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Safety on the ground: using critical incident technique to explore the factors influencing medical registrars' provision of safe care

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ABSTRACT

Background Avoidable patient harm in hospitals is common, and doctors in training can provide underused but crucial insights into the influencers of patient safety as those working 'on the ground' within the system. This study aimed to explore the factors that influence safe care from the perspective of medical registrars, to identify targets for safety-related improvements.

Methods This study used enhanced critical incident technique (CIT), a qualitative methodology that results in a focused understanding of significant factors influencing an activity, to identify practical solutions. We interviewed 12 out of 17 consenting medical registrars in Scotland, asking them to recount their observations during clinical experiences where something happened that positively or negatively impacted on patient safety. Data were analysed manually using a modified content analysis with credibility checks as per enhanced CIT, with data exhaustiveness reached after six registrars.

Results A total of 221 critical incidents impacting patient safety were identified. These were inductively placed into 24 categories within 4 overarching categories: *Individual skills*, encompassing individual behavioural and technical skills; *Collaboration*, regarding how communication, trust, support and flexibility shape interprofessional collaboration; *Organisation*, concerning organisational systems and staffing and *Training environment*, relating to culture, civility, having a voice and learning at work. Practical targets for safety-related interventions were identified, such as clear policies for patient care ownership or educational interventions to foster civility.

Conclusions This study provides a rigorous and focused understanding of the factors influencing patient safety in hospitals, using the 'insider' perspective of the medical registrar. Safety goes beyond the individual and is reliant on safe system design, interprofessional collaboration and a culture of support, learning and respect. Organisations should also promote flexibility within clinical practice when patient needs do not conform to standardised care pathways. We suggest targeted interventions within educational and organisational priorities to improve safety in hospitals.

INTRODUCTION

How safe would you feel as a hospital inpatient? Avoidable patient harm in hospitals

WHAT IS ALREADY KNOWN ON THIS TOPIC

- ⇒ 10% of hospital inpatients in high-income countries come to harm while receiving hospital care.
- ⇒ Doctors in training, as those intimately involved in patient safety 'on the ground' in hospitals, are an untapped resource to understand and identify solutions to improve safety in hospitals.

WHAT THIS STUDY ADDS

- ⇒ This study used critical incident technique to explore the factors that influence the provision of safe patient care from the perspective of the medical registrar, to identify practical targets for safety-related improvements.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

- ⇒ Using these insights, an array of educational and organisational priorities have been identified for intervention to improve safety in hospitals, for example, implementing clear policies for patient care ownership and educational strategies to enhance flexibility and behavioural skills.

is common and a leading global cause of morbidity and mortality.¹ Doctors in training (qualified doctors who are not yet consultants) are essential providers of inpatient care who commonly make or witness errors, accumulating a wealth of first-hand experience in both safe and unsafe situations.²⁻³ However, few studies have explored the factors that influence patient safety in hospitals from the viewpoint of doctors in training.²⁻⁴⁻⁷ Through neglecting this perspective, we risk missing crucial insights from 'insiders' within the system to effectively target areas for improvement.⁸⁻⁹

The landmark report 'To Err is Human'¹⁰ by the Institute of Medicine invigorated the conversation around patient safety worldwide,¹¹ with an estimated 10% of patients in high-income countries harmed while receiving hospital care.¹²⁻¹³ National patient

safety strategies^{14 15} and a renewed focus on safety in medical postgraduate curricula reflect the increasing priority afforded to safe care in the UK.¹⁶⁻¹⁸ Indeed, the UK postgraduate internal medicine curriculum now includes a mandatory requirement for ‘simulation training involving human factors.’¹⁸ While training in behavioural skills through simulation-based education is a laudable aim, this encompasses only a small element of the wider science of human factors and ergonomics (HFE). The key principles of HFE focus on the design of safe systems that optimise human performance and well-being.^{19 20} To understand how system design can be improved, we must gain as close an understanding as possible of the day-to-day experience, or work-as-done, of those within the system.²¹

