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Title

Surveillance, anticipation and firefighting in hospital: Perspectives of patient safety from a New Zealand case study.

Abstract

Aim:

This study explored how doctors, nurses and managers working in a New Zealand tertiary hospital understand patient safety.

Background:

Despite healthcare systems implementing proven safety strategies from high reliability organisations, such as aviation and nuclear power, these have not been uniformly adopted by healthcare professionals with concerns raised about clinician engagement.

Design:

Embedded case study design with qualitative research.

Methods:

The study used purposeful sampling and data were collected using focus groups and semi-structured interviews with doctors (n=19); registered nurses (n=19); and senior organisational managers (n=3) in a New Zealand tertiary hospital.

Results:

Safety was described as a core organisational value. Clinicians appreciated proactive safety approaches characterised by anticipation and vigilance where they expertly recognised and adapted to safety risks. Managers trusted evidence-based safety rules and approaches that recorded, categorised and measured safety.

Conclusion and implications for nursing management:

It is important that nurse managers hold a more refined understanding about safety. Organisations are more likely to support safe patient care if cultural complexity is accounted for. Recognising how different occupational groups perceive and respond to safety, rather than attempting to reinforce a uniform set of safety actions and responsibilities, is likely to bring together a shared understanding of safety, build trust and nurture safety culture.

Keywords:

Patient safety, safety culture, leadership, acute care, safety systems.

Introduction

The World Health Organisation (WHO, 2018) estimates that one in ten patients will experience harm resulting from healthcare. The international scale of patient harm is apparent in the stream of 'watershed' public investigations that report preventable patient deaths (Department of Health (DH), 2013; Kohn, Corrigan & Donaldson, 2000; Queensland Public Hospitals, 2005; National Patient Safety Foundation (NPSA), 2017). In response, international strategies have been put in place to reduce healthcare harm by implementing safety methods from high reliability organisations (HROs) such as those found in aviation and nuclear power (Sutcliffe, 2011).

Background

Implementing HRO safety systems, such as incident reporting and protocols, has dominated healthcare policy with proliferation of safety tools including targets, quality improvement metrics and root cause analysis (RCA). However, the sentinel patient safety inquiry into Mid-Staffordshire Hospital in the United Kingdom concluded that patient safety efforts should move from outcome-based performance measures and focus on "*major cultural change, rather than a new regulatory regime*" (DH, 2013, p. 11). Consequently, governments, regulators and quality improvement bodies swiftly embraced additional HRO strategies intended to transform safety culture such as checklists, crew resource management and leadership walk rounds (e.g. Institute of Healthcare Improvement, 2016; NPSA, 2015).

Researchers have reported the relationship between patient harm and multiple variables in healthcare organisations, including nurse-patient ratios, human factors, and culture (e.g. Atkin et al., 2014; Carayon, 2012; Vaughn et al., 2018). A systematic review by Braithwaite et al. (2017) identified a positive association between culture, almost exclusively measured by

surveys, and patient safety outcomes. However, low survey response rates, particularly from doctors (Scott et al., 2011), questions construct validity of current surveys, and the assumption that safety culture is comparable in different parts of organisations. Qualitative work has successfully explored and identified safety subcultures (Dixon-Woods, Suokas & Tarrant, 2009; Hardy, 2013) although little is known about how subcultures impact safety culture (Manion & Smith, 2017).

New Zealand (NZ), like other countries, has developed a focus on mitigating harm in acute care hospitals (e.g. Health Quality Safety Commission (HQSC), 2018; Ministry of Health, 2018). This has resulted in the adoption of selective HRO system approaches including national adverse events reporting (HQSC, 2017). However, there is evidence these approaches have not been widely embraced nor adopted by NZ healthcare professionals (Hardy, 2013; Martin, Mason, Lovelock, Cumming & Hider, 2015). To understand why this may be, it is necessary to explore how doctors, nurses and managers in NZ perceive patient safety in their everyday work.

