Non-technical skills for scrub practitioners

by Guy McClelland

Correspondence address: Guy McClelland, School of Health, Brook Building, University of Central Lancashire, Preston PR1 2HE. Email: gmcclelland@uclan.ac.uk

The non-technical skills of situational awareness and the formation of effective interpersonal relationships are essential to enhance surgical outcomes. However, most scrub practitioners demonstrate only tacit awareness of these skills and develop such qualities on an informal basis. Application of non-technical skills may be assessed formally, using a structured framework, to transform normative behaviour and to strengthen barriers against the latent threats that may result from fallible humans working in inadequate organisational systems.

The patient burden of iatrogenic injury justifiably receives prominent media exposure. The organisational burden of an ineffective safety culture however is less obvious. It may manifest in the form of financial penalties and negative perceptions generated by health commissioning bodies and service users, which then reduces clinical effectiveness and organisational sustainability. Patient safety research demonstrates an incident rate of 9.2% across all health organisations (de Vries et al 2008). This figure is almost replicated at large acute NHS trusts with a reported incident rate of 5.9 per 100 patient admissions (NPSA 2012). Litigation payments as a consequence of iatrogenic harm are approximately one billion pounds annually (DH 2011a).

In recognition of this patient and organisational burden, the Never Events framework identifies 25 clinical incidents with the potential to cause severe harm or death and which frequently occur, despite national guidance existing to prevent such incidents from occurring (DH 2011b). Never events specifically relevant to the scrub practitioner include implantation of the incorrect prosthesis, wrong site surgery and unintentional retention of surgical equipment and swabs (DH 2011b). However, the framework intentions may be incongruent with the basic principle of incident disclosure and diffusion because it fails to cascade the majority of patient safety incidents captured prior to serious harm occurring and which are considered to have inconsequential outcomes. The learning culture fails to become embedded within the organisation, and normative behaviour at an organisational and individual level ensures that inconsequential incidents frequently recur until a practitioner fails to capture an incident and a never event is repeated.

Approximately 40% of patient safety incidents occur during the perioperative phase; however, the surgical specialties of cardiac and neurology, which involve close liaison between the surgical and anaesthetic teams, account for only 4% of perioperative incidents (Catchpole et al 2009). The specialities of orthopaedics and general surgery, where the main surgical interaction is with the scrub practitioner, account for 32% and 30% of all incidents respectively (Catchpole et al 2009). This suggests that the physical and psychological stressors experienced by the scrub practitioner within the clinical environment produce reactions to situations which deviate significantly from other health professionals. These stressors may shape an individual’s decision making process and the actions produced by a value judgement from indicators during an operative procedure. Such judgements and decisions have the potential to act as a physical barrier to capture incidents or, paradoxically, may act as the variable accelerant in the aetiological development of patient harm.

Latent threats, omissions and active failures

Catchpole et al’s (2008) observational study of surgical team performance demonstrated that minor failures in the non-technical skills of situational awareness, communication and inter-professional working occur frequently during operative procedures, and have the potential to introduce latent threats which evolve and generate significant errors. These errors are tolerated by the surgical team because they are regarded as having inconsequential outcomes. Generally, practitioners recognise errors at an early stage of their development and initiate interventions to rescue the situation to ensure that no direct harm occurs to the patient. However, the presence of those specific scrub practitioner components within the Never Events framework demonstrates that frequently recurring minor incidents lead to potential significant patient harm resulting from the alignment of latent threats which are not captured due to active failures and omissions by the surgical team.

Reasons’ Swiss Cheese Model demonstrates that latent threats originating at an organisational, patient, colleague and individual practitioner level, combine with an active failure or omission by the practitioner with direct interventional contact with the patient, and penetrate the last barrier of the model, resulting in a clinical incident (Beuzekom et al 2010). Active failures and omissions are generated from errors originating from the inappropriate application of clinical skills, inadequate knowledge levels of an individual practitioner, or the misapplication of rules and policies intended as barriers to prevent and capture the evolution of adverse incidents (Reason 2008).
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The frequent occurrence of errors originating during operative procedures suggests that latent threats are generally not recognised. Although Gawande et al (2003) effectively described the potential trajectory of swab loss when the latent threats of emergency surgery, high patient body mass index, multiple operative teams and inadequate supervision are aligned, they failed to describe the root cause of latent threats, failures and omissions generated by individuals and organisations which lead to swab retention. Bell (2012) gave an honest description of the course of events, and the role played by individual practitioners and organisational conditions which, when combined, produced the latent threats and active failures which contributed to the temporary loss of a swab. This reflection requires further analysis in order to assist scrub practitioners in applying their skills to recognise and capture threats endemic within the intraoperative phase.