In the UK, identifying and learning from adverse events primarily relies on voluntary incident reporting systems, which are defined by the absence of safety, hampered by poor engagement and confer a limited understanding of day-to-day work.^{8 12 22} Safety culture correlates with safety behaviours,²³ however, physicians are often only peripherally involved in organisational safety strategies and under-report patient safety incidents.^{2 8 24 25} Doctors in training are an untapped resource influencing safe care, as a group intimately aware of conditions affecting safety ‘on the ground’.^{3 26} They, therefore, hold the potential to be powerful agents for change, for example, through engagement in quality improvement work to drive service development.²⁷⁻²⁹

The medical registrar is a senior grade of doctor in training in the UK, usually the most experienced physician on site out of hours.³⁰ Registrars hold a crucial role influencing safety in hospitals, through their remit as a senior decision maker, educator, team builder and communication intermediary.^{6 30} Through exploring the perspective of those in key positions influencing safety

‘on the ground’, we improve our chances of success in improving safety in hospitals.

Aim

We aimed to:

1. Explore the perspective of medical registrars regarding the factors that influence safe care.
2. Use these focused insights to identify areas that could be effectively targeted for safety-related improvements.

METHODS

Study design

This qualitative postpositivist study used enhanced critical incident technique (CIT). CIT was first described by Flanagan, as a tool to understand the important requirements of an activity.³¹ We chose this methodology because it results in a highly focused understanding of the factors that promote or detract from an activity and facilitates the identification of practical solutions to improve the likelihood of success in that activity.³¹⁻³³

The term critical incident (CI) can be misleading to healthcare professionals, as it may be confused with similar terms such as a critical safety event. The unit of analysis in CIT methodology is not the event itself, but rather the factor (termed the ‘CI’) that influenced the activity or outcome.³⁴ The word ‘critical’ denotes that the incident had a significant impact on the outcome.³³ Therefore, a CI could be alternatively understood as a ‘significant factor’ that influences an activity (figure 1). CIT is, therefore, focused on the CI (factor) that influenced the activity or outcome, as opposed to the activity or outcome itself.

CIs were defined as factors that significantly helped or hindered safe patient care, supported by clinical observations involving a clear description of (1) events themselves, (2) the incidents that influenced the events and (3) the



Figure 1 Illustrative example of a critical incident during an activity of baking a cake.

importance of incidents to the outcome. Enhanced CIT, introduced by Butterfield *et al.*,³⁵ was chosen to improve the trustworthiness of the results. Enhanced CIT includes ‘wish-list (WL) items’—factors that were not present at the time, but which participants believe would be helpful to the activity—and a series of nine credibility checks within the analysis.³⁵

Context

This study was conducted in Scotland, where doctors undertake 2 years of foundation training after graduating from medical school before embarking on specialty training. Those pursuing a medical specialty undertake stage 1 internal medicine training (internal medicine trainee years 1–3), followed by stage 2 internal medicine training (specialist trainee years 4–7). In stage 2, medical trainees generally dual train in internal medicine and another medical specialty and are commonly known as, and will be referred to hereafter, as ‘medical registrars’.

Participant recruitment

We invited medical registrars working in Scotland to volunteer to participate in this study using a recruitment poster disseminated via email, Microsoft Teams channels and professional networks. Written informed consent was gained online with verbal reiteration at interview. We sent participants the interview schedule in advance to allow time to consider responses.

Patient and public involvement

Patients or the public were not involved in the design, conduct, reporting or dissemination plans of this study.

Data collection

We developed and followed an interview schedule to ensure consistency with CIT methodology (online supplemental appendix 1). We asked participants to recount their observations during clinical experiences where something happened that positively or negatively impacted on patient safety.

Interviews were conducted by KR, audiorecorded and transcribed verbatim. KR conducted interviews online due to the diverse geographical location of the participants. KR had the necessary deep familiarisation with both CIT and the relevant clinical context to understand the activities and outcomes being studied.³³

Sample size was not predetermined, however, the sample was judged to be sufficient based on reaching exhaustiveness, the term used to indicate saturation as per CIT methodology (table 1).³⁵

Data analysis

We analysed the data as per enhanced CIT protocol.³⁵ Often, more than one CI was identified as having influenced an event due to the complex nature of clinical situations involving patient safety. These were included as separate CIs linked to the same clinical event, to ensure all factors were included.