This New Zealand-based study therefore aimed to: 1. Explore the concept of patient safety from the perspective of doctors, nurses and senior managers; and 2. Describe the factors doctors, nurses and senior managers perceived to be important in a patient safety culture.

Research design and methods

The study utilised instrumental, embedded case study design using qualitative methods to contextualise the phenomenon of patient safety in a NZ acute care hospital (Stake, 2005). Perceptions of patient safety held by senior organisational managers, doctors and nurses were explored and we selected the emergency department (ED) and intensive care unit (ICU) as embedded cases (Yin, 2009). These units can be identified as high-risk, high-hazard areas (Sutcliffe, 2011) that utilised organisational and locally developed safety monitoring systems and processes.

Study sample

The study was undertaken in a tertiary hospital responsible for providing acute and elective care and specialist services across a large geographical area in New Zealand. Tertiary services were provided to approximately one million people across urban, rural and remote areas. Within the organisation, an Executive Director took accountability for quality, patient safety and compliance. Safety procedures were designed in accordance with national and

organisational guidelines. All staff were required to report events in an electronic reporting system. All events were categorised by a charge nurse manager (CNM) and medical lead in each area. Risks that could not be mitigated by a local unit or divisional governance boards were escalated to the executive leadership team and then to hospital board members.

The ED was a dedicated trauma centre with other attendances attributable to both severe illness and minor injuries. During the period field work was conducted, approximately 130 patients self-presented or were referred by another service every day. On arrival, triage scores, derived from international standards, were assigned by nurses to patients. This score indicated the severity of a patient's condition, and informed whether the patients was admitted directly to the ED clinical area or returned to the waiting room.

The 16 bedded ICU operated within a 'closed model'; that is, only the consultant on-call had admission rights to the unit. Patients were admitted from in-patient wards, operating theatres and a flight retrieval service. An early warning score (EWS) was used to identify deteriorating ward patients and prescribed a graded response within a defined time frame, including review by specially trained ICU nurses. The hospital's emergency rapid response team attended all medical emergency team (MET) calls, led by the ICU specialist registrar.

Data collection

Data was collected between October 2015 and April 2016 through use of focus groups, interviews and field notes. Focus groups were identified as the best strategy to collect data from doctors and nurses (Rubin & Rubin, 2012), during planned development days. Face-to-face interviews were conducted with senior managers, who had previously held clinical roles, in order to provide an opportunity for candid discussion (Ybema, Yanow, Wels & Kamsteeg, 2009). A template developed from the literature guided semi-structured, audio recorded interviews held in a private room. Two broad questions were asked: 1. Can you describe what patient safety looks like in your daily practice; and 2. What organisational and clinical factors are required to develop a culture that supports patient safety? Additional probes were used to further explore responses. Six focus groups and three face-to-face interviews were conducted with a duration of 20-70 minutes. Fifty-three staff participated in the study (Table 1).

Data analysis

Interviews were recorded and transcribed verbatim for analysis using an inductive approach (Bryman, 2008). Codes were developed in four stages, commencing with line by line coding

to develop in vivo codes in participants own words and concluded with the generation of theoretical concepts. Data saturation was met when no new codes were developed during analysis (Saunders et al. 2018), data collection ceased, and case units were analysed individually and across units (Saldana, 2013). To provide a basis for idiographic generalisation, codes and themes were analysed, contextualised and interpreted alongside a detailed description of the setting, the literature and the researcher's experience detailed in field notes. Strategies for case study rigor (Stake, 1995; Yin 2009) are described in Table 1.

Results

Findings indicate that whilst all doctors, nurses and managers held patient safety as central to every decision made, each occupational group understood, experienced and managed patient safety differently; this created misunderstanding and conflict. As can be seen in reporting of qualitative research, the findings and discussion sections are presented together to include interpretation and discussion of meaning (Evans, 2007; Langdridge & Hagger Johnson, 2009).

