


Surgical incidents and their impact on operating theatre staff: qualitative study

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Abstract

Background: Surgical incidents can have significant effects on both patients and health professionals, including emotional distress and depression. The aim of this study was to explore the personal and professional impacts of surgical incidents on operating theatre staff.

Methods: Face-to-face semistructured interviews were conducted with a range of different healthcare professionals working in operating theatres, including surgeons and anaesthetists, operating department practitioners, and theatre nurses, and across different surgical specialties at five different hospitals. All interviews were audio recorded, transcribed verbatim, and analysed using an inductive thematic approach, which involved reading and re-reading the transcripts, assigning preliminary codes, and searching for patterns and themes within the codes, with the aid of NVivo 12 software. These emerging themes were discussed with the wider research team to gain their input.

Results: Some 45 interviews were conducted, generally lasting between 30 and 75 min. Three overarching themes emerged: personal and professional impact; impact of the investigation process; and positive consequences or impact. Participants recalled experiencing negative emotions following surgical incidents that depended on the severity of the incident, patient outcomes, and the support that staff received. A culture of blame, inadequate support, and lack of a clear and transparent investigative process appeared to worsen impact.

Conclusion: The study indicated that more support is needed for operating theatre staff involved in surgical incidents. Greater transparency and better information during the investigation of such incidents for staff are still needed.

Introduction

Medical errors are thought to affect around 16 per cent of patients admitted to hospital, with 50 per cent of these occurring during surgical procedures^{1,2}. A 'surgical incident' can occur during a surgical or invasive procedure, and may result in patient harm. A recent assessment of the problem in the UK National Health Service (NHS) identified 314 reported surgical incidents in the interval between April 2019 and December 2019, with 165 due to wrong-site surgery, 91 a retained foreign object, and 58 a consequence of wrong implant/prosthesis³.

Health professionals have been recognized as secondary victims of medical errors^{4,5}, defined as 'a health care provider involved in an unanticipated adverse patient event, medical error and/or a patient related-injury, who becomes victimized in the sense that the provider is traumatized by the event'^{5,6}. Studies^{7,8} have highlighted that, following a surgical incident, surgeons, theatre nurses, and other health professionals can experience emotional distress and depression, with symptoms similar to those of post-traumatic stress syndrome. A survey of 7900 surgeons indicated

that, following their involvement in a surgical incident, they experienced low quality of life, anxiety, burnout, and depression in the following 3 months^{5,6}. Such experiences not only affect surgeons and their families, but can also have an adverse impact on the provision of care, clinical performance, and patient safety^{4,5}. These surgical incidents can have enduring effects and, in some instances, the individuals may never fully recover and may consider changing profession^{7,9–11}. Some studies indicate that an adverse event can lead to increase in use of illicit drugs⁹, addiction to alcohol, decrease in quality of life, depression, and burnout^{12,13}.

A systematic review¹⁴ to investigate the impact surgical incidents can have on operating theatre staff highlighted how little had been published on the impact of surgical incidents on the wider operating team beyond surgeons and anaesthetists, or how surgeons and other health professionals might change their behaviours following a surgical incident.

The main aim of this qualitative study was to explore the psychological, emotional, and behavioural impact of surgical

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incidents on all operating theatre staff, and how their attitudes or behaviours might change following such events.