We extracted CIs and WL items from the first interview and sorted them inductively into categories that were meaningful to the research aims. This process was repeated for each interview sequentially, with incidents identified from each interview placed into categories which were developed or altered as necessary. This comprised a modified content analysis, the recommended analysis method for a CIT study.³² The analysis was completed manually, using Microsoft Word and Excel. A ‘best-fit’ approach was used when an incident could fit into more than one category. KR completed this initial analysis, with the categories then reviewed and discussed in detail between KR and JK, to agree on refinements to incident placement, category titles and operational descriptions. Credibility checks³⁵ conducted by different coauthors, also contributed to adjustments (table 1). The final categories and operational descriptions were then reviewed and agreed on by all authors. KR developed suggested implications for practice, directly influenced by the findings and reviewed and agreed on by all authors.

RESULTS

Characteristics

Seventeen medical registrars completed online consent, with 12 undertaking interviews between November 2022 and February 2023. Five were unable to schedule an interview within the data collection period, so withdrew from the study. Interview duration ranged from 26 to 70 min, with a mean of 54 min. Participant characteristics are displayed in table 2.

Findings

We identified 221 CIs impacting on patient safety, placed into 24 subcategories within four overarching categories: individual skills; collaboration; organisation and training environment (figure 2). Credibility checks are detailed in table 1. Category operational descriptions and participant rates are included in online supplemental appendix 2.

Individual skills

This category encompassed how the behavioural and technical skills of the medical registrar influence safety.

Using your team

Asking for help and delegating appropriately ensured that the ‘right people [are] doing the right job’ (P01) to allow for the ‘cognitive burden of figuring out what’s going on’ (P01).

Situational awareness

Recognising problems and planning ahead was key to avoiding ‘picking up the pieces at the other end’ (P03), including ‘having a plan ABC&D’ (P11) and an awareness of the surrounding environment:

‘Understanding...who you’ve got on your team, what they can do, what you can do, what your hospital is doing...how many people need to be seen on the take? How unwell are they?’ (P11)

**Table 1** Description and results of credibility checks within the analysis as per enhanced critical incident (CI) technique

Credibility check	Description	Result	Author
Audiotaping Interviews	The interviews were audiorecorded and transcribed ensure the accuracy of the accounts	Confirmed for all interviews	KR
Interview fidelity	We confirmed fidelity to the interview protocol via independent review of 25% of interview audiorecordings selected using a random number generator	Confirmed for 25% interviews	SC-S
Independent extraction of CIs	25% of interview transcripts, selected using a random number generator, were independently reviewed to identify and extract CIs and WL items. For incidents that did not match, the reviewer discussed the discrepancy with the primary researcher for the purposes of resolving the difference. If resolution could not be reached, the incident in question was not used in further analysis.	Alterations made to 8 CIs	SES
Exhaustiveness	We reviewed the number of new categories created when sorting the incidents identified from each interview. Exhaustiveness was achieved when no new categories emerged.	No new categories emerged after interview 6 out of 12	KR
Participation rates	We calculated participation rates for each category. A category was considered viable if a minimum of 25% of participants identified incidents within it. ^{35 46}	Confirmed for all categories (online supplemental appendix 2)	KR
Placing incidents into categories by an independent judge	An independent reviewer was provided with the category headings and operational descriptions and asked to place 25% of CI and WL items, selected using a random number generator, into the category they felt it belonged. An acceptable match rate with the primary researcher was set at 80% or over. ⁴⁷	First round: 69% concordant. Revision of category operational definitions, review of incident categorisation and rewording of 19 CIs to improve clarity. Second round: 85% concordant.	SC-S
Cross checking by participants	We contacted the participants by email to confirm that they agreed with the incidents identified from their interview, and the categories into which those incidents had been placed	No changes made to the CIs. Two CIs were reassigned to different categories	KR

Continued

Table 1 Continued

Credibility check	Description	Result	Author
Expert opinions	We submitted the category headings and operational definitions to an internal and external expert with knowledge in the field of patient safety, human factors and hospital medicine. They were asked whether they found categories useful, whether they were surprised by any of the categories and whether they thought anything was missing.	Two experts (VT and external expert EM) confirmed that they found the categories useful. They noted the benefits of a theme dedicated to collaboration, emphasising the importance of this which can otherwise be lost within other non-technical skills frameworks. They felt there was a degree of overlap within the categories, particularly within the collaboration theme. They were surprised that there was not a separate category for leadership, however, noted qualities of leadership within other categories. They felt escalation encompassed multiple skills, making it challenging to categorise.	KR, VT
Theoretical agreement	The assumptions and findings from this study have been compared with a review of relevant literature in the field as described in the discussion.	See discussion	All authors

CI, critical incident; WL, wish-list.

