</th>
<th>medium level</th>
<th>low level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before the training</td>
<td>8%</td>
<td>82%</td>
<td>10%</td>
</tr>
<tr>
<td>After the training</td>
<td>91%</td>
<td>9%</td>
<td>0</td>
</tr>
</tbody>
</table>

Self-reported knowledge of emergencies improved and participant satisfaction is high
COAST:

Crisis Obstetric Anaesthesia Simulation Training

- Designed in accordance with the current competence-based training curriculum
- Aims to complement clinical obstetric anaesthesia training
- **Mandatory** for anaesthetists in training in Ireland
- Nine to twelve participants per course
- Participants provided with relevant pre-course reading material

Typical obstetric anaesthesia emergency situations:
- postpartum haemorrhage
- dural puncture during an attempted epidural
- high spinal anaesthesia with cardiovascular collapse
- failed spinal with conversion to general anaesthesia
- eclampsia
- failed obstetric intubation
Relatively inexperienced anaesthesia trainees

Many have experience of simulation/ scenario-based training previously
## Post Course Evaluation Statements

<table>
<thead>
<tr>
<th>Statement</th>
<th>Median</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1: The course met the stated educational objectives</td>
<td>5</td>
<td>[4,5]</td>
</tr>
<tr>
<td>S2: The course matched my own learning needs</td>
<td>5</td>
<td>[3,5]</td>
</tr>
<tr>
<td>S3: I found the course relevant to my stage of training</td>
<td>5</td>
<td>[2,5]</td>
</tr>
<tr>
<td>S4: I found the course relevant to my current clinical practice</td>
<td>5</td>
<td>[2,5]</td>
</tr>
<tr>
<td>S5: The methods of delivery were adequate to the course stated objectives</td>
<td>5</td>
<td>[3,5]</td>
</tr>
<tr>
<td>S6: The pace of the course was adequate</td>
<td>5</td>
<td>[2,5]</td>
</tr>
<tr>
<td>S7: I am overall satisfied with the course</td>
<td>5</td>
<td>[4,5]</td>
</tr>
<tr>
<td>S8: The course will change my future practice</td>
<td>5</td>
<td>[2,5]</td>
</tr>
</tbody>
</table>
Collaborative multiprofessional obstetric emergency training in Ireland

- Higher specialist trainees in obstetrics and gynaecology and anaesthesia
- Combined IOG and CAI faculty
- Supported by midwifery staff (Rotunda & NMH)
- Challenges devising clear multidisciplinary learning objectives for both technical and non-technical skills
Evidence!
Significant increase in knowledge after training (MCQ test)

>90% improved scores

Location of training no difference

Addition of team training no difference

Crofts JF et al. BJOG 2007;114:1534-41
Hospital, simulation center and teamwork training for eclampsia management

- Training led to higher rates of completion of basic tasks
- Tasks are completed faster
- No additional benefit from simulation centre
- Nor from teamwork theory

Ellis D et al. Obstet Gynecol 2008;111:723-31
*Does training in obstetric emergencies improve neonatal outcome?*

- Significant reduction in low 5-minute APGARs
- Significant reduction in neonatal HIE
- Sustained over time...
- Potential confounders? (Guidelines? Corporate commitment to risk reduction)

![Table showing data on 5-minute Apgar and HIE rates from 1996 to 2003.](https://example.com/table_image.png)

Draycott T et al. BJOG 2006;113:177-82
Didactic and simulation non-technical skills team training to improve perinatal patient outcomes in a community hospital

- Significant and persistent improvement in perinatal morbidity following the introduction of the training programme

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Pre-intervention Mean (SD)</th>
<th>Postintervention Mean (SD)</th>
<th>% Change (Pre to Post)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Intervention</td>
<td>1.15 (0.47)</td>
<td>0.72 (0.12)</td>
<td>−37.4%†</td>
</tr>
<tr>
<td>Didactic-Only</td>
<td>1.46 (1.05)</td>
<td>1.45 (0.82)</td>
<td>−1.0%</td>
</tr>
<tr>
<td>Control</td>
<td>1.05 (0.79)</td>
<td>1.50 (0.35)</td>
<td>+42.7%</td>
</tr>
</tbody>
</table>

* WAOS, Weighted Adverse Outcomes Score; SD, standard deviation.
† Significant at the .05 level.

(Small hospitals, small numbers, variable morbidity rates pre-training)

Retrospective cohort study of diagnosis – delivery interval with umbilical cord prolapse: the effect of team training

- Reduction in DDI from 25 to 15 minutes
- Increase in appropriate actions performed for UC prolapse deliveries
- NS increase in SAB (100%)
- NS reduction in low APGARs
- NS reduction in NICU admits

Siassakos D et al. BJOG 2009;116:1089-96
Cardiac arrest in pregnancy: increasing use of perimortem caesarean section due to emergency skills training

- Significantly increased rate of PMCS’s after MOET introduction (2004)

- Outcome is still poor:
  - No PMCS within 5-minute window
  - >2/3 maternal ROSC
  - Maternal case fatality = 83%
  - Neonatal case fatality = 58%

Djikman A et al. BJOG 2010;117:282-87
The active components of effective training in obstetric emergencies

D Siassakos, a JF Crofts, b C Winter, c CP Weiner, d TJ Draycott e

Table 1. Emerging reports of improved outcomes with obstetric team training

<table>
<thead>
<tr>
<th>Hospital unit</th>
<th>Unique features of training programme</th>
<th>Reported outcomes</th>
</tr>
</thead>
</table>
| Southmead Hospital, Bristol, UK 9, 11, 12 | Infrastructural changes (protocols, props to help adherence to guidelines, practical solutions)  
Regular in-house clinical drills for all staff | 51% reduction in 5-minute Apgar <7  
50% reduction in Hypoxic Ischaemic Encephalopathy  
75% reduction in Erb’s palsy after shoulder dystocia  
40% reduction in median decision-delivery interval for cord prolapse |
| BIDMC, Boston, USA 6                | Teamwork course for all staff  
Debriefings, improved handover  
Protocol development  
Selected clinical drills | 23% reduction in adverse obstetric events  
62% reduction in malpractice claims  
Labour staff has more positive attitudes to safety than the rest of the hospital |
| Liverpool Women’s Hospital, UK 7    | Integrated risk management  
Patient involvement  
Regular team briefings  
Regular fire-drills  
Infrastructural improvements | 11% reduction in adverse events with identified suboptimal care  
50% reduction in 5-minute Apgar <4  
50% reduction in cord pH <7  
86% reduction in incidence of Erb’s palsy  
50% reduction in 5-minute Apgar <7 |
| New Cross Hospital, Wolverhampton, UK 10 | ‘In-house’ drills for all staff following the Southmead model |                                                                   |
| Copenhagen Denmark (Soerensen JL, MSc Thesis) | Clinical drills  
Streamlined protocols  
Eclampsia and haemorrhage boxes | 45% reduction in midwifery sick leave |
Moving forward?

- Impact of SBME depends on more than the “spec”
- Faculty teaching expertise, motivation to succeed, institutional support contribute to success or failure...

Morgan PJ et al:
Evaluating teamwork in a simulated obstetric environment
Determination of psychometric properties of a behavioural marking system for obstetrical team training using high-fidelity simulation

- Development of useful performance assessment tools
- Translational component: relate them to clinical practice and patient outcome?
Context?