Methods

The study was classified as a service evaluation by a University Ethics Committee and Health Research Authority, and registered as such within the organization (research site) concerned (IRAS ID: 237980/1158905/37/907). This study was conducted at five teaching hospital sites within one large NHS Trust that provides multispecialty surgical procedures including emergency and major trauma. A recruitment pack including an invitation letter and information sheet was e-mailed to all theatre staff (medical and non-medical) working across the five hospital sites, asking them if they would be willing to participate in the research study. A range of healthcare professionals working within operating theatres (surgeons, anaesthetists, theatre nurses, operating department practitioners (ODPs), and theatre support workers) were approached and asked if they would like to participate in this study. Purposeful sampling was employed to recruit relevant health professionals working in operating theatres with varied experiences across the five hospitals. Some 129 operating theatre staff were identified through investigation records as being involved in a surgical incident and were all contacted by e-mail. The snowball sampling technique was also used to identify potential participants. Posters promoting the study were displayed on Trust noticeboards and in rest rooms. A summary of the study was also presented to medical and non-medical staff who attended any one of 4 different audit days, and three quality and safety meetings attended by staff working in different specialties, and a broad range of other staff, including patient safety advisors and managers involved in risk management and incident investigations, between March and November 2018. A summary of the study was also presented to the Trust's Safer Surgery Committee and Trust's Safety Culture Committee, chaired by the Trust Board of Directors, encouraging them to both promote and participate in the study. Health professionals were given the opportunity to ask the researcher questions about the study before participating.

All face-to-face interviews took place at a convenient time and location for the interviewee, and without any other individual present. A standard interview topic guide was used to help guide the interview (available on request). Questions in the topic guide were informed by a literature review, and consultation with patient safety and qualitative research experts. The interview schedule was piloted with four experienced theatre nurses for face validity, and included general questions on the possible causes of surgical incidents, the effects these incidents had on the participant, strategies they used to cope with the incident, any change in attitude and behaviour following the event, and their perspectives of the culture of learning from incidents at both an organizational and individual level, and relevant prompts. All interviews were conducted by a single researcher, audio recorded, transcribed verbatim, and analysed using a reflexive inductive thematic approach¹⁵ with the aid of NVivo 12 (QSR International, Melbourne, Victoria, Australia)^{16,17}. Saturation was achieved when the themes suggested by interviewees from different professional groups began to repeat themselves, and subsequent participants from the different professional group interviews yielded no major new insights. The researcher used a reflexive thematic approach by familiarity with the data through reading and re-reading the transcripts, and assigning preliminary codes to the interviews transcribed. The

researcher also began to identify themes within each transcript (content analysis)^{16,17}. Consideration was given throughout this process to the study objectives, and the identified themes of emotional and behavioural impact of surgical incidents on operating theatre staff, and how their attitudes or behaviours might change after such events. The researcher then generated an index or conceptual framework by which the raw data could be labelled and sorted. This involved identifying recurring themes and concepts, together with the terms used in the interview schedule and wider literature. A workable list of main themes and subthemes was compiled and applied systematically to the whole data set. The researcher interpreted the data and assigned a description to them. Patterns were investigated and relationships between all levels (such as personal and professional impact and nature of the incident) were noted. The researcher also began to build explanations for the recurring patterns and associations in the data. This process involved interrogating the data set as a whole to identify linkages between sets of phenomena and exploring why such linkages occurred. These linkages were displayed on a series of maps to further improve understanding and clarity.

Throughout the analysis, four other researchers independently coded a selection of interview transcripts, and compared and discussed these codes in depth with the initial researcher to reduce researcher bias. Themes or trends generated from each step of the data analysis, or any sections of data that did not support generating themes, were also discussed with the other researchers to uncover bias.

Results

Some 45 face-to-face interviews were conducted between February 2018 and December 2018, each lasting between 30 and 75 min. Participants included eight surgeons, eight anaesthetists, 12 theatre scrub nurses, nine ODPs and eight healthcare assistants from different surgical specialties across five hospital sites (Table 1). All participants described incidents that could be considered moderate in severity there was moderate increase in treatment following surgery.

Personal and professional impact

Most of the theatre staff interviewed (36 of 45) felt that surgical incidents had both a personal and professional impact on them. One member of the junior theatre staff described how it had a 'very big impact on personal life and on professional life', influencing the way she worked and work-related decision-making. An ODP questioned her ability to do her job, leading to a sense of low esteem, whereas another theatre staff member described how it 'made me doubt in my abilities to be a scrub nurse, to count, to see with my eyes, to trust what my eyes are seeing'.

