The relevance of non-technical skills in obstetrics and gynaecology

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Key content
• The non-technical skills (NTS) as identified in the literature.
• Developments in NTS training.
• Current assessment practices and approaches to skills assessment in obstetrics and gynaecology.
• Potential use of assessments of NTS in obstetrics and gynaecology.

Objectives
• Describe the NTS required in obstetrics and gynaecology and their relationship to performance.
• Develop an awareness of how these skills may be formally assessed and the potential role of NTS feedback.

Ethical issues
• What are the ethical issues relating to the involvement of trainees in education research at the same time as performing an assessment?
• Is another assessment feasible within the constraints of our training programme?

Keywords: competence / error / human factors / non-technical skills / patient safety

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Introduction
Non-technical skills (NTS) are important and underpin technical ability. They include the social skills of communication, team-working and leadership and the cognitive skills of situational awareness and decision-making, as well as the important influences of managing stress and coping with fatigue. Such skills are of particular relevance in our specialty, where multiple tasks are often required simultaneously, the woman is usually awake, her partner is usually present and the clinical circumstances may be stressful.1

The concept of these skills is not new,1 but interest in them is growing as increasing evidence suggests that NTS failures are likely to lead to adverse events. In obstetrics, the triennial Confidential Enquiry has conducted detailed reviews of maternal deaths in the UK. In the last triennium, 70% of direct deaths were considered to have involved an element of substandard care2 and this was particularly apparent for pre-eclampsia and acute fatty liver, where over 90% of cases exhibited substandard care. The report does not detail these deficiencies specifically, but identifies failures in teamwork, communication and interpersonal skills as areas of particular concern. These weaknesses result not just in increased mortality, but also significant morbidity and economic losses, with obstetrics and gynaecology malpractice claims representing half of the UK NHS litigation bill over the last 10 years.3

Despite growing interest in the role of NTS, there is little formal training or assessment of these skills within the specialty. However, the NHS Institute for Innovation and Improvement has published The Clinical Leadership Competency Framework4 and the current RCOG training curriculum and logbook is being reviewed in order to integrate this under guidance from the General Medical Council (GMC), hence there is an opportunity to address these deficiencies.

This article describes the NTS, NTS training and the role for including assessment of NTS within specialty training.

Key non-technical skills
The language used to describe NTS may vary. A number of key categories or concepts have been described and these may be inter-relational. These categories were originally written with reference to aviation, and although not formally agreed for medicine, may apply equally. The set was derived through interviews, observations and accident report analyses.
Situational (or situation) awareness

Situational awareness is essentially perception or attention to the surroundings and the detection of any changes. This concept is familiar on the delivery suite, where multiple tasks may present simultaneously, task interruption is common and delegation is often required. It is also essential as part of good surgical decision making in the operating theatre. Situational awareness may be influenced by factors such as experience, preconceptions, expectations and task workload.

Of use in building situation awareness are quick updates, team huddles and planning meetings in order to maintain a shared mental model and ensure that team members are able to anticipate future events.

Decision making

The process of reaching a judgement or choosing an option to meet the needs of a given situation or task is required in almost every patient encounter in obstetrics and gynaecology. Conditions for decision making can vary in relation to time pressures, feasibility of options, task demands and levels of support for the decision maker. Broadly speaking, the first stage in decision making requires situation assessment – i.e. observation and identification of the problem. In the second stage of decision making, there is a process of choosing a course of action to meet the needs of the situation assessment. The effectiveness of the response chosen will depend on the accuracy of the initial assessment and the experience of the individual making the decision. Finally, the result of implementing the chosen plan of action should be reviewed, checking that the desired outcome has been achieved and defaulting to a ‘Plan B’ if necessary. Decision making may be degraded by fatigue, as it erodes working (short-term) memory, thereby reducing one’s ability to retrieve problem solving information from the long-term memory.

Team working

The link between poor teamwork and risk to women has been highlighted by CMACE and the King’s Fund Safe Births enquiry. Key elements of team working include support for other team members through sharing workload, accepting individual responsibility, conflict resolution and exchange of information. Siassakos et al. used the administration of magnesium sulphate in an eclampsia simulation as a surrogate marker for team efficiency and patient outcome and found that more efficient teams did better at handover and task allocation. We work in teams that are constantly changing, with different health professionals and different levels of expertise coming together on each shift, and there is increasing demand for flexibility and responsiveness within the team. The focus must be on the individual to be as effective as possible and to have a clear understanding of their individual role.