Safety occurs in a complex system

Across the embedded units, safety was not perceived to be a simple concept where care was either safe or unsafe. Safety was often described where the risk of harm was dependent on the situation at that time. Participants recognised the interdependent and complex nature of the healthcare system suggesting: *"there's so many layers in a big hospital system that it doesn't take much for the system to fall down because of one chink in the armour."* (ICUSDR1). Clinicians and managers described conditions that culminated in a *"tipping point"* (ICUSDR1), where safety was compromised by competing demands. ED crowding and ICU capacity problems caused by *"flow"* (SM2, EDSRN 3, ICUSRN6) or *"surge"* (SM3, EDSRN1) created a 'perfect storm' where the risk of harm was certain when *"the workload, the pressure, the distractions, the competing priorities, the demands – a systemic problem - contributes to getting it wrong"* (SM3).

In order to manage safety, key organisational surveillance tools were used. Although there were similarities in how safety was perceived by clinicians working in ED and ICU, fundamental differences existed in the safety approaches and behaviours clinicians and managers applied. Managers valued safety systems that recorded, categorised and measured safety, Clinicians preferred systems that anticipated and responded to risk, characterised by vigilance.

Safety surveillance

Managers valued systems that recorded safety within a “*clinical governance framework*” (SM1), categorised events and applied RCA to prevent reoccurrence. The incident reporting system was their key safety surveillance tool perceived as “*the bottom line*” (SM3) to generate safety culture. Contrastingly, front line clinicians consistently described this system as “*reactive*” (ICUSDR3). It was not perceived to successfully mitigate risks in the complex dynamic environment clinicians experienced, with many concluding “*I can’t say (a harmful event) is not going to happen again*” (EDSDR10). Indeed, decisions made by the NZ Health and Disability Commissioner indicate that reporting a preventable adverse event does not avoid the event reoccurring (e.g. 11HDCC01434; 13HDC01676). These perspectives reflect a persistent debate; traditional safety strategies are orientated towards understanding episodes of weakness and failure by understanding the cause of harmful incidents (Perrow, 1984; Reason, 1997). Alternatively, high reliability science and resilience engineering embrace proactively anticipating and remaining vigilant to risk (Wieck & Sutcliffe, 2001), appreciating knowledge that can be generated from any event, regardless of outcome (Flanagan, 1954; Hollnagel, Wears & Braithwaite, 2015).

Safety is traditionally defined as a state where as little as possible goes wrong (‘Safety I’) and assumes identifiable failures or malfunctions can be uncovered and resolved (Hollnagel, et al., 2015). This perspective is consistent with international policy and approaches that managers favoured, that is, reporting concerns to management for resolution via top-down interventions (Westrum & Adarnski, 1999). Contrastingly, clinicians proposed RCA generated recommendations that “*often lead to a drop-in safety outcome, because of the change in practice slowing the system down, introducing new error, people learning that new error.*” (ICUSDR2). The incident reporting system was viewed as bureaucratic, with clinicians suggesting safety is achieved by adapting to complex systemic conditions and individual patients in every day work. The clinician perspective acknowledges that safety outcomes are recognised as “*emergent, rather than resultant*” and safety is defined as the ability to succeed under varying conditions, or ‘Safety II’ (Hollnagel et al., 2015, p. 23).

Clinicians viewed harm resulting from a hazard previously recorded as a near miss event as unacceptable, proposing this was common; “*something happens then it’s an adverse event, but actually it was a [near miss] for about the last 20.*” (SEDRN3). Near misses can occur up

to 300 times more frequently than adverse events (Wolf & Hughes, 2008), with harm from cumulative minor failures increasingly recognised as greater than harm from adverse events (Vincent & Amalberti, 2016). A focus on small repetitive events is congruent with the 'mindful' approach prevalent in HROs where learning from previous, or potential failures is a proactive prevention strategy (Reason, 2000; Weick & Sutcliffe, 2001). Managers indicated they *"support a low threshold for reporting risks and are just as interested in near misses"* (SM2), but this conflicted with the perceptions of clinicians that managers *"don't even look at them"* (SEDRN2) and that *"it's easier to get resources to fix a rare problem, that has caused a single bad event than introduce a concept of improvement"* (ICUSMO2). One possible explanation is managers who declined to participate indicated patient safety was *"not part of the role"* (field notes).