Some 32 participants described short- or long-lived negative emotional impacts. In the short term, these included loss of confidence, personal life interference (social impact), anger, anxiety, sadness, worrying about their job and career progression, sickness, and depression. In the long term, negative impacts included losing trust and confidence in other health professionals, and being overcautious or risk-averse in clinical practice. The latter sometimes led to confusion and misinterpretation within the team. One general surgery consultant described feeling sad about surgical incidents that had happened in the past and having to deal with it in his own way. A vascular theatre nurse described how recalling a past incident evoked an emotion of anger and frustration: 'Last year a patient was anaesthetized and is on the operating table and all of a sudden during the 'time-out' phase of

Table 1 Details of study participants

Participant no.	Staff job title
P1	Theatre scrub nurse
P2	Ear, nose, and throat consultant surgeon
P3	Trauma and emergency consultant anaesthetist
P4	Vascular theatre nurse
P5	Senior ODP
P6	General surgery consultant
P7	Theatre Support worker
P8	Obstetrics surgical trainee
P9	ODP
P10	Theatre Support worker
P11	Theatre scrub nurse
P12	Anaesthetist, senior registrar
P13	Theatre support worker
P14	General surgery registrar
P15	Theatre scrub nurse
P16	Orthopaedic consultant surgeon
P17	Theatre support worker
P18	Anaesthetist, junior registrar
P19	Theatre scrub nurse
P20	Vascular consultant surgeon
P21	Theatre scrub nurse
P22	Theatre support worker
P23	Trauma and emergency anaesthetist, junior registrar
P24	Theatre support worker
P25	Paediatric consultant anaesthetist
P26	Orthopaedic senior nurse
P27	Vascular consultant surgeon
P28	Theatre support worker
P29	Paediatric theatre nurse
P30	Theatre scrub nurse
P31	Obstetrics senior nurse
P32	ODP
P33	Paediatric consultant anaesthetist
P34	Orthopaedic theatre nurse
P35	Consultant anaesthetist
P36	Senior ODP
P37	ODP
P38	Theatre support worker
P39	Senior ODP
P40	Obstetrics surgeon, registrar
P41	ODP
P42	Senior ODP
P43	Consultant Anaesthetist
P44	Lead Theatre nurse
P45	Senior ODP

ODP, operating department practitioner.

the Surgical Safety Checklist we realized that the patient did not sign the consent form. Surgery was cancelled and the patient was rescheduled. It is a massive surgical incident due to negligence from the team as no one checked the patient consent form before putting her to sleep. It really infuriated me; I was really mad on that day and even now’.

It was noted how the same or similar surgical incidents could occur more than once. One consultant anaesthetist explained that ‘we can accept that it [surgical incident] is a one-off and we aim to learn from the incident. If the same incident happens again in a month and again in two months’ time, then it is very depressing’. A theatre support worker described the range of emotions experienced when a cancer specimen was lost, including guilt, sadness, anger, and rage. The same participant felt that staff were reluctant to admit responsibility owing, in part, to a perceived blame culture.

One anaesthetic trainee recalled how the impact of surgical incidents experienced by theatre staff might be related to the

associated risks of the procedure. She gave two examples: one high-risk patient who died during a procedure; ‘even though the death in theatres was termed as a surgical incident, my emotional reaction was less negative as we did everything for the patient’. In a second incident, the patient had been given a regional block on the wrong side of his leg before surgery. The operation was performed, and the patient had severe postoperative complications; ‘I was devastated, speechless and the negative emotions I had at that time were severe because it should have not happened’.

Impact of the investigation process

The majority of participants (32 of 45) highlighted a lack of transparency in how the investigative process was conducted following surgical incidents. One junior member of theatre staff explained how she was ‘not asked to do anything, not scrub, not even for simple cases’ and worried about the long-term implications for her future. Another explained how she ‘did not know what was going on’ during the investigative process, with ‘the most stressful bit being because there’s a belief around that the surgeons will always try and wriggle themselves out of it and then lay the blame on the scrub staff or on the theatre staff’.

