Lack of standardisation between specialties for human factors content in postgraduate training: an analysis of specialty curricula in the UK

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INTRODUCTION

It is well recognised that a significant proportion of errors involving trainee doctors result from failures of non-technical skills (NTS),[1] which occur at least as frequently as knowledge and technical errors.[2] Regardless of background, all trainees need generic skills of leadership, decision-making, team-working and resource management.[3] It might, therefore, be expected that curricula for different specialties would use similar definitions and teaching methods to specify NTS standards. We have performed an analysis of medical training curricula to determine the extent to which different medical specialties set training objectives in NTS, and to seek trends in the prominence with which these skills feature.

METHODS

All hospital-based medical, surgical and critical-care specialties were obtained in mid-2013, along with each curriculum's immediate predecessor (where available). The curricula were initially searched for the core keywords 'non-technical skills', 'situational awareness' and 'human factors', as well as a list of secondary keywords (generated by a modified Delphi process) grouped under headings 'task management', 'team working', 'situational awareness' and 'decision making'. The list was refined over two generations before consensus was reached. Each curriculum was analysed using NVivo V.10 (QSR International, Warrington, UK).

RESULTS

Curricula of 31 medical, 3 critical-care and 12 surgical specialties were reviewed comprising approximately two million words of text over 88 documents (see online supplementary appendix tables A1

and A2). NTS terms occurred infrequently across most of the examined texts, with most occurrences in anaesthesia, emergency medicine (EM) or intensive care medicine (table 1).

Only these critical-care specialties specify requirements for formal training in NTS, using methods including self-study, tutorials and simulation. NTS are generally described as both knowledge and behaviours requiring observation and assessment, including at professional examinations.[4] The availability of a validated assessment tool in anaesthesia[5] facilitates the delivery of such training.

No comparable training or assessment requirements exist in the curricula of medical and surgical specialties. Although well placed to train and assess NTS, simulation is seldom mentioned outside critical-care specialties, and almost exclusively recommended only for procedural skills training or resuscitation. NTS-related objectives, where specified, are generally considered knowledge skills and assessed accordingly.

Several medical curricula contained no relevant instances of any keywords. These curricula touched on aspects of NTS, but lacked in specific detail on learning objectives or assessment recommendations. For example, communication was considered only in the context of doctor–patient relationships, language skills or record-keeping. Safety was considered in terms of adherence to guidelines, evidence-based practice and continuing professional development. Understanding components of team-working is expected by many of these curricula, but it was generally unclear what the curriculum authors consider these components to be, or how they should be taught.