Communication

Communication is an important element of effective teamwork (i.e. a co-skill) and is the exchange of information, ideas, feelings or feedback. The ability to communicate effectively with the mother and her partner is also essential in order to gain their confidence and provide reassurance in a stressful life-situation. Communication issues are particularly relevant in maternity services where there may be multiple handovers, transfers between home settings and hospital and referrals between professional groups. Poor communication between primary care and hospital or within hospital has frequently been cited as a contributor to adverse events. In an emergency, more efficient teams are likely to recognise and verbalise the crisis and use closed-loop communication (i.e. task clearly and loudly delegated to specific individuals, accepted, executed and completion acknowledged) to protect the flow of information. The SBAR format (situation, background, assessment, response) is also of use in transmitting critical information and is now commonplace on many delivery suites.

Leadership

Effective leadership is essential for maintaining safe performance in the workplace and maintaining morale. Leadership requires motivating, directing and organising the team, encouraging individuals to work together, assessing performance, task assignment and generating a positive environment. Leadership skills may also be needed by other members of the team when necessary to plan, prioritise and manage workload.

Other non-technical skills

In obstetrics, maintaining dignity and a professional relationship with the woman when she is awake and vulnerable should be considered as an additional key NTS. Partner management and dealing with disruptive behaviour are also essential and can be classed as separate, but related, entities to communication skills. Furthermore, professional behaviour (i.e. remaining calm under pressure, coping with distractions and interruptions) and cross-monitoring of performance are also skills required across the specialty. In any discipline, acknowledging the importance of managing stress and fatigue are also essential to ensure good cognitive and interpersonal functioning.

The relationship between non-technical skills, training and outcomes

The relationship between NTS and human error is illustrated in Figure 1. Deficient NTS can increase the chance of error, which in turn can increase the chance of an adverse event. By contrast, good NTS can reduce the likelihood of error and
hence the potential for adverse events. The relationship between NTS and patient outcomes remains unclear. A recent systematic review looking at the effect of NTS on technical performance in surgery has suggested that certain non-technical constructs such as stress and poor communication in theatre can contribute to the deterioration of surgeons’ technical performance, although the precise extent of this effect remains to be seen. Surgeons’ observational scores for communication were often low and deteriorated further towards the end of procedures, e.g. if the surgeon left theatre towards the end of the operation and designated a trainee to complete the remaining tasks such as skin closure. This review also found that receiving feedback and effectively coping with stressful events in the operating theatre had a beneficial impact on technical performance.

Although teamwork training is relatively new to obstetrics and gynaecology, the complex and often time-critical nature of the specialty would suggest that this is an area warranting further development. Other industries such as aviation and the oil business have developed the concept of Crew Resource Management (CRM) in order to improve NTS with the aim of enhancing safety.

In 2001, the obstetric department at Beth Israel Deaconess Medical Centre (BIDMC) in Boston, USA was approached by the government to adapt CRM for the specialty. The department was the first in obstetrics and one of the first in health care to apply CRM to clinical practice. This work led to a national prospective randomised controlled trial on the impact of team work training and obstetric outcomes. Since then, mixed results have been found with teamwork and communication training, with or without the use of simulation. Systematic reviews of isolated teamwork training in obstetrics have not shown much impact in terms of outcomes, although such sessions may be helpful in introducing concepts and influencing safety attitudes. However, deeper integration using a combination of didactic teaching, interdisciplinary team training and simulation exercises has been shown to reduce perinatal morbidity in a recent large scale randomised controlled trial.

A number of initiatives have been set up to develop teamwork training in obstetrics. In the UK, PRactical Obstetric Multi-Professional Training (PROMPT) has been developed as a multi-professional training package for obstetric emergencies. PROMPT is associated with direct improvements in perinatal outcome and has been shown to improve knowledge, clinical skills and teamwork. The PROMPT Maternity Foundation (PMF) and the Royal College of Obstetricians and Gynaecologists (RCOG) are currently working together to disseminate such training overseas with the aim of reducing maternal morbidity and mortality.

In the USA, the State Obstetric and Pediatric Research Collaboration (STORC), is a multi-disciplinary organisation that seeks to improve maternal and neonatal health outcomes through a focus on team training to create a state-wide safety culture in Portland, Oregon. STORC advocates a mobile simulation programme as an effective way to develop new skills, maintain infrequently used clinical skills and address latent safety threats in the clinical setting. STORC has developed a standardised curriculum for simulated obstetric emergency drills (CORDS) to be implemented and tested.

