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Safety Culture in a Major Accredited Irish University Teaching Hospital: A Mixed Methods Study Using the Safety Attitudes Questionnaire

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Safety Culture in a Major Accredited Irish University Teaching Hospital: A Mixed Methods Study Using the Safety Attitudes Questionnaire

Abstract

Background

The measurement of safety culture, the way in which members of an organisation think about and prioritise safety, in a hospital can provide valuable insight and inform quality improvement strategies.

Aims

The aim of this study is to describe the safety culture of a university teaching hospital in the Republic of Ireland.

Methods

This is a mixed-methods survey study using the Safety Attitudes Questionnaire (SAQ). The SAQ was distributed to all staff in the study hospital. Staff attitudes towards six domains of patient safety culture were assessed over 32 Likert-scaled items. Thematic analysis was performed on qualitative data.

Results

A total of 768 staff members completed and returned a copy of the SAQ. The hospital scored above the international benchmark in five out of six domains, indicating a positive safety culture, but scored below the international benchmark in the domain '*Working Conditions*'. This positive safety culture was not mirrored in the qualitative data, from which five themes emerged; three major – Staffing Issues, Patient-Focused Care, and Hospital Environment - and two minor – Safe Reporting

Culture and Training & Education.

Conclusions

In this study, a mixed methods approach was successfully used to investigate the safety culture in a large Irish hospital. Although the SAQ results indicated a positive safety culture, the qualitative data revealed a number of issues that hospital staff felt impacted negatively on patient safety. The results of this study will inform future work on the design of an intervention to improve patient safety in the hospital.

INTRODUCTION

In 2017, the World Health Organisation (WHO) announced that its third Global Patient Safety Challenge, Medication Without Harm, would focus on medication safety, aiming to reduce the global rate of medication errors by 50% within five years [1]. Medication errors, defined as 'any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the healthcare professional, patient, or consumer', are a leading cause of preventable harm worldwide, estimated to incur an annual global cost of US$42 billion [1,2].

In order to understand medication errors and work towards their reduction, it is first necessary to fully comprehend the systems and contextual factors in which these errors take place [3].

The concept of safety culture, defined as *'the product of individual and group values, attitudes, perceptions, competencies, and patterns of behaviour the determine the commitment to, and the style and proficiency of, an organisation's health and safety management'*, has been used worldwide to describe healthcare organisations' commitment to patient safety [4–7]. Several tools to measure patient safety culture have been developed over recent years, one of the most widely used and rigorously validated of which is the Safety Attitudes Questionnaire (SAQ) [8]. The SAQ has been used previously to measure the safety culture in the acute medical admissions unit of an Irish hospital, however, to date, safety culture has not been measured on a hospital-wide scale in Ireland [9].

The aims of this study were to investigate the safety culture of an Irish hospital and to identify areas in which patient safety could be improved. A mixed methods approach was adopted to provide an in-depth description of staff attitudes towards patient safety culture in the hospital.

METHODS

Study Design and Setting

This mixed methods study was carried out in a large Irish university teaching hospital that contains 810 beds and over 40 medical and surgical specialities on campus. The hospital is a level 1 Trauma centre, providing secondary and tertiary care for a catchment area of approximately 550,000 people.

Questionnaire

The short-form version of the SAQ is a 32-item, Likert-scaled questionnaire which is used to measure caregiver's attitudes towards safety culture across six domains: '*Safety Climate*', '*Teamwork Climate*', '*Perceptions of Management*', '*Job Satisfaction*', '*Working Conditions*', and '*Stress Recognition*' [8]. In addition to its validity, we chose to use the SAQ in this study because of the availability of international benchmarking data for the survey [8].

The questionnaire was adapted to suit the Irish healthcare setting, for example by replacing the word 'attending' with the word 'consultant'. The questionnaire contained an open comments section in which respondents were asked '*What are your top three recommendations for improving patient safety in your clinical area?*', as well as a '*Communication and Collaboration*' section, in which respondents were asked to rate the quality of their interactions with other healthcare professionals. Permission to use the short form of the SAQ was received from the Centre for Healthcare Quality and Safety, University of Texas, prior to survey adaptation [10].

Electronic and hard copies of the survey were distributed to all hospital staff between December 2017 and January 2018. The survey was anonymous; although some demographic information was collected. Ethical approval for this study was granted by the local research ethics committee prior to study commencement.

Quantitative Data Analysis

Questionnaire results were analysed using SPSS® version 24 [11]. To allow comparison to the international benchmark [8], the mean score for each safety culture domain was calculated using the following coding: 'Strongly Disagree' = 0, 'Disagree Slightly' = 25, 'Neutral' = 50, 'Agree Slightly' = 75, 'Agree Strongly' = 100 [9]. Where items were negatively worded, the scores were reversed. Each respondent's scores for the six domains were determined by calculating the sum of their responses for each question in the domain and dividing by the number of questions in the domain. Descriptive statistics were used to calculate the mean score and standard deviation.

The responses to individual statements were calculated by recoding the responses 'Strongly Disagree' and 'Slightly Disagree' into 'Disagree' (coded as 1) and the responses 'Strongly Agree' and 'Agree Slightly' into 'Agree' (coded as 2). Neutral responses were coded as 3. The percentages of study participants who responded positively and negatively to each statement were calculated.

One-way ANOVA was used for comparison of results to the international benchmark. Tukey post-hoc tests were used when significance was detected. All of the analyses were two-sided with a statistical significance threshold set at $p<0.05$.