Table 1 Instances and examples of core non-technical-skills keywords

Specialty	HF	NTS	SA	Sample text from selected curricula	Assessment tool
Anaesthetics	14	28	12	(Demonstrate) 'awareness of **human factors** … and the importance of **non-technical skills** in achieving consistently high performance such as: effective communication, team-working, leadership, decision-making and maintenance of high **situation awareness**' (A27 critical incidents/attitudes and behaviours)	CbD, CEX, examination, simulation
				(Describe) 'the central role **human factors** plays in developing a culture of safe practice and how collaboration and team-working enhances safety' (advanced training (domain 1: clinical practice)/knowledge and skills)	ALMAT, MSF
Emergency medicine	3	4	4	(The trainee) 'ensures the primacy of patient safety in all aspects of communication and cooperation and is able to utilise cognitive strategies, **human factors** and CRM to maximise this'—CC15 communication with colleagues and cooperation/behaviour in emergency department context	ACAT, CbD, CEX, MSF
				(Demonstrate) 'awareness of human factors concepts and terminology and the importance of **non-technical skills** in achieving consistently high performance such as: effective communication, team-working, leadership, decision-making and maintenance of high **situation awareness**'—(C critical incidents/attitudes and behaviours)	ACAT, CbD, examinations
				'Demonstrate good **non-technical skills** such as: effective communication, team working, leadership, decision making and maintenance of high **situational awareness**' (C critical incidents/skills)	ACAT, CbD, DOPS, simulation
Intensive care medicine	3	4	2	'Outline **human factors** theory and understand its impact on safety' (2.7 prioritisation of patient safety in clinical practice/knowledge and 11.3 identifies hazards and promotes safety for patients and staff/knowledge)	CbD
				(Demonstrate) 'awareness of human factors concepts and terminology and the importance of **non-technical skills** in achieving consistently high performance such as: effective communication, team-working, leadership, decision-making and maintenance of high **situation awareness**' (3.10 critical incidents/attitudes and behaviours)	CEX, CbD, examinations, simulation
Allergy	1	0	0	'Outlines **human factors** theory and understands its impact on safety' (1.7 prioritisation of patient safety in clinical practice/knowledge)	CbD
Immunology	1	0	0	'Outlines **human factors** theory and understands its impact on safety' (1.7 prioritisation of patient safety in clinical practice/knowledge)	CbD
Clinical pharmacology	1	0	0	'Be able to describe … the **human factors** which lead to drug use errors' (36 drug errors/knowledge)	PbD
Surgical specialties*	0	0	1	(ST3 person specification) '**situation awareness**: capacity to monitor and anticipate situations that may change rapidly' (selection criteria/personal skills)	Application, interview, references
ACAT	Acute care assessment tool			Direct observation of a trainee over an extended period, commenting on management, reasoning, interpretation of signs, team-working and resource management	
ALMAT	Anaesthesia list management assessment tool			Direct observation of a trainee supervising trainee's conduct over a whole session, including management, record keeping, interpretation of signs/investigations, team-working, leadership and communication	
CbD	Case-based discussion			A post-hoc assessment of case management intended to demonstrate clinical reasoning, decision-making and medical knowledge	
CEX	Clinical evaluation exercise			Direct observation of a trainee over shorter periods. Feedback covers assessment, diagnostic skill, clinical reasoning and decision-making, safety, communication and professionalism	
DOPS	Direct observation of procedural skills			An assessment of technical skill performance; in some specialties (notably emergency medicine) reference is also made to NTS components such as SA	
MSF	Multi-source feedback			Collection of feedback from a trainee's peers from various professional backgrounds, covering knowledge, skills, performance, contribution to safety and quality, communication and team-working and probity	
PbD	Problem-based discussion			A post-hoc assessment of knowledge demonstrating reasoning, decision-making and application of knowledge in relation to drug treatment usually at a population level	

Summary of the occurrences of 'human factors', 'non-technical skill' and 'situational awareness'; unlisted specialties contained no relevant instances of the search terms in 2010.
*Some surgical specialties (cardiothoracic surgery, neurosurgery, oromaxillofacial surgery, otolaryngeal surgery, plastic surgery, paediatric surgery, trauma and orthopaedics and urology) each contained this single instance of 'situation awareness'.
CRM, crisis resources management; HF, human factors; NTS, non-technical skills; SA, situational awareness; ST3, specialty trainee 3.

DISCUSSION

There is evidence that NTS training impacts patient safety in a wide range of clinical areas,[6–8] but NTS learning objectives feature rarely outside critical-care specialties. Although, at first glance, human factors seem primarily of interest to practitioners dealing with the most acute situations, the principles are widely applicable, and have value in less urgent settings. Industrial data clearly show that human errors contribute to critical incidents in a breadth of circumstances,[9] and although error frequency is higher when time and workload pressures increase,[10] significant incidents still occur at lower operating tempos.[11]

It seems likely that most curricula are drafted assuming NTS can be acquired implicitly, for example, through the observation of suitable role models, rather than recognising a need for formalised training and assessment. This may be less desirable as self-assessment of NTS quality is unreliable,[12] and the way objectives and assessments are set and measured has a motivational impact on learners.[13] We suggest a need to move to explicit NTS teaching and assessment in all curricula.

There is a need for assessment tools to enable both trainee and assessor to objectively define acceptable standards. Validated systems exist in anaesthesia for NTS assessment, and comparable tools exist in surgery and EM, but there is a need to develop such taxonomies in other specialties. NTS are a behavioural system, and assessments must include an observational component: although retrospective assessments such as case-based discussions are often cited as assessment tools, it is unlikely that instruments designed to assess knowledge are appropriate for measuring NTS.

Many specialty programmes are recognising these needs at a local level; however, teaching and assessment can vary within and between institutions. A fundamental feature of multidisciplinary teams working in high-reliability organisations is that team members observe each other's practice and offer feedback on it. This requires each member of the team, regardless of professional background, to have a shared understanding of NTS.[4] With such variability in training methods, the body of literature and educational materials generated by one specialty would at best be opaque, and at worst inaccessible, to another. This presents significant barriers to delivering multidisciplinary team-training.

We hope that this paper will spark a debate about the role perceived for NTS training within individual specialties, and how we can find commonalities around which to build quality training to enhance patient safety.

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