Objective assessment of non-technical skills

It is essential that tools with evidence of validity and reliability are used in any assessment process. Behavioural assessment tools are well established in other high-risk industries such as aviation and nuclear power, where they are used to guide NTS training and assessment and to support safe practice. In medicine, a number of acute specialties including surgery, anaesthesia and emergency medicine have developed similar tools. These are ratings...
scales based on skills list which may be used to identify individual behaviours that contribute to superior or substandard performance.20 It follows that such feedback may affect changes in behaviour and hence improves patient safety, although this is yet to be demonstrated. Many of the assessment tools described have established reliability and validity in small simulation-based studies. These studies may work in a local context but it could be argued that they are therefore not generalisable and may not be practicable in the real world.

Non-technical skills for surgeons (NOTSS),21 was developed by the University of Aberdeen and the Royal College of Surgeons of Edinburgh and is perhaps the most widely evaluated behavioural assessment tool in surgical specialties. The tool aims to provide a language and structure that allows a better understanding of the NTS through the observation and identification of four key NTS skill categories (situation awareness, decision making, communication and teamwork, and leadership), each further broken down into elements (see Box 1 – NOTSS skill taxonomy). Multiple ‘good’ and ‘poor’ behavioural markers that exemplify each category and element are also described for reference in the NOTSS handbook and ‘good’ examples of these are also shown in Box 1.

NOTSS has been shown in a recent Health Technology Appraisal (HTA)24 to demonstrate validity for assessing non-technical performance in theatre and good reliability scoring is achievable using six to eight assessments. Parallel assessments using NOTSS and Objective Structured Assessment of Technical Skill (OSATS) tools were conducted in 90 cases in this report24 with elective caesarean section, evacuation of the uterus and diagnostic laparoscopy as index procedures. In terms of validity, all four domain scores were significantly positively correlated with the generic part of the OSATS score.25 The decision-making domain was most strongly correlated with technical performance, reflecting the fact that NTS are a separate, but related attribute. The suggestion that NOTSS measures a training-related skill is evidenced by the significant positive correlation of performance with ST level and years of UK training.25 Older age was not associated with improved scores, nor was more years of non-UK training.25 These findings are not surprising as, from experience, junior trainees have a tendency to focus on technical skills but can usually manage to effectively communicate and lead within their competence level, whilst decision-making and situation awareness skills are areas where more experienced individuals do better.

Almost a quarter of NOTSS scores in the HTA report identified a trainee as performing an element or category at a ‘marginal’ or ‘poor’ standard.24 This has potential implications for training and suggests that, by providing a clear and simple structure and language to describe NTS, NOTSS may highlight areas for skills development not currently emphasised within the current assessment portfolio which has a largely technical focus (although the Team Observation/Reflective Practice forms allude to non-technical aspects of performance). The NOTSS tool can also be used less formally to guide a reflective discussion of NTS and their role in case management.

### Box 1. NOTSS skill taxonomy

<table>
<thead>
<tr>
<th>Category</th>
<th>Element</th>
<th>Examples of good behaviours for category *</th>
</tr>
</thead>
<tbody>
<tr>
<td>Situation awareness</td>
<td>Gathering information</td>
<td>Awareness of workload and staffing levels, review of notes</td>
</tr>
<tr>
<td></td>
<td>Understanding information</td>
<td>Prepares team for arrival of emergency</td>
</tr>
<tr>
<td></td>
<td>Projecting and anticipating future state</td>
<td>Ensures that relevant investigations have been ordered and reviewed</td>
</tr>
<tr>
<td>Decision making</td>
<td>Considering options</td>
<td>Verbalises equipment required in advance, recognises implications of busy triage area</td>
</tr>
<tr>
<td></td>
<td>Selecting and communicating option</td>
<td>Recognises and articulates problems</td>
</tr>
<tr>
<td></td>
<td>Implementing and reviewing decisions</td>
<td>Appropriate options generated</td>
</tr>
<tr>
<td>Communication and teamwork</td>
<td>Exchanging information</td>
<td>Asks for opinions of senior colleagues if necessary</td>
</tr>
<tr>
<td></td>
<td>Establishing a shared understanding</td>
<td>Has a ‘plan B’</td>
</tr>
<tr>
<td></td>
<td>Co-ordinating team activities</td>
<td>Listens to concerns of team members, seeks advice if unsure</td>
</tr>
<tr>
<td>Leadership</td>
<td>Setting and maintaining standards</td>
<td>Clear and concise handovers given with no missing information</td>
</tr>
<tr>
<td></td>
<td>Supporting others</td>
<td>Allocates tasks appropriately</td>
</tr>
<tr>
<td></td>
<td>Coping with pressure</td>
<td>Communicates that procedure is not going to plan</td>
</tr>
</tbody>
</table>

