Case Study

Multiprofessional Simulations in Teams for Better Management of Obstetric Emergencies

Southmead Maternity Unit, North Bristol NHS Trust, UK.

Bristol, UK

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This case study describes how simulation training has been successfully integrated with local staff training and the improvements in outcomes that have been associated with the training programme. The document was developed in collaboration with, and approved by Southmead Maternity Unit, North Bristol Trust, UK.
The diagram shows the number of participants per discipline that train every year.

**Figure 1:** The columns show number of participants per discipline that train every year.
The introduction of multi-professional obstetric emergencies training at Southmead Maternity Unit, Bristol, UK has been associated with improvements in neonatal outcomes. The pertinent question is: What are they doing right? This case study aims to elucidate the background for their encouraging results by providing insights into why and how simulation training was integrated with their local staff training program and how the training is organized.

WHY SIMULATION WAS IMPLEMENTED

Substandard clinical care: The Confidential Enquiries into Maternal Deaths (CEMD) and The Confidential Enquiries into Stillbirths and Deaths in Infancy (CESDI) have repeatedly identified substandard clinical care as a major contributor to maternal deaths and fetal and neonatal mortalities.

New training requirements: The Confidential Enquiries contributed to a growing focus on patient safety in the United Kingdom, and in 2000 the government issued new, national training requirements for the National Health Service (NHS). Maternity hospitals managing to adhere to the new training standards would, as a result, have their insurance premiums reduced, which incentivized many maternity departments in the UK to start obstetric emergencies training.

More simulation training: The Maternity Delivery Unit at Southmead Hospital decided to integrate simulations more fully within their local staff training program as the new national training requirements came into effect.

HOW THE PROCESS EVOLVED

Southmead Maternity Unit is part of the North Bristol NHS Trust. Currently over 6,000 babies are born each year in the maternity unit. Southmead Maternity Unit started multi-professional practical obstetric emergencies training in the year 2000.

Better training equipment: Back in 2000, there were very few training mannequins that could be used for obstetric emergencies training. The Southmead team collaborated hence with a Bristol based manufacturer of skills training products (Limbs and Things), to develop an appropriate training mannequin for shoulder dystocia. The project took over eight years to complete, and as the mannequin evolved, it was found to be excellent for training in the management of normal, vaginal breech and instrumental deliveries too. Finally in 2007, with much involvement from the Southmead team during the ongoing product development phase, the PROMPT Birthing Simulator was a commercial reality and has since been fully integrated with the training curriculum at the maternity unit.

Midwife from Southmead Hospital practicing cephalic delivery and essential communication skills at the same time. A colleague plays the role of the mother.

ORGANIZATIONAL MODEL

The training days at Southmead, called Intrapartum Update Days, are facilitated every 4-6 weeks and are developed 'in house' by a multi-professional team of midwives, obstetricians, anaesthetists. They are organized and coordinated by the practice development midwives.

Lectures, workshops, practical simulations: Each training day starts with theoretical sessions in the morning, where doctors and midwives from the unit give lectures and facilitate workshops on selected topics relevant to pregnancy and maternity care. Some of the lecturers also act as instructors and facilitators during the practical drill training that follows in the afternoon. The curriculum for the training days is reviewed and revised every 12 months.

Flat structure: Involving staff from all disciplines in the training helps develop a strong sense of ownership on all levels, and also a common desire to continue to improve care. The facilitators have found that keeping an informal atmosphere promotes the learning process, as participants feel less anxious about making mistakes and more comfortable asking questions.

Local trainers: All trainers have a medical background as obstetricians, anaesthetists or midwives. Some have attended external obstetric emergencies courses, but this is not an essential requirement. However, local champions (i.e. staff that have accumulated extensive clinical experience on the 'shop floor') are vital members of the training team.

Frequency of training: Once a year all maternity staff (midwives, obstetricians, obstetric anaesthetists and health care assistants) at Southmead Maternity Unit are allocated a non-clinical day to attend the local training course. Staff are not charged by the hospital to attend the course which is run locally within the maternity unit.
Faculty per training day

Organizers: 2 Practice Development Midwives
Instructors*: 4 Obstetricians
2 Anaesthetists
6 Midwives
1 Health Care Assistant and 1 labor ward secretary to assist with administration etc.

* The list reflects the number of available trainers at Southmead maternity unit. During training days each drill station is staffed by two trainers (ideally 1 doctor and 1 midwife).

TRAINING FACILITIES

Lectures: The lectures in the morning take place in the Learning and Research building about a five minute walk from the Maternity Department.

Simulation research centre: The maternity unit has been able to adapt an unused room on one of the wards into a simulation research centre. Training and research are conducted in this area and it provides space for the storage of training equipment. The room is also used for one of the drill stations on the training day while the rest of the drills (6 drill stations in total) are set up in any of the available rooms in the maternity unit.