Positive consequences

Despite the overwhelmingly negative experiences of surgical incidents, several participants emphasized how surgical incidents had a positive impact on their career and professional development. They highlighted the importance of attentiveness and cautious practice, with one junior ODP recalling: ‘I took a positive spin on it [surgical incident] of being more cautious the next time, over checking and being more thorough in my checks and I think it had a positive effect on my overall ability to perform’. One senior anaesthetic nurse explained how it had a positive long-term impact on their professional practice and theatre practices in general: ‘professionally it developed me as a practitioner, which I am now, out of that adversity it made me cautious, and from early point of my career, I was able to measure what was expected of me’.

Discussion

This qualitative study explored the second-victim phenomenon with regard to healthcare professionals, especially those working in operating theatres, in the setting of the UK NHS. This study identified the profound impact of surgical incidents on medical and non-medical operating theatre staff. Consistent with previous research, participants predominantly recalled negative emotions, irrespective of their profession and years of experience^{5,11,18–22}. These negative emotions could be mapped to earlier studies describing six stages to recovery for second victims²³, with most participants in the present study experiencing immediate chaos and confusion after the surgical incident, followed by re-evaluation in isolation, seeking support, worrying about restoring personal and professional integrity, and finally moving on or surviving the surgical incident, but constantly being beleaguered by it (Table 2). The majority of participants described the overall impact as long-lasting.

This study found little difference between the impact that medical and non-medical theatre staff experienced following a surgical incident. Similar to previous studies^{7,9,10,24}, most participants emphasized that the surgical incidents affected them both personally and professionally. The severity of the negative emotions experienced appeared to depend on the nature and severity

Table 2 Examples from study mapped to six stages to recovery of Scott and colleagues²³ for second victims

Stage	Features and characteristics	Example of participant's emotional responses in study
Stage 1: chaos and accident response	This stage involves the participant's reactions soon after the error was made and realized. They experience distraction and seek immediate help	'As soon as I realized I have given a block [regional nerve block for pain relief] on the wrong site, I was completely stunned, speechless, shocked terrified and sick' (anaesthetic registrar, P18)
Stage 2: intrusive reflections	This stage involves the participant's re-evaluation of the incident in self-isolation	'made me doubt in my [her] abilities to be a scrub nurse, to count, to see with my [her] eyes, to trust what my [her] eyes are seeing' (theatre scrub nurse, P19)
Stage 3: restoring personal integrity	Participants are more worried and fear what others might think of them in clinical practice. They become worried about their professional career and integrity	'It was like an earth shattering feeling, there is fear and sometimes embarrassment that I have been involved in an incident. Feared of what others might be thinking of me at work' (orthopaedic senior nurse, P26)
Stage 4: enduring the inquisition	This stage involves the participant's journey through the investigation process and its impact	'So as I said we all been investigated in isolation and I have no idea what they talked to the surgeon involved and what contents were discussed and what results of the discussion was. I was aware the anaesthetist who was involved was called in to explain the circumstances in which the surgery was performed, haven't got any results of what transpired between them. I did not get any detailed feedback as well after the investigation was carried out. It was very stressful experience' (senior ODP, P5)
Stage 5: obtaining emotional first aid	This stage involves seeking support from trusted colleague(s), manager(s) or supervisor, and family member	'My clinical educator had a very good influence in me, I trusted him at that time and he sort of opened my eyes that these things happen and what you can get out of them is learning and that what I managed to do' (ODP, P32)
Stage 6: Moving on (need to select 1 of 3): Dropping out Surviving Thriving	This stage represents participants coping with the incident based on the support they have received. Some participants consider quitting the profession, some are more resilient and learn from the incidents	One anaesthetic registrar was encouraged to reflect on the surgical incident and 'talk to the [his] fellow colleagues about the incident and 'the Stop before you block' project, which I have initiated following the incident, was drafted within the theatre policies and procedure. I was thrilled and pleased as my incident had a positive effect on the theatre practices. I have even given a speech in conference on my project. It really helped me to cope with my initial negative emotions' (anaesthetic registrar, P18)

of the incident, patient outcomes, causative factors, support received, and the investigative process. Participants felt that the negative impact was very profound after what was perceived to be a preventable or avoidable surgical incident, compared with those that were perceived as non-preventable or inevitable.