Decision-making

Cognitive flexibility in decision-making influenced safety, such as the ability to alter decisions with changing circumstances or accepting risk when *'faced with decisions where there isn't necessarily a right answer'* (P04). Cognitive bias was a threat to patient safety, such as a delay in investigation due to diagnostic momentum:

'It was handed over that the consultant had seen her X-ray, didn't want any further scans... it's quite clearly documented...and I know stuff changes but...we are so guided by the notes and what we see in it beforehand, aren't we?... [she] was actually really sick' (P09)

Experience and technical skill

A breadth and depth of clinical experience, knowledge and skills were required for competence and confidence within the medical registrar role. Unfamiliar situations could engender self-doubt:

'If it had been a situation that I was more familiar with...I would have more confidence in maybe challenging something I didn't think was quite right' (P07)

Assertiveness

Using assertiveness to challenge colleagues was key, either directly or through probing for learning: *'you want to know what their rationale is'* (P09). Assertiveness was complicated by the transitional space that medical registrars occupy in the medical hierarchy: *'you're not the most senior member of the team, but you're making very senior decisions'* (P11), with conflict between *'having to respect your consultant'* (P11) and being *'an independent practitioner'* (P11).

In summary, the ability to harness and refine effective behaviour skills as the medical registrar strongly influenced patient safety.

COLLABORATION

This category involved how interprofessional individuals and teams support, communicate and collaborate with each other.

Acts of kindness

Altruistic offers of help from colleagues positively influenced safety, such as volunteering *'to take the [on-call] phone'* (P04) to allow breaks.

Support

Being able to access support from the interprofessional team was key. This was influenced by the approachability

**Table 2** Participant demographics

Demographic	N
Self-identified gender	
Woman	7
Man	5
Dual-training specialty (other than internal medicine)	
Geriatric medicine	6
Respiratory medicine	3
Acute medicine (a distinct medical specialty in the UK concerned with the assessment, diagnosis and treatment of adult patients with urgent medical needs)	1
Renal medicine	1
Gastroenterology	1
Training region within Scotland	
South-East	6
North	3
East	2
West	1
Training grade	
ST4 (minimum 5 years postgraduate)	4
ST5 (minimum 6 years postgraduate)	3
ST6 (minimum 7 years postgraduate)	5
Self-identified ethnic group	
White	11
Asian, Asian Scottish or Asian British	1
Age range	
24–29	1
30–34	8
35–39	3
Employment status	
Full time	10
Less than full time	2

of seniors, the ability to seek reassurance from colleagues to *'reinforce your decisions'* (P03) and peer-to-peer advice:

'Having a peer to bounce those ideas off was really helpful, and it's just that reassurance of am I being ridiculous? Am I missing something?' (P09)

Trust

How relationships and trust build within teams was influential, with lack of team continuity being detrimental:

'You need to have a relationship with people...if you've only seen them once or twice...you doubt their decision making as they doubt yours' (P09)

Trust could be affected by perceived unsafe clinical decisions by a senior, resulting in *'[avoiding] asking for their opinion about certain things because I disagree with their*

approach' (P10). Honesty was also essential: *'you're having to really rely on that information'* (P11).