In situ simulation: The faculty aim to run at least one drill station in a delivery room on the labor ward, as the local knowledge gained by using the actual emergency call bells, moving real delivery beds and locating the emergency blood fridge in the department are all vital factors in the success of this local training day. The other simulation/drill stations are set up in whichever rooms are available at the time. It is important to the faculty that the training day goes ahead, irrespective of faculty and room shortages and over the past 11 years, the training day has never once been cancelled.

METHODOLOGY

1. INTERACTIVE LECTURES AND WORKSHOPS

Refreshing and sharing new knowledge: Each training day starts with interactive lectures and workshops from 09.00 – 12.30. This session is an excellent opportunity to refresh common medical knowledge, share new care guidelines and medical findings and also to update colleagues on the latest CMACE release (Center for Maternal & Child Enquiries). The UK Report ‘Saving Mothers’ Lives’ is released every 3 years. The report provides information on the total numbers of maternal deaths in the UK and recommendations for improvements in care. There were 261 maternal deaths in the period 2006-08, but the number is decreasing. The leading cause of direct maternal deaths in the UK is currently sepsis.

Examples of interactive lectures

- Birth after caesarean (new guideline and patient info leaflet)
- Recognition and management of puerperal sepsis (including patient cases)
- Complications of eclampsia and pre-eclampsia
- Recognition of venous thrombo-embolism
- Bladder care
- CTG interpretation (workshop)

2. SIMULATION TRAINING

Multi-professional teams: After lunch, the participants are divided into six multi-professional teams (comprising midwives, obstetricians, anaesthetists, health care assistants and students) of around eight colleagues. Each team rotates through six 30 minute simulation drill stations during the course of the afternoon.

The instructor explains the topic of the scenario before it starts.

Validation: Sometimes a quick lecture is provided directly before or after the simulation, other times it is purely a practical drill session with debriefing at the end. When a new working document has been developed or revised, such as transfer forms (used when transferring patients from delivery to the ICU) or obstetric early warning charts, these documents are included within a scenario and hence are tested prior to being released into routine clinical practice.

Topics: Although the teams are not informed about the actual topic of each upcoming scenario, the participants are aware that the selected learning objectives will reflect some of the themes covered in the previous morning lectures. Each simulation lasts 30 minutes, including the debriefing which takes place immediately after each scenario is completed.
Using everyday tools and equipment helps prepare staff for real emergencies.

How: The multi-professional teams move on to each drill station which are manned by 2 instructors. The instructors are staff (midwives, obstetricians and anaesthetists who work in the maternity department). Prior to each scenario, 5-6 participants are assigned an active role in the simulated scenario. All staff are told to act within their usual role (eg midwives act as midwives and anaesthetists act as anaesthetists). Some participants will observe and fill in prepared checklists. Relevant information here is the timings of performed clinical care actions and aspects of team working. Observers are assigned active roles at the next station.

Structured, but not rigid: When the team is ready, the instructors provide a short introduction/handover before running the simulation ‘on the fly.’ The method is structured, but not rigid. Instructors will help and encourage along the way, but avoid stepping in too early. They aim to make it a fun, educational experience, rather than intimidating. Hence there is no formal test or assessment at the end of the training day. Instead the training team prefer to monitor the success of the training program on the effect on clinical outcomes.

Clinical outcomes: Since training was introduced there has been a 50% reduction in term babies with a low Apgar score and a 50% reduction in the number of babies developing HIE (Hypoxic Ischaemic Encephalopathy), both markers of future cerebral palsy. There has also been a 75% reduction in neonatal injury following shoulder dystocia. These outcomes are continually audited as an indicator of a well-trained and functioning work force.

3. DEBRIEFING

Non-threatening atmosphere: Each simulation is followed by a relatively short debriefing session from within the team themselves using structured clinical and teamwork checklists. There is always an emphasis on what the team did well. Again, the aims are to create a non-threatening, friendly atmosphere where everyone feels happy to ask questions.

The checklists that are filled in by observing participants during the simulation sessions are used to pinpoint timings of performed actions and to demonstrate whether required care decisions were completed. Communication and team roles and leadership are also discussed with reference to teamwork.
Level of activity: When the training day first started in 2000, only midwives and obstetricians trained together, but now that the anaesthetists and health care assistants also participate, the entire maternity staff practice multi-professional simulation training in teams.

Compulsory training: It is a mandatory requirement that all 350 staff in the maternity unit attend the training day once a year. This includes 250 midwives, 35 obstetricians, 6 anaesthetists and all health care assistants on labor ward and in the community.

Attendance: A database of attendance is kept by the Practice Development Midwives and bookings for each date are coordinated by the labor ward secretary. Those who are not able to attend on the booked date are contacted and asked to reschedule for the next session. Attendance is monitored via the midwives’ annual supervisory review process and the medical staff, via their mandatory appraisals.