Incident reporting systems alone are not a valid, patient safety strategy (Leistikow, Mulder, Vesseur & Robben, 2016). Reason's famous 'Swiss cheese model' is now out-dated (Reason, Hollnagel & Paries, 2006) and Hollnagel et al. (2015) propose learning from RCA is obsolete in complex environments where people and technology interact. Others conclude that a reactive top-down rational approach of imposing rules limits the proactive innovation required to maintain safety by supporting cultures of risk aversion and bureaucracy (Dekker, 2014; Hale & Borys, 2013; Traynor, 1999).

Managers relied on risk registers to monitor and remain vigilant to safety risks; *"if you've a level of risk that's not tolerable, we have a responsibility to raise this to the board."* (SM2). Senior managers oversaw a complex, detailed process where assessment of clinical risk was undertaken in monthly meetings which did not include clinician experts from the embedded case units. Multiple risks, e.g. clinical, financial and operational, were recorded together and assessment of patient safety was influenced by fiscal climate and the hospital board's tolerance to financial, political and reputational considerations. It has been noted that occupational groups classify risk differently (Dixon-Woods et al., 2009; Waring, 2005) and risks raised by clinicians are often downgraded by managers (Hardy, 2013). This risk management approach may explain the perception of managers paying *"lip service"* (EDSMO10) to safety issues and impacted safety culture; *"patients need to be put first not targets, not negative outcomes, not bad publicity, the patient needs to be seen through all of that...unless you do that, you are going to have some difficulty with culture."* (EDSDR10).

Such competing views about safety surveillance approaches resulted in a lack of consensus about safety issues for clinicians and managers. Clinicians used language such as *"tension"* (ICUSDR2) and *"battle"* (EDSRN1) when describing interactions about safety risks with

managers in the organisation. Contrastingly, HRO theorists suggest “*ambivalence builds resilience*” within organisations which remain open to disparate perspectives (Weick & Sutcliffe, 2001, p. 167). Healthcare professionals willing to listen to multiple perspectives may be better placed to mitigate immediate risk in practice. As resilience is increasingly conceptualised as a combination of reactive and proactive activities of adaptation, recovery and response (Macrae & Draycott, 2016), healthcare systems underpinned by both Safety I and II approaches should be more successful. Research that illuminates how subcultures values, behaviours and actions differ will enhance our ability to nurture safety culture (Manion, Smith 2017).

Vigilance and anticipation

Key vigilant and anticipatory approaches were used to recognise and respond to complex safety risks; this was evident in data collection across all cases. Managers favoured tools vigilant to crowding and resource pressures including computerised systems that monitored staffing levels, care needs and occupancy. Clinicians valued speciality specific systems, developed by doctors, and the EWS system in ICU and triage in ED dominated clinical practice. Both tools monitor and are vigilant to the unpredictable nature of patients, anticipate deterioration in acute illness, prescribe a graded response and mobilise appropriate clinical expertise to the patient. International research findings, HDC case decisions and NZ policy suggest surveillance of a patient’s clinical condition with tools such as triage and EWS can avoid preventable death in acute illness (National Confidential Inquiry into Patient Outcomes and Death, 2012; 13HDC00482, 05HDC11908). Such systems accommodate Vincent’s (2006) assertion that individual patients are unpredictable, creating risks impossible to mitigate with complex rule-based approaches and HRO theory that encourages “*deference to expertise*” when dealing with complex problems (Weick & Sutcliffe, 2001, p. 48).