Team communication

Clarity and adequacy of team communication was crucial for safety, for example, communication with nursing staff:

'I didn't really speak to the nurse who was looking after this patient, who might have, given the opportunity, said...pretty sure you shouldn't be doing this' (P04)

Handover

The quality of information transfer at critical points, such as during referrals or transition of care, was fundamental. This included written communication, such as treatment escalation plans aiding out of hours decision making, or verbal communication, for example, prioritisation during a referral hindered by the lack of a 'headline' statement:

'I said, can I ring you back in 10 minutes? And he said, yeah, that's fine. And then when I rang him back...he said oh it was just about this woman that's got ST elevation on the ECG [medical emergency]. And I said, why didn't you tell me about that when [you] first rang?' (P01)

Briefing and debriefing

Resuscitation team briefings facilitated role allocation and enabled *'you to understand your team'* (P02). Formal and informal peer and team debriefing promoted safety though fostering a culture of collaboration and improvement:

'They have got a registrars group...everybody discusses out of the hours responsibility, how challenging it is for us, and what you can do to help each other' (P08)

Flexibility to enable patient-centred care

The ability to be flexible or deviate from protocols when interacting across specialties, professions and hierarchy gradients to keep the patient at the centre of care promoted safety, for example, flexibility in roles: *'being a bit dynamic to say yes, triage is a nursing role, but actually if there's doctors sat there doing nothing then the doctors can do it'* (P02). A focus on the patient facilitated an ease of interaction between specialties:

'Everyone just wanted the best for the patient. There wasn't a tit for tat as to who was doing what, everyone kind of did their bit' (P12)

Rigid protocols fostered a lack of appreciation that *'[the] protocol is there, but clinical judgement always trumps everything'* (P08). Inflexible referral pathways without consideration of the patient impeded safety:

'I think that inflexibility and that inability to be a bit dynamic and see that, actually yes, it might not be what we normally do, but it's the right thing for the patient' (P02)