CURRICULUM
The curriculum is developed by a multi-professional training ‘steering group’ including the labor ward lead obstetrician, the labor ward midwifery matron, the community midwifery matron, the lead obstetric anaesthetist, the maternity unit risk manager and the practice development midwives. New and revised national guidelines and recommendations are used as a basis for the new program, which is renewed each year and introduced each April. Although the new training requirements require maternity hospitals in the UK to facilitate a scenario on maternal collapse every year, the curriculum developers are free to decide on the causes leading up to this critical event.

Most frequently used scenarios
- Eclampsia
- Cord prolapse
- Shoulder dystocia
- Twin delivery
- Vaginal breech delivery
- Maternal collapse
- Sepsis
- Inverted uterus
- Ruptured uterus
- Antepartum hemorrhage
- Post partum hemorrhage
- Neonatal resuscitation
- Theatre practice update

TRAINING SOLUTION AND USAGE
The team at Southmead use a variety of training equipment to facilitate their scenarios.

- PROMPT is used to teach the management of shoulder dystocia, assisted vaginal breech delivery and the intrapartum management of twins. The importance of communication with the patient is a key message of the training at Southmead, and the PROMPT mannequin is integrated with a patient-actor (hybrid simulation) to increase the fidelity of their simulations.

- SimMom is currently being used by the team at Southmead for their maternal collapse scenarios.

- MamaNatalie has been used to learn the management of Post-partum haemorrhage. Again the integration of MamaNatalie with a patient-actor helps to practice essential communication skills.

- MamaNatalie is also used to teach the management of post-partum haemorrhage and essential communication skills.
REFLECTIONS AFTER 10 YEARS

“Following the implementation of obstetric emergency training, there has been an associated 50% reduction in the number of babies born with low Apgar scores at term and also the development of hypoxic brain injury. Occurrences of brachial plexus injury following shoulder dystocia have reduced by 75%, and the management of cord prolapse has improved.”

Dr. Joanna Crofts, Southmead Maternity Unit, North Bristol NHS Trust, UK

Identified Benefits

“As the training is ‘owned’ by the unit, everybody feels part of it. With ownership comes pride in your work. Everyone can contribute their ideas to enhance the training program.”

“You are able to train and learn in the teams that would attend emergencies in real life.”

“The added benefits from inter professional team working, especially the communication between obstetricians and midwives.”

“People used to worry about training, but the non-threatening atmosphere has changed that. Now people expect to train and there is no problem with staff attending.”

“Having local experts to facilitate the simulations yields higher competency levels in general.”

“In addition to well known advantages like having people who normally work together train together using the equipment they normally use; in situ training is also more cost effective, as there is no need for specific training facilities.”

Identified Challenges

- A dedicated team are required to constantly drive the training program
- The full support and backing of higher management is required to ensure the release of staff to attend
- Financial incentives such as CNST (The Clinical Negligence Scheme for Trusts) are essential
- As the maternity unit becomes busier, it becomes more difficult to run the training days. However, the increase in clinical workload facing staff makes it even more important to continue the training…‘against all odds at times’

Identified Success Factors

- Common ownership
- Multi-professional training in teams
- Includes all staff
- Facilitated in situ
- Practical scenarios
- Imagination and the passion colleagues exhibit during training
- A non-threatening atmosphere
The above mentioned factors at Southmead Maternity Unit correspond well with Siassakos et al. who reviewed the process of obstetric emergencies and teamworking training programs that have been associated with improved patient outcomes in hospitals throughout the world.

Active components of effective training:
- Institution-level incentives to train
- Multi-professional training of all staff in their units
- Teamwork training integrated with clinical teaching
- Use of high fidelity simulation models

**WHAT MAKES GOOD SIMULATION PROGRAMS**

Issenberg et al. reviewed and synthesized existing evidence in educational science that addressed the question: What are the features and uses of high-fidelity medical simulations that lead to most effective learning?

Issenberg argued, that the weight of the best available evidence suggests that high-fidelity medical simulations facilitate learning, when training is conducted under the “right conditions.”

Right conditions:
- Feedback is provided during the learning experience
- Learners engage in repetitive practice
- Simulation is integrated into the normal training schedule
- Learners practice with increasing levels of difficulty
- Simulation training is adapted to multiple learning strategies
- A wide variety of clinical conditions are provided
- Learning on the simulator occurs in a controlled environment
- Individualized learning with reproducible, standardized educational experiences is provided
- Learning outcomes are clearly defined
- Ensuring the simulator is a valid learning tool

**FUTURE PLANS AND PROSPECTS**

Southmead Maternity Unit has evidently found a successful formula for improving the management of obstetric emergencies, yet their training staff continue to seek new and effective ways of implementing local training.

They wish to continue their collaboration with the simulation industry and assist with the development of evaluated training tools to improve clinical outcomes for mothers and babies all over the world.
RESEARCH ACTIVITY

The Department of Obstetrics and Gynaecology at Southmead Hospital has widely published their research into effective obstetric emergencies simulation training. The team consider monitoring the effect of training on real clinical outcomes is essential.

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