*This list is not exhaustive*
Non-technical skills for surgeons in obstetrics and gynaecology

Behavioural marker systems, such as those described, should ideally be used in the environment for which they were designed. However, this can take many years and significant resources to develop and at present there is no psychometrically robust tool to assess NTS specifically in obstetrics and gynaecology.

Thus, it may be more pragmatic to pilot the usability of an appropriately adapted version of an existing tool for use in obstetrics and gynaecology. The RCOG has taken the decision to adapt NOTSS and this has been approved by the original authors. Behaviours have been defined specific to the specialty and in line with proposed changes to other assessment tools within the current training portfolio. Rankings have been removed to concentrate on anchor statements and feedback. The modified tool has been piloted for delivery suite and gynaecological surgery in two UK deaneries in 2012/2013 with evaluations from trainers and trainees. The findings from the pilot are expected by the end of 2013 and preliminary reports suggest that these will be positive although there may be implementation challenges to overcome.

It is widely recognised that both trainer and trainee training is essential in order to use the tools to assess NTS. The concept of the assessment tools must be understood clearly with a basic level of training if they are to work in the real-life environment, and training programmes are likely to be required to deliver this in a measurable way in the future. Helping trainers identify important aspects of the constructs under scrutiny and the inter-relationships between these may be improved through the provision of short online simulation scenarios demonstrating poor and excellent team behaviours. Similarly, information about performance expectations might be useful. Recorded feedback from skills drills may be useful in this respect in order to teach and reflect whilst working through assessments in a constructive manner.

Whether NOTSS is used in obstetrics and gynaecology as a formative tool added to the assessment portfolio or whether it will become a summative one will clearly depend on feedback, reliability data, and ultimately deliverability in a real life setting.

The move towards NTS training and assessment may improve attitudes to NTS, but the effects will vary. More stable teams (e.g. smaller units with fewer staff) may have a better baseline level of NTS and perceived changes may thus be less apparent. With anything new, there is likely to be a degree of cultural resistance. Honest debriefing and challenging authority appear to be particular areas of difficulty found in previous studies and institutional support will be required to sustain changes in attitude and culture.

It should also be noted that NTS assessment tools are sufficient to identify individual behaviours only and not the mechanisms that lead to harm through NTS failure. In any clinical situation it is evident that team interaction is essential and the performance of the obstetrician or gynaecologist can be enhanced or impeded by the midwives/nurses and anaesthetists working with them.

Hence, whilst focussing on the obstetrician or gynaecologist alone is important in order to assess an individual in training, it is not a true reflection of teamwork and may not be sufficient alone to effect patient safety. Measures such as STORC'S clinical teamwork scale, which is a self-assessment of the efficacy of teamwork, may be a useful innovation in this respect, although it is yet to be linked to outcomes.

Conclusion

Non-technical skills are the cognitive, social and personal resource skills that complement clinical and technical skills. They are a vital part of the skill set required to become a competent obstetrician or gynaecologist. Non-technical skills are currently not adequately integrated within, or assessed as part of the curriculum, although the interest in this area is growing, in part as a result of leadership and patient safety initiatives within the NHS.

NOTSS is the most widely evaluated NTS assessment tool for the individual and has been tested in the real world. An adapted version is being piloted by the RCOG following appropriate educational training and may form part of the future training portfolio.

NTS concepts should be incorporated into training, including both simulation and real-life operating room/delivery suite settings in order to provide formative evaluation and feedback with the aim of improving quality of care.

Disclosure of interests

K Suzanne Jackson was part of the NOTSS Working Group on behalf of the RCOG Assessment Sub-Committee. Kevin Hayes is Chair of the RCOG Assessment Sub-Committee. Kim Hinshaw is Chair of the RCOG Curriculum Committee.

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Non-technical skills in obstetrics and gynaecology

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