Human fallibility

The non-technical skill of situation awareness is defined as an individual’s cognitive ability to maintain attention and respond to changes within their immediate environment to enhance surgical outcomes (Patey 2008). During Bell’s incident description (2012), situational awareness failed on numerous occasions by different practitioners, but the two most significant errors appeared to be the actions of the surgeon and scrub practitioner due to over-focusing on technical skills. Technical skill performance develops in individuals by constructing processes in their short term memory which are then transferred to the long term memory when the task has been mastered, allowing an individual to concentrate on more complex tasks and aspects of their environment (Flin et al 2008). Details stored within short term memory are easily lost when an individual is distracted from the task they are concentrating on (Flin et al 2008).

The student scrub practitioner involved in the clinical incident may have been over-focusing on technical skills, such as draping and passing instruments, in order to attain effective task completion rates in those skills. The student would have constructed those skills within their short term memory during the procedure, and this may have produced attention deficit to the actions of others within the wider environment. The scrub practitioner seemed to be concentrating their attention on their own technical performance from their short term memory, in an attempt to effectively anticipate the requirements of the surgeon. This then caused the individual to forget to perform a count to locate their swabs at an earlier stage of the procedure and resulted in an unintentional clinical rule based violation.

Riley et al (2006) found that scrub practitioners modify the swab and instrument count during operative procedures, based on the stresses placed on them by the complexity of the surgery, the clinical ability of the scrub practitioner and the familiarity with the procedure and surgeon. The process is intended to capture errors, but an easily acquired technical skill may be unintentionally modified to allow the practitioner to focus on tasks with greater complexity.

Technical skills such as scrubbing up, gowing, draping and initiating swab counts, are essential for effective scrub practice. These represent low cognitive activities that are learned through repetition and by promoting automatically to ensure task completion. After acquiring these technical skills, the practitioner expends minimal cognitive effort to accomplish those tasks and switches to involuntary automaticity for task completion, subconsciously assigning an even lower cognitive level to technical skill tasks (Toft & Maskie-Taylor 2005).

The actions of the surgeon which caused the swab to be lost are due to involuntary automaticity. Urinary catheterisation also demonstrates a low cognitive technical skill which becomes consigned to long term memory when mastered, allowing the surgeon to concentrate on the complex surgery ahead. Attention deficit, due to fixation on the forthcoming procedure, may have allowed the swab to be left undetected in the area of the perineum. Catchpole et al (2009) suggested that patient safety culture is determined by trade-offs at both an individual practitioner and an organisational level. The active failures of the surgical team demonstrate a trade-off which allowed them to concentrate on the complex surgery at the expense of situational awareness of their immediate environment.

Clinical incident recovery

Contemporary health policy also demonstrates a trade-off, and emphasises financial stability. This trade-off can manifest as inferior organisational systems which increases the latent conditions that contribute to patient safety incidents (Offredy et al 2009). The decisions of senior managers remote from the clinical area, in an attempt to increase patient throughput and produce financial stability, can increase the latent threats within the immediate clinical environment. Effective clinical leadership is required to balance the safety versus production latent threat (Mahajan 2010). Design of safer organisational systems has been largely neglected, the emphasis being placed on individual practitioners to engage with human factors to recognise and manage latent threats (NHSIII 2010).

The incident reflection accurately describes the stressors faced by practitioners on a daily basis to complete the operating list to prevent on-the-day cancellations. In this case, the scrub practitioner effectively used their inter-personal skills of communication and assertiveness to prevent closure of the abdomen until the swab was found, but it is not beyond possibility that a less assertive practitioner may have initiated a safety versus production trade-off to allow the operating list to be completed. Those interpersonal non-technical skills of communication and assertiveness, combined with the advanced cognitive activity of reflection in practice, triggered situational awareness permitting the identification of a key stage when the swab was lost, subsequently allowing incident recovery.