The vigilant and anticipatory approaches healthcare professionals utilised are consistent with the view that safety is created when people adapt and respond to hazards in complex conditions, rather than trying to eliminate them (Hollnagel et al., 2015). A positive safety culture requires workable safety solutions that allow an organisation to achieve specified goals, whilst acknowledging hazards remain (Weick & Sutcliffe, 2001). Our findings support proposals that successful healthcare systems are designed to support high functioning teams to recognise and respond to risk in their everyday work (Macrae & Draycott, 2016).

Firefighting: a strategy to manage risk

Rather than working within pre-established sets of safety rules and norms, clinicians identified working outside “*what is pre-defined*” (EDSDR10) by organisational safety systems, as a necessary and proactive safety behaviour. Doctors described complex clinical situations and high clinical workloads in everyday work, suggesting “*very few things present like we’ve been taught in a text book.*” (EDSDR10). Therefore, expertise in “*risk stratification*” (EDSDR5) to enable rapid, accurate patient assessment and mitigate the risk of “*misdiagnosis*” (EDSDR5) was highly valued.

“*Firefighting*” (ICUSDR5) skills were admired improvisation skills clinicians gained from experience and exposure to risk. Nurses claimed that informal processes or work-arounds maintained safety within a “*background of chaos*” (EDSRN2), insisting that “*strategising around situations*” (ICUSRN5) was an important facet of safety leadership. Informal leaders with “*firefighting*” skills were viewed as the “*go to people*” (EDRN4). Visible, experienced *firefighters* were trusted to know when to break or bend rules during anticipated and unanticipated safety events. Common examples of safety events “*go to people*” managed everyday included ED crowding, sub-optimal skill mix, MET calls and competition for ICU beds. Similarly, resilience engineers propose an important organisational resource is the knowledge and skills to detect emerging risks and provide a coordinated response, with shared expectations, assumptions and norms creating trust in high performing teams (Hollnagel & Woods, 2006).

Managers utilised ‘firefighting’ behaviours to predict and control limited resources but were clear that breaking organisational rules was an unsafe act: “*You can have the frameworks there but if people aren’t working to that and making it part of what they do every day then it’s a waste of time.*” (SM2). Clinicians indicated rules, such as protocols or procedures, were usually cumbersome, difficult to access and apply in everyday work and failed to account for patient complexity. They proposed expertise in risk stratification as safer than working with multiple, competing rules that increased cognitive load and the potential for error. Senior clinicians wanted healthcare leaders to trust their clinical judgement, in a challenging situational context, over which they had minimal control:

“*It’s not about winging it, it’s about relying on your intuition and a bit of gut feeling about how far we can stretch, and what wouldn’t be ideal if you were planning forward, but at that point in time is possibly your only solution. You can still make it safe by putting other things in place.*” (ICUSRN2).

Although “*firefighting*” was viewed as a leadership attribute, it is similar to ‘patching’ behaviour referred to in the safety literature (Perry, Wears & Fairbanks, 2012). Patching can encourage “*muddling through*” behaviour with unintended safety consequences by encouraging unwanted variation (Perry et al., 2012, p. 716). In this study, patching was reported to impact on safety, evident in ED where patients were *re-triaged* and treated in corridors, a recognised antecedent to harm (Ardagh & Drew, 2015; Handel et al., 2010). Similarly, when several patients were competing for ICU beds, clinicians were forced to consider discharging patients at night to meet acute demand. With either of these situations there is potential to decrease the safety of patients and clinicians (Laupland et al., 2011). The constant interplay between quality and efficiency that participants and field notes describe is well-recognised in acute care environments (Perry et al., 2012; Nugus & Braithwaite, 2010) and can lead to “*care rationing*” choices (Nugus & Braithwaite, 2010, p. 512) that impact safety, including “*minimum standards (when one) can’t afford gold plate*” (SM2).