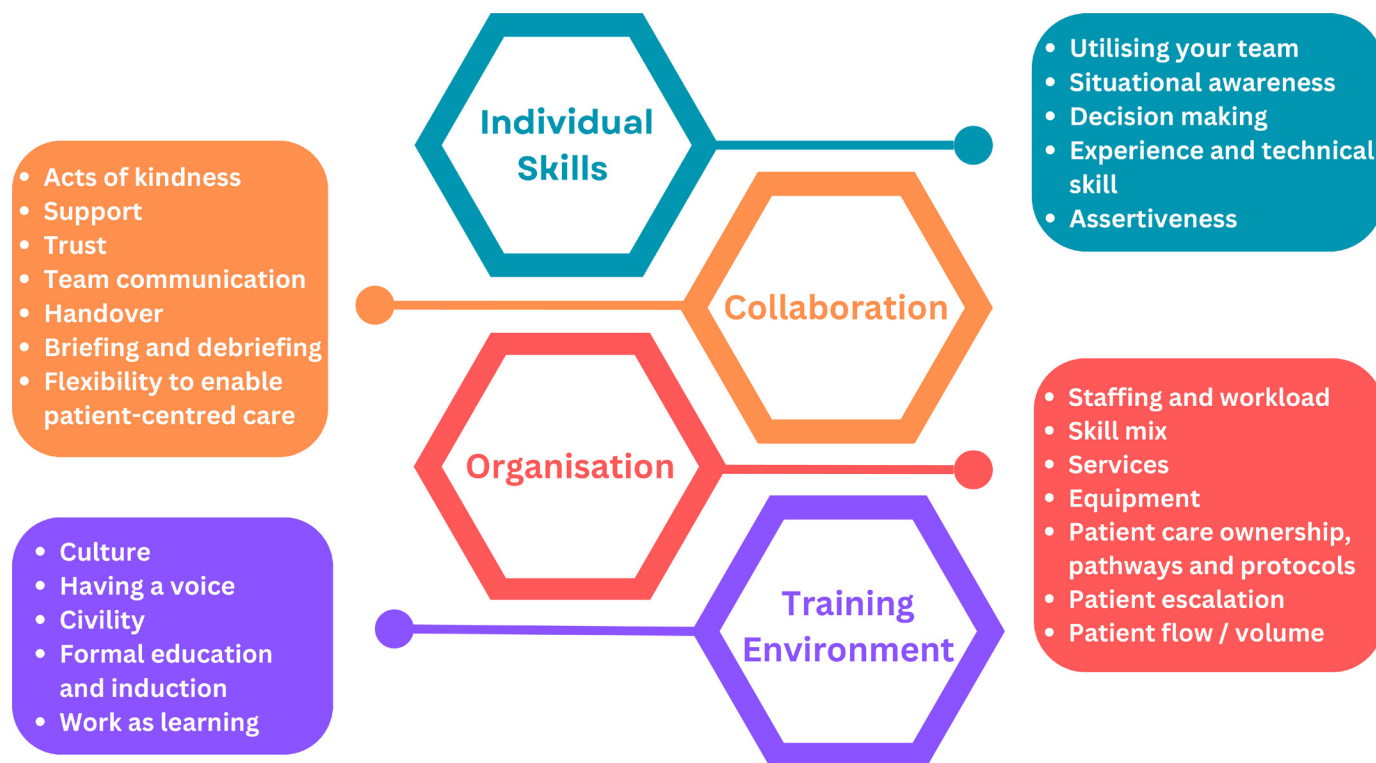


Figure 2 Representation of the overarching and subcategories influencing patient safety.

In conclusion, patient safety was shaped by the ways in which interprofessional teams collaborate, communicate and support each other. A central concept was the ability to demonstrate flexibility and vary practice to ensure the patient remained the focus of care.

ORGANISATION

This category concerned the ways in which the workforce and organisational systems influence safety.

Staffing and workload

Inadequate staff to patient ratios was detrimental, as well as challenges in managing workload due to fatigue, interruptions and competing demands. One participant describing feeling *'set up to fail'* (P11) as a medical registrar due to being *'the end point in a protocol to lots and lots of people needing your help and time'* (P11).

Skill mix

Having the right people in the right roles was key. A senior lacking adequate experience resulted in hesitancy in asking for help. Rostering two medical registrars on call with complementary skill sets improved safety, as well as allocating a healthcare professional to coordinate the team in an oversight role:

'What ties it together very nicely is that there are coordinating ANP's [advanced nurse practitioners]... who know exactly how it works, who can provide quite a nice link with the nurses on the wards and who take away a lot of that coordination... they've got a better birds' eye view' (P05)

Services

It was essential to have access to appropriate services, such as ambulatory care, a robust triage system or medical input into non-medical specialties. Conversely, *'patient care changing based on what day of the week it is'* (P06) hindered safety.

Equipment

Access to working equipment was influential, with information technology (IT) a recurring topic:

'We don't have comprehensive and integrated IT systems that are fast, efficient, talk to primary care...the computer system is incredibly slow... your time could have been so much better used' (P02)

Patient care ownership, pathways and protocols

Having clear procedures, for example, an admission pathway for acute coronary syndrome, promoted safety. A frequent topic that impeded safe care involved unclear policies for the ownership of care of medical patients on non-medical wards or waiting for beds in the accident and emergency (A&E) department:

'If you come in through A&E...you have this kind of no-man's land after you've been referred to medics...and I do wonder if they suffered because of sitting there for 18 hours...the old school consultants wouldn't review people in A&E' (P05)

Patient escalation

Appropriate and timely patient escalation was essential, helped by accessible escalation pathways: *'the emergency theatre had a who to call algorithm... you can say to a porter... please ring that number...you don't need anyone trained'* (P12)

Patient flow/volume

Managing patient flow was key for safe care in an appropriate environment, with departmental overcrowding a common detrimental factor:

'[An elderly gentleman] was placed back on a plastic chair...in a waiting area...there was an absence of any drip stands left...[he] was very unwell...trying to hold his own bag of fluid, which was beyond suboptimal' (P06)

To conclude, the ways in which the workforce interact with organisational systems significantly influenced safety. A recurrent factor resulting in unsafe care comprised inadequate pathways for the ownership of care of patients outside of specialty areas.

TRAINING ENVIRONMENT

This category encompassed workplace culture, speaking up, respectful interactions and learning at work.