The nurturing of cognitive comprehension of situation and environment and the ability to form effective interpersonal relationships, described as non-technical skills, may provide additional barriers to the latent conditions and active failures which contribute to incident development in surgery (Mitchell et al 2011).

Non-technical skills and errors

Analysis and evaluation of the interaction of the scrub practitioner with non-technical skills is captured in two research papers. Wauben et al (2011) determined that
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The scrub and scrub practitioner have opposing perceptions of the effectiveness of inter-professional teamwork, communication and situation awareness. The scrub practitioner population sample recorded a significant difference in six out of seven non-technical elements, by rating the interpersonal skills and cognitive awareness of surgeons during the intra-operative phase as incongruent with establishing effective inter-professional care delivery. These data may indicate that some scrub practitioners struggle to adjust to the threat of working with a range of surgeons who may display complex heterogenic behavioural patterns. The perceived surgical deficit in situational awareness and communication may actually have been a failure by the scrub practitioner to adjust to this independent variable and to use their own non-technical skills to initiate effective communication to optimise their own situational awareness and adopt positive homogenous behaviour.

Catchpole et al (2008) determined the root cause of minor failures within the surgical team allowing measurement of the frequency of non-technical errors. Data analysis determined a significant relationship between high frequencies of intra-operative non-technical errors and longer operative duration in orthopaedic surgery, suggesting that effective application of non-technical skills improved surgical care delivery and reduced latent threats in the clinical environment. The most common root cause of intra-operative errors was a deficit in situation awareness, manifesting as ineffective equipment co-ordination by the scrub practitioner. This confirms the data generated by Wauben et al (2011) which suggested that the existence of a communication deficit between surgeon and scrub practitioner promoted ineffective task management and produced the latent threat of discrepant intra-operative situational awareness.

The transferability of both research papers is enhanced when they are appraised in conjunction with each other. Wauben et al (2011) identified the non-technical skills of task management, communication and situation awareness as being applicable to scrub practice, allowing formulation of the Scrub Practitioner List of Intraoperative Non-Technical Skills (SPLINTS) to enhance the application of technical skills. The framework explicitly defines positive and negative examples of scrub practitioner behaviour and allows an observer to determine the application of non-technical skills during the intra-operative phase. The observer attaches a behavioural rating on the scale of one to four to a defined non-technical action, indicating the assessed practitioner’s task completion rate during a surgical procedure (Mitchell et al 2012). Use of a measureable scoring system permits the assessed practitioner effectively to demonstrate their competency level, highlights latent threats and violations at an individual level, and subsequently allows the observer to provide objective feedback, permitting both practitioners to identify positive and negative aspects of clinical practice (Yule et al 2008). Fundamentally, the feedback stage is facilitated by the ability of the assessor effectively and sensitively to communicate those positive and negative aspects of clinical practice, to promote critical reflection and to prompt the assessed practitioner to adopt or remove practices from their normative behaviour (Mitchell et al 2010).

In the absence of a behavioural ratings system to produce a measureable competency, training and education of novice practitioners may occur on an informal basis using unstructured formative feedback (Gillespie et al 2009). The quality and value of unstructured formative feedback limits the ability of an assessor to articulate a defined competency level and fails to trigger the cognitively active process of shared critical reflection between assessor and novice, preventing modification of negative aspects of an individual’s behaviour.

Gillespie et al (2009) demonstrated that the absence of effective interpersonal communication by experienced practitioners may promote experiential learning by novices exclusively to develop low critical technical skills. Adaptation and modification of those skills occurs without critical input from senior colleagues as the procedure complexity and associated stressors increase. This process continues to promote automaticity and allow skills, rule and knowledge based errors to become established within an individual’s normative behaviour and to contribute to low task rate completion. Ultimately, this manifests as an inability to effectively anticipate a surgeon’s requirements and results in slow provision of instrumentation. This may contribute to the development of the conflict which is endemic within the clinical environment and results in negative interpersonal relationships and aggression by surgeons. This condition negates an individual’s self-efficacy, further reducing the cognitive ability of the scrub practitioner and contributing to individual failure at a skills level.