The present study found that operating theatre staff were affected both by the incident itself and by the manner in which the incident was handled, as noted elsewhere^{20,21,25}. A culture of blame, inadequate support, and a lack of a clear and transparent investigation seemed to deepen and extend the impact of the original incident. Clinician-led reviews created suspicion among those being investigated, leading staff to question how much information they should disclose. Most participants commented on inadequate organizational support and, when support was received, that it was often chaotic. This study suggests that more support needs to be offered during the investigative process, and in an organized fashion, to operating theatre staff involved in surgical incidents.

Medical errors cause patient harm primarily owing to human or systemic factors^{2,10,26-28}. There is a risk of human error behind every endeavour, but health professionals should be held accountable only for things under their control. Following patient safety incidents, the current practice in NHS organizations often includes system improvements, such as change of policy or clinical practice based on 'one size fits all'^{26,27,29}. Researchers from improvement science propose complex adaptive theory, which

requires the NHS hierarchy to move away from standard responses to patient safety incidents, and instead reflect on the complexity of the healthcare system and how to support clinical staff adequately²⁹. The complex nature of everyday clinical work still needs to be acknowledged correctly, and that far more things get done correctly than wrongly^{26,27,29}.

The importance of promoting just culture in organizations following incidents has been emphasized elsewhere³⁰⁻³³, including guidelines for NHS leaders and managers³⁴. The aviation industry and military employ trained human factors experts to support organizations, managers, and staff during the investigative and learning process following safety incidents³⁵⁻³⁸. More work needs to be done by healthcare organizations to explore how these roles could be adopted to promote effective investigation and safe learning systems. Multidisciplinary team input to review or investigate the incidents, to improve shared learning and emphasize the importance of safety, has been suggested as a reasonable approach^{27,39,40}.

Some participants in the study highlighted the positive impact that the surgical incidents had on them, which was primarily dependent on the support they received, a finding widely highlighted in previous research^{4,5}. Resilience and adaptability are considered key to the sustainability of the workforce in complex healthcare system such as the NHS^{29,41}.

Several institutions in the USA and Europe have developed formal second-victim support programmes that allow health

Table 3 Potential recommendations from study

Recommendation	Brief description
Support following incidents	One-to-one support sessions: support should be structured and meet individual needs. This could be an informal one-to-one discussion with a senior colleague soon after the incident, with a second follow-up meeting offered, if necessary. Individuals should consider and be supported to take some time off work in the aftermath of a surgical incident, if needed, as the psychological impact might affect their concentration and continual performance Debriefing sessions: these should follow the incident to deconstruct the incident and encourage learning from it Mentoring: senior colleagues or managers should provide health professionals with peer support or mentoring programmes
Investigation or inquiry process	To have an open and transparent process in analysing the event, with the individual kept fully informed while the incident is investigated NHS managers and incident investigators need to reflect on the complexity of the healthcare system while investigating incidents Need to find innovative ways to support frontline clinical staff

NHS, National Health Service.

professionals to cope with their emotional distress by obtaining timely support in an empathetic, confidential, non-judgemental environment^{4,6,42}. The Resilience in Stressful Events (RISE) programme is a multidisciplinary second-victim work programme initiated by John Hopkins University, which supports healthcare workers who were involved in a patient safety incident⁴². Research needs to be conducted to explore how these supporting structures could be adapted for use in the NHS. A list of potential recommendations is shown in Table 3.

This study has a number of limitations. It was confined to staff working in either the anaesthetic room or operating theatre. Staff working in preassessment and postanaesthetic care or recovery units, who can be considered part of the surgical team, were excluded. There is a risk of self-selection bias, as health professionals chose whether or not to participate in this study, although participants varied in profession, sex, and years in practice. The extent to which the findings can be generalized across the NHS is unknown, but the present results do seem to echo the findings in other healthcare systems.

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