Culture

The values, ideas, customs and beliefs within an organisation or training environment influenced safety, with a widespread challenging expectation that asking for help as the medical registrar goes 'against the grain', particularly out of hours:

'I've had them [medical consultant] say to me, "what is your question? Why are you phoning me? Feel free to cope"...that masochistic culture, so you don't phone the consultant, you just get on with it' (P11)

Having a voice

Creating conditions that encouraged speaking up behaviours within the team was key. Hindering factors included steep hierarchies and not being heard or valued. Helping factors included listening and being receptive to challenge as a senior clinician:

'It's good for someone to be able to interrupt that and raise an alternative possibility...I was quite confident about what I felt the patient needed before this was pointed out to me' (P04)

Civility

Patient safety was threatened when colleagues were perceived to be rude or obstructive:

'It wasn't that easy to get anaesthetics...they were slightly obstructive initially and when they came down, they were a bit rude...it made me feel more stressed...and more scared to phone anaesthetics in the future' (P07)

Formal education and induction

Useful and relevant educational opportunities and a personalised induction, for example, offering shadowing, were important for safe care:

'it's not only about clinical knowledge, it's understanding the system, understanding the hospital' (P08)

Work as learning

Using everyday encounters as educational opportunities positively impacted safety, for example, using a clinical error as a learning moment:

'I was able to have a really good learning opportunity with the FY2 [foundation year 2 doctor] and we talked about delirium and sedation...they were actually really appreciative of having that chat' (P07)

In summary, the wider training environment profoundly affected safety, with key influencing factors including culture around asking for help, speaking up, respecting each other and learning at work.

Implications for practice

We have used these findings to identify areas that could be effectively targeted for safety-related improvements. These educational and organisational priorities are summarised in [figure 3](#).

DISCUSSION

In this CIT study, we have identified four overarching categories that influence medical registrars in their ability to provide safe care: individual skills, collaboration, organisation and training environment. Our findings reflect complementary work by the Royal College of Physicians describing key problems facing medical registrars in the UK, identifying themes including workload, teamwork, professional interactions and training.³⁰

Our findings align with the principles of HFE, with a unifying thread concerning how interactions between people and their environment influence safety.³⁶ The findings share similarities with Rosenorn-Lanng's SHEEP model,³⁷ a generic framework of factors related to error in healthcare, with kindred themes of systems, human interaction, environment, equipment and personal factors. However, we discovered categories not represented in this model, such as acts of kindness, trust, learning at work and patient care ownership. Furthermore, the SHEEP model suggests that deviation from protocols is detrimental to safety, contradictory to our category 'flexibility to enable patient-centred care'. We note that the SHEEP model generally focuses on factors leading to error, and these differences may be explained by our alternative approach of examining the influencing factors where safety was present as well as absent. This is aligned with 'safety II' principles that advocate learning 'from what works as well as from what fails'.²¹

Priority	Area	Suggested educational priority or policy implication
Educational Priorities	Simulation-based Education (individual and team)	Suggested targets for learning outcomes <ol style="list-style-type: none"> Behavioural skills <ol style="list-style-type: none"> Delegation, situational awareness, decision making, assertiveness, communication, support, technical skills Civility – challenging incivility and supporting colleagues Strategies to empower speaking up behaviours within your team Briefing and debriefing Information transfer – referrals and handover
	Organisation Wide Education	Suggested targets for learning outcomes <ol style="list-style-type: none"> Civility Culture: speaking up and asking for help Recognising and maximising opportunities for learning at work Peer debriefing Flexibility to enable patient-centred care <ol style="list-style-type: none"> Interprofessional and cross-speciality training with focus on collaborative working and shared goals
	Induction	<ol style="list-style-type: none"> Shadowing opportunities for new registrars Induction process personalised to needs of new starts
Organisational Priorities	Staff Support	<ol style="list-style-type: none"> Prioritisation of continuity for healthcare teams in rota management Two medical registrars on call with complementary skill sets Healthcare professional in dedicated coordination / oversight role within on-call teams Ensuring clinical areas are staffed by those with adequate experience Space and opportunity for peer support and peer debriefing, e.g. a staff forum, spaces for listening or peer mentoring programme
	Pathways	<ol style="list-style-type: none"> Accessible escalation pathways for patient care Clear ownership of patient care when outside own speciality area Equity and ease of access to key services, such as a 7-day ambulatory care service
	Processes	<ol style="list-style-type: none"> Robust handover systems e.g. universal treatment escalation plans Embedding team briefings and debriefings within usual practice e.g. for medical emergency team or at shift start and end Allowance of flexibility and variation in practice when required to prioritise patient need
	Equipment	<ol style="list-style-type: none"> User-friendly and efficient information technology (IT) systems IT systems allowing communication between primary and secondary care

Figure 3 Summary of suggested implications for practice.