Psychological safety and transformational leadership

The ability of junior practitioners to challenge traditional hierarchal perioperative staffing structures is essential when a judgement is made that a latent threat is present in the clinical environment (NHSII 2010). However, Silen-Lipponen et al (2005) demonstrated that the withdrawal of an effective support network after a failure has occurred isolates junior practitioners from integrating into the perioperative team, and further reduces their ability to intervene in patient safety issues. This punitive measure detracts from the
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individual’s perception of the existence of a psychological safety network and reduces the ability of leaders and organisations to respond to latent threats (Leonard & Frankel 2012).

Senior theatre practitioners using the SPLINTS framework have the potential to act as role models, displaying positive behaviour by discussing errors and initiating a dialogue to determine how the error may have occurred and to promote psychological safety as a barrier to latent threats. Parallels therefore exist between SPLINTS and the fundamental principles of transformational leadership which construct integrity and trust permitting follower self-determination, intellectual stimulation and empowerment (Curtis & O’Connell 2011). It is essentially these human conditions which the SPLINTS framework is intended to replicate due to the positive collaborative structure of the assessment process. Contact with transformational leadership through the SPLINTS process promotes professional development, autonomy and individual self-efficacy and may increase the ability of organisations to retain effective, safe and empowered scrub practitioners.

Summary

The application of effective non-technical skills is essential due to latent threats caused by the innate fallibility of humans and inadequate organisational systems. However, awareness of their contribution to effective scrub practitioner performance during the intra-operative period remains almost exclusively tacit knowledge. This article has aimed to promote the use of a framework to assess the ability of practitioners to interact with non-technical skills to promote effective interpersonal relationships and enhance situational awareness. Contemporary policy drivers oblige frontline health staff to contribute to the patient safety agenda by introducing and developing innovative projects aimed at promoting organisational sustainability (DH 2011a). SPLINTS contributes to this agenda by developing practitioners’ awareness of ineffective clinical practice which contributes to patient harm. It also strengthens barriers to counter the latent threats endemic in the environment and to increase organisational sustainability by reducing litigation payments. The obvious patient benefit is reduced exposure to harm during the intra-operative phase, with enhanced surgical and health outcomes.

References

Bell R 2012 Hide and seek, the search for a missing swab Journal of Perioperative Practice 22 (5) 151-6
Beuzekom M van, Boer F, Akerboom S, Hudson P 2010 Patient safety: latent risk factors British Journal of Anaesthesia 105 (1) 52-9
Catchpole K, Panesar SS, Russell J et al 2009 Surgical safety can be improved through better understanding of incidents reported to a national database London, NPSA
Curtis E, O’Connell R 2011 Essential leadership skills for motivating and developing staff Nursing Management 18 (5) 32-5
De Vries EN, Ramswatt MN, Smorenburg SM et al 2008 The incidence and nature of in-hospital adverse events: a systematic review Quality Safety Health Care 17 216-23
Flin R, O’Connor P, Crichton M 2008 Safety at the sharp end: a guide to non-technical skills Farnham, Ashgate
Gillespie BM, Chaboyer W, Walls M et al 2009 Operating theatre nurses’ perceptions of competence: a focus group study Journal of Advanced Nursing 65 (5) 1019-28
Mahajan RP, 2010 Critical incident reporting and learning British Journal of Anaesthesia 105 (1) 69-75
Mitchell L, Flin R, Yule S et al 2010 Scrub practitioners’ list of intraoperative non-technical skills Aberdeen, University of Aberdeen
Offredy M, Rhodes M, Doyle Y 2009 The anatomy, physiology and pathogenesis of a significant untoward incident Quality in Primary Care 17 415-21
Patey R 2008 Identifying and assessing non-technical skills The Clinical Teacher 5 40-4
Reason 2008 The human contribution: unsafe acts, accidents and heroic recoveries Farnham, Ashgate
Riley R, Marais E, Polglase A 2006 Governing the surgical count through communication interactions: implications for patient safety Quality Safe Health Care 15 369-74
Toft B, Mascie-Taylor H 2005 Involuntary automaticity: a work system induced risk to healthcare Health Services Management Research 18 211-16
Wauben L, Dekker Van-Doom C, Wijngaarden J et al 2011 Discrepant perceptions of communication, teamwork and situation awareness among surgical team members International Journal for Quality in Health Care 23 (2) 159-66