Whilst firefighting was recognised in this study, and in the literature, as an important and valuable skill to manage risk, it requires appropriate resources to mitigate the risk of harm. When the aspiration is to deliver patient care that is only “*good enough*” (Vincent & Amalberti, 2016, p. 21), patients will be exposed to variation, poor standards and hazards. In unsafe organisational conditions both patients and staff are harmed (DH, 2013). Participants described essential safety building blocks, suggesting a resilient safety culture requires the right staff, skills, leadership and environment. A “*buffer*” (ICUDR2) incorporating adequate staffing, manageable workloads and organisational capacity was identified as essential to enable the organisation and its people to respond to threats and opportunities and thereby “*sustain required operations under both expected and unexpected conditions.*” (Hollnagel, Pariès, Woods & Wreathall, 2010).

Limitations

A limitation of this study is the small number of senior managers who participated. To address this, we examined health care literature to determine that views shared were representative. We examined only one NZ healthcare organisation and findings are limited to high hazard environments with similar characteristics. Replication is required in other non-specialised areas where different safety challenges exist.

Conclusion

Patient safety is a core value clinicians and managers describe, although multiple perspectives exist regarding how risks are identified, operationalised and mitigated. Failing to account for differences of interconnected subcultures creates conflict and erodes trust. A deeper understanding of the complex situational context of healthcare environments is required with healthcare policy and leadership that acknowledges diversity to promote safety approaches that build trust and nurture safety culture.

Implications for Nursing Management

There is growing recognition of the importance of safety culture in organisations with significant research exploring health professionals' understanding of patient safety. Research and policy work in this area has traditionally questioned whether health professionals are engaged with the patient safety movement with a resulting lack of consensus regarding how patient safety is conceived and operationalised. Doctors, nurses and senior managers within the complex environment of acute hospitals hold different perspectives on safety; these have informed development of unique, context-specific and disciplinary specific safety approaches that mirror strategies favoured by HROs and resilience engineers.

A collaborative approach to safety is required to build trust and nurture safety culture. Nurse managers can support this by creating opportunities for open dialogue and embracing an interdisciplinary approach. Different perspectives must be acknowledged so a more refined understanding and approach to safety is developed within and across occupational groups. Nurse managers must appreciate safety strategies that acknowledge the important human contribution to safety and advocate for the resources required to build resilient teams that can adapt to complexity in their everyday work context. The challenge this presents cannot be underestimated when the international approach is dominated by traditional safety approaches, hierarchies and efficiency drives.

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Tables

Table 1: Strategies for case study rigour

Criterion	Strategies
Reliability	<ul style="list-style-type: none">• Case study protocol detailed• Interview guide developed• Formal database recording transcripts, excel sheets and diagrammatic representations kept
Validity	<ul style="list-style-type: none">• Data triangulation: use of multiple types and sources of data• Embedded subcases included• Investigator triangulation: supervision, discussion and observer in place during focus groups• Propositions used in study• Processes and reflective memos documented in research/field journal• Detailed description of the case recorded• Findings of research integrated into the broader situational context• Theoretical triangulation: findings of research integrated into the published literature

Table 2: Participants

Professional Group	Definition	Code (n=number)	Number of Participants	Years of experience (mean)
ED senior doctors (Focus group 1)	Senior medical officer or Registrar in training.	EDSDR(n)	12	15.9
ED senior doctors (Focus group 2)	Senior medical officer or Registrar in training.	EDSDR(n)	12	15.9
ED senior nurses	Registered nurse with formally designated leadership role in management of staff, education or clinical expert.	EDSRN(n)	7	13.7
ED registered nurses	Registered nurse	EDRN(n)	6	2.8
ICU senior doctors	Senior medical officers and registrars in training.	ICUSMO(n)	7	15
ICU senior nurses	Registered nurse with formally designated leadership role in management of staff, education, clinical expertise or research.	ICUSRN(n)	6	15
Senior Manager	Executive, professional or operational leadership role	SM (n)	3	Not provided