The concept of flexibility to enable patient-centred care reflects healthcare professionals being able to vary their practice to do the ‘right thing’ for patient safety. Adaptability and plasticity within teams when working towards a common goal is thought to enhance resilience within healthcare systems.^{38 39} However, healthcare organisations often value standardisation, stability and the control of risk, which must be balanced with the adaptive flexibility that is essential when navigating the complexity intrinsic to healthcare.^{40 41} Rigidity within teams is promoted by professional silos, hierarchy, externalisation of responsibility or fixation on incidents.^{42–44} Flexibility in healthcare is commonly considered in the context of the ability of the workforce to adapt to different tasks or roles.⁴¹ We extend this concept by proposing that healthcare professionals must also adopt the *cognitive flexibility* required to overcome these barriers, allowing variations in clinical practice that prioritise the needs of a particular patient over conformity and standardisation. This variability echoes ‘safety II’ principles regarding the need for constant adjustment to meet prevalent conditions,²¹ an approach

essential for safety when combined with a shared goal of patient-centred care. There is a paucity of evidence on how we can foster this flexibility in healthcare teams,⁴⁵ and this should, therefore, be a priority for future research.

Strengths and limitations

A CIT study involves a clear focus for data collection and analysis, leading to a deep understanding of participants’ views regarding what helps or hinders an activity. This results in the efficient generation of practical solutions to problems, a characteristic useful for healthcare research.^{32 33} As this study aimed to identify practical points influencing safety, we divided the categories with a degree of granularity. For example, the categories of ‘briefing and debriefing’, ‘handover’ and ‘team communication’ could have feasibly been combined into one category—communication. However, such a broad-brush approach risked losing practical utility—‘communication’ is less meaningful when considering strategies to improve safety compared with a detailed approach where specific solutions are clearer. Consequently, a degree of overlap



exists between the categories and the CIs placed within them, with a 'best-fit' approach used where required.

This study included representation from medical registrars from a range of dual training specialties across all Scottish training regions, however, only one registrar identified as being from an ethnic group other than white and this study was exclusively within Scotland. This may limit the wider generalisability of the results, particularly regarding the perception of culture within medicine, which is likely to vary significantly dependent on multiple factors including location. We chose to exclusively use the perspective of the medical registrar, given their central role within patient safety.³⁰ However, we are conscious that this has limited insight from other perspectives, such as nurses, allied healthcare professionals or other physician groups. We also note that although qualities of leadership feature throughout the categories, there was no dedicated leadership category. Medical registrars may less readily recognise factors related to their own leadership role within the team. A further study including a wider interprofessional group, for example, the 'hospital at night' team, would be a valuable addition to elaborate on this model. CIT focuses on the factors that influence an activity or outcome (in this study, patient safety), however, an interesting avenue of further research would be an exploration of the ways in which safe or unsafe events influence future behaviour.

This is a postpositivist study, acknowledging that perception of reality is influenced by participants' and researchers' experiences. Although it is impossible to reach objectivity, a 'degree of trustworthiness' can be reached though comparing and combining subjective but independent views as well as following the rigour of enhanced CIT methodology.^{32 35} As this study relied on the inductive identification and categorisation of CIs, the researchers' prior clinical and educational experiences influenced the interpretation and findings, particularly KR and JK who are female medical registrars from different regions within the same training programme as the participants. KR had pre-existing professional relationships with some participants, as a medical registrar and medical education fellow within National Health Service Lothian, with participants aware that KR had an interest in simulation-based education and patient safety. However, there was clinical diversity within the research team, which included a general practitioner, a surgical trainee and an acute medicine consultant.

CONCLUSIONS

Through rigorous exploration of everyday experiences of medical registrars, 'insider' figures central to safety, we have gained a focused understanding of what influences safe care in hospitals. Safety goes beyond the individual, to encompass safe system design, interprofessional collaboration and a culture of support, learning and respect. Organisations should also enable healthcare professionals to demonstrate the flexibility required to prioritise individual patient need over standardised care when

appropriate. We recommend that leaders consider the educational interventions and organisational priorities suggested to improve safety in their hospitals.

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