In situ simulation in neonatal transport

Neonatal transport is crucial to the implementation of effective regionalised perinatal care and involves the application of advanced clinical skills in situations outside the familiar, supportive environment of the neonatal unit. *In situ* simulation (ISS) has been shown to assist the teaching of clinical skills, identify risk and improve team working. Despite this, the study presented here highlights that a third of neonatal transport teams in the UK fail to offer simulation training of any kind. ISS with access to a high-fidelity manikin should be an integral part of training in neonatal transport.

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Keywords

neonatal transport; simulation; education

Key points

MacLaren A.T., Peters C. *In situ* simulation in neonatal transport. *Infant* 2016; 12(5): 168-70.

1. *In situ* simulation (ISS) allows exposure to clinical scenarios in real-time without any danger to the infant.
2. Despite its proven uses, ISS is not universally used in neonatal transport.
3. When available, ISS is very well received by those taking part.
4. Formal training in simulation instruction ought to be commonplace.
5. A formal curriculum should be identified to allow more effective sessions.

Efficient and reliable neonatal transport services are an essential part of the implementation of effective, regionalised perinatal care and the safe transfer of neonatal patients often requires the use of advanced clinical skills. Studies have shown that the transportation of patients has a greater degree of risk than in-patient neonatal care.[1,2] These outcomes can be improved by ensuring transfers are carried out by experienced clinicians exposed to high-quality training with the ability to identify risk.[3] *In situ* simulation (ISS) has been shown to assist the teaching of clinical skills, aid the identification of risk and improve team working, especially in clinical scenarios that are encountered infrequently.[4-6] It acts as an 'educational bridge' preparing staff for real-life situations while protecting patients. The West of Scotland Neonatal Transport Service is part of Scottish Specialist Transport and Retrieval (ScotSTAR) and is one of the busiest neonatal transport services in the UK, with the team carrying out more that 1,000 road and air transfers in 2014. The West of Scotland Neonatal Transport Service has routinely used high-fidelity simulation as a method for training staff for over three years with very positive feedback from those involved (**FIGURE 1**).

Aim and methodology

This questionnaire-based study examined current provisions for ISS-based medical training within neonatal transport teams in the UK. All 19 neonatal transport teams across the UK were contacted via email and asked to complete a cross-sectional survey of 13 questions. To ensure maximal response, each team had an email reminder sent three times prior to analysis of the results. The survey examined:

- whether ISS is routinely offered
- how often sessions take place
- whether the instructors receive formal training in ISS
- the roles of professionals involved in the scenarios
- whether a specific curriculum is followed
- whether feedback is obtained.

Responses were a mixture of yes/no, free text and multiple choice. Data were collected between March 2015 and January 2016 and stored and analysed using a Microsoft Excel database.

Results

Completed questionnaires were received from 15 of the 19 regional transport teams (79%) with representation from all four nations within the UK. Senior medical staff completed 83% of questionnaires and 17% were completed by senior nursing staff.

1. Are you delivering ISS within your service?

Only 67% (10 out of 15) of the UK neonatal transport teams undertake regular, formal ISS sessions.

2. How often do ISS sessions take place?

Forty per cent (4 out of 10) of the teams participating in ISS have formal sessions taking place every week. Every team taking part in ISS has at least three sessions in every six-month period.

3. Who participates in these sessions?

All teams include both doctors and nursing staff in the training sessions; however, only 50% of teams involve ambulance staff. Twenty per cent of teams state that consultants are not involved in the training sessions.

4. Who provides the training?

All teams participating in ISS state that consultants run the sessions, with 50% having additional input from nursing staff. Only one of the 10 teams involves nurse educators when delivering the training.

5. What training have the instructors had?

Seventy per cent of the teams questioned have a team member who received formal training in ISS. Consultants trained in neonatal life support lead ISS in the remaining teams.

6. Do the sessions have a set date/time or are they unannounced?

A minority of teams (30%) have unannounced ISS sessions but the majority occur during specific training sessions.

7. Where do the sessions take place?

All teams report that ISS takes place in more than one setting. Sessions most commonly take place in the neonatal intensive care unit (80% of teams) and in the back of an ambulance (70% of teams). Thirty per cent of teams have access to a formal simulation suite.

8. Do you use real-life or sim-only equipment?

All teams use dedicated simulation equipment supplemented by real-life equipment.

9. How are the scenarios chosen?

Seventy per cent of teams base their scenarios on recent events, for example an incident that occurred during a transfer that generated a team discussion. Two out of 10 teams choose the scenarios randomly.

10. Are you using simulation training to support a medical curriculum?

Seventy per cent of teams link ISS to the Royal College of Paediatrics and Child Health (RCPCH) generic neonatal curriculum.[7] None of the teams follow a formal curriculum for neonatal simulation.

11. Do you use simulation to address patient safety issues?

All teams use ISS to address patient safety issues.

12. Do you use a high-fidelity manikin?

Seventy per cent of teams carrying out ISS have access to a high-fidelity manikin (**FIGURE 2**).

13. Do you collect feedback?

Seventy per cent of teams collect feedback on their ISS sessions. All teams that collect feedback report it as 'positive'.

Discussion

This study demonstrates that the use of ISS in neonatal transport is fairly widespread across the UK. However, despite its proven use in acute medicine,[4] one third of neonatal transport teams are failing to offer it as a form of training.

ISS should be an established component of training in neonatal transport. Firstly, due to the implications of the European Working Time Directive, the time spent 'on shift' is reduced from previous generations with a resulting decrease in exposure to clinical situations. In addition, emergency situations in the neonatal transport setting generally occur less frequently than in a busy neonatal unit. The majority of neonatal transports involve the transfer of an already stabilised baby from one unit to another with the opportunity for practical procedures (such as tracheal intubation or chest drain insertion) being reduced. This lack of exposure is a particular problem for those members of staff working solely within the transport setting without rotation through a neonatal unit. ISS allows exposure to these clinical scenarios in a real-time, real-life setting without posing danger to the baby.[8]

ISS can mimic the stress felt when dealing with these situations in real life and lead to improvement in vital non-technical skills such as situational awareness, decision-making and leadership.[9] Furthermore, ISS has been shown to help in the identification of latent safety threats,

FIGURE 1 Loading the ambulance during a training exercise at the West of Scotland Neonatal Transport Service.

FIGURE 2 Use of a training manikin in neonatal transport simulation.

which are weaknesses that would otherwise have remained unrecognised.[6] These weaknesses can then be discussed among the team with methods put in place to improve. Ultimately, ISS should lead to improved competence, confidence and team-working with the goal of enhanced patient care. Certainly, ISS appears popular among participants with all teams that responded to the questionnaire reporting positive feedback from the sessions.

There are probably barriers to the widespread use of ISS. Although not formally asked on the questionnaire, teams not routinely participating in ISS identified lack of time and financial constraints as the main barriers to regular sessions. Setting up a simulation suite is indeed expensive and more evidence is needed of the benefit of ISS, specifically within neonatal transport, before managers are persuaded to spend more money on it. The lack of available time for staff to participate in a formal ISS session is an obvious issue and, indeed, one team stated they only managed to run sessions when there were two transport teams on service.

Despite staff constraints, lack of available time and lack of resources, it is encouraging to see that 40% of teams are taking part in ISS sessions every week. In contrast, 30% of teams participating in simulation are having sessions less than once every two months. Although it is positive that ISS is taking place, this may be insufficient to allow suitable identification of the team's developmental needs. Evidence suggests that more regular sessions are required for the full benefits of ISS to be seen.[10] Perhaps it is necessary that ISS sessions should be organised and led by instructors who have completed formal training in ISS? There are well-established neonatal simulation instructor courses taking place in England and 2016 saw a neonatal simulation instructor course run for the first time in Scotland at Forth Valley Hospital, Larbert. These courses offer experience in adult learning techniques, which is crucial when delivering effective training within the team.

One notable feature of our study was the absence of formal curricula for neonatal ISS. Currently, there exist two separate curricula for neonatal training in the UK that both contain sections related to neonatal transport: the RCPCH neonatal curriculum[6] and the more extensive curriculum for higher specialist training in neonatology as set out by the neonatal College Specialty Advisory Committee (CSAC).[11] There is evidence that following a formal curriculum ensures better coverage of the main topics and better identification of weaknesses; the authors believe that setting out a formal curriculum to be covered by the ISS sessions will lead to more efficient training. This curriculum can simply identify appropriate scenarios covering some of the major neonatal emergencies commonly encountered in neonatal transport. An ISS curriculum is currently in development within the West of Scotland Neonatal Transport Team.

Conclusions

ISS with access to a high-fidelity manikin should be an integral part of training in neonatal transport. Formal curricula for neonatal transport simulation are currently lacking and this could be improved to ensure adequate coverage of common clinical scenarios occurring in neonatal transport. More commonplace formal training in simulation instruction would ensure maximum benefit from ISS sessions.

Acknowledgement

The authors would like to thank all the neonatal transport teams who took the time to complete their questionnaire.

References

1. **Longhini F., Jourdain G., Ammar F. et al.** Outcomes of preterm neonates transferred between tertiary perinatal centers. *Pediatr Crit Care Med* 2015;16: 733-38.
2. **Bowman E., Doyle L.W., Murton L.J. et al.** Increased mortality of preterm infants transferred between tertiary perinatal centres. *Br Med J* 1988;297:1098-100.
3. **Palmer K.G., Kronsberg S.S., Barton B.A. et al.** Effect of inborn versus outborn delivery on clinical outcomes in ventilated preterm neonates: secondary results from the NEOPAIN trial. *J Perinatol* 2005;25:270-75.
4. **Wayne D.B., McGaghie W.C.** Use of simulation-based medical education to improve patient care quality. *Resuscitation* 2010; 81:1455-56.
5. **Rosen M.A., Hunt E.A., Pronovost P.J. et al.** *In situ* simulation in continuing education or the health care professions: a systematic review. *J Contin Educ Health Prof* 2012;32:243-54.
6. **Lok A., Pierce E., Shore H., Clark S.J.** A proactive approach to harm prevention: identifying latent risks through *in-situ* simulation training. *Infant* 2014: 11;160-63.
7. **Royal College of Paediatrics and Child Health.** *Curriculum for Paediatric Training General Paediatrics.* Level 1, 2 and 3 Training. London: RCPCH; 2010.
8. **Sorensen J.L. et al.** Unannounced *in-situ* simulation of obstetric emergencies: staff perceptions and organisational impact. *Postgrad Med J* 2014;90: 622-29.
9. **Patterson M.D., Geis G.L., Falcone R.A. et al.** *In situ* simulation: detection of safety threats and teamwork training in a high risk emergency department. *BMJ Qual Saf* 2013;22:468-77.
10. **Everett-Thomas R., Valdes B., Valdes G.R. et al.** Using simulation technology to identify gaps between education and practice among new graduate nurses. *J Cont Educ Nurs* 2015;46:34-40.
11. **Royal College of Paediatrics and Child Health.** *Aligned Neonatal Framework for Level 3 Grid Training.* London: RCPCH; 2010.