Qualitative Data Analysis

The qualitative data from the open comments section of the questionnaire were subjected to a thematic analysis according to the method described by Braun and Clarke [12]. To facilitate analysis, data were entered into QSR International's NVivo 11 Qualitative Data Analysis Software [13].

RESULTS

Respondent Demographics

Questionnaires were completed and returned by 768 hospital staff members (response rate 22.4%). Demographic characteristics for survey respondents are listed in **Table 1**. The majority of respondents were nurses (47%, n= 361), had been working in their clinical area for 5 years or more (41.8%, n=321), and had been working at the hospital for 10 years or more (38.4%, n=295).

Table 1: Respondent Demographics

Demographic Characteristics	**Frequency (n=768)**	**Percent (%)**
Job Category		
Doctor	188	24.5
HSCP	94	12.2
Healthcare Assistant	35	4.6
Nurse	361	47.0
Other	67	8.7
Clinical Area		
Mixed Medical/Surgical	97	9.7
Medical	177	17.7
Surgical	103	10.3
ICU	28	2.8
Paediatric	77	7.7
Neurological	27	2.7
Cardiac Surgical	12	1.2
Other	183	18.3
Work Experience in Current Hospital		
< 6 Months	100	13.0
6 Months - 1 Year	60	7.8
1-5 Years	196	25.5

5-10 Years	73	9.5
>10 Years	295	38.4
Work Experience in Current Clinical Area		
<6 Months	132	17.2
6 Months - 1 Year	54	7.0
1-2 Years	71	9.2
2-5 Years	127	16.5
>5 Years	321	41.8

HSCP: Health and Social Care Professional, ICU: Intensive Care Unit

Of the 768 staff members who returned a questionnaire, 550 (71.6%) completed the open comments section. As some respondents provided more, and some fewer than three recommendations, 1,375 recommendations were submitted for thematic analysis.

Quantitative Results

Table 2 shows the percentages of staff members who responded either positively or negatively towards each statement in the SAQ.

Table 2: Responses to SAQ Statements

Domain	Statement	Agree (%)	Disagree (%)	Neutral (%)	Missing (%)
Teamwork Climate	Input from my discipline is well received in this clinical area.	597 (77.7)	40 (5.2)	101 (13.2)	30 (3.9)
	In this clinical area, it is difficult to speak up if I perceive a problem with patient care.	527 (68.6)	145 (18.9)	66 (8.6)	30 (3.9)
	Disagreements in this clinical area are resolved appropriately (i.e., not who is right, but what is best for the patient).	521 (67.8)	95 (12.4)	125 (16.3)	27 (3.5)
	I have the support I need from other personnel to care for patients.	591 (77.0)	76 (9.9)	60 (7.8)	41 (5.3)

	It is easy for personnel here to ask questions when there is something that they do not understand.	677 (88.2)	41 (5.3)	28 (3.6)	22 (2.9)
	All disciplines in this clinical area work together as a well-coordinated team.	571 (74.3)	111 (14.5)	64 (8.3)	22 (2.9)
Safety Climate	I would feel safe being treated here as a patient.	590 (76.8)	86 (11.2)	79 (10.3)	13 (1.7)
	Medical errors are handled appropriately in this clinical area.	540 (70.3)	80 (10.4)	91 (11.8)	57 (7.4)
	I know the proper channels to direct questions regarding patient safety in this clinical area.	593 (77.2)	79 (10.3)	73 (9.5)	23 (3.0)
	I receive appropriate feedback about my performance.	365 (47.5)	228 (29.7)	143 (18.6)	31 (4.0)
	In this clinical area, it is difficult to discuss errors.	455 (59.2)	170 (22.1)	112 (14.6)	31 (4.0)
	I am encouraged by my colleagues to report any patient safety concerns I may have.	575 (74.9)	76 (9.9)	94 (12.2)	23 (3.0)
	The culture in this clinical area makes it easy to learn from the errors of others.	523 (68.1)	124 (16.1)	96 (12.5)	25 (3.3)
(no domain)	My suggestions about safety would be acted upon if I expressed them to management.	439 (57.2)	179 (23.3)	133 (17.3)	17 (2.2)
Job Satisfaction	I like my job.	616 (80.2)	55 (7.2)	89 (11.6)	8 (1.0)
	Working here is like being part of a large family.	446 (58.1)	172 (22.4)	135 (17.6)	15 (2.0)
	This is a good place to work.	527 (68.6)	116 (15.1)	115 (15.0)	10 (1.3)
	I am proud to work in this clinical area.	617 (80.3)	50 (6.5)	82 (10.7)	19 (2.5)
	Morale in this clinical area is high.	387 (50.4)	235 (30.6)	128 (16.7)	18 (2.3)
Stress Recognition	When my workload becomes excessive, my performance is impaired.	636 (82.8)	60 (7.8)	45 (5.9)	27 (3.5)
	I am less effective at work when fatigued.	678 (88.3)	32 (4.2)	39 (5.1)	19 (2.5)
	I am more likely to make errors in tense or hostile situations.	622 (81.0)	71 (9.2)	54 (7.0)	21 (2.7)
	Fatigue impairs my performance during emergency situations (e.g. emergency resuscitation, seizure).	455 (59.2)	124 (16.1)	86 (11.2)	103 (13.4)

Perceptions of Management	Hospital management supports my daily efforts.	189 (24.6)	356 (46.4)	191 (24.9)	32 (4.2)
	Hospital Management doesn't knowingly compromise patient safety.	309 (40.2)	239 (31.1)	187 (24.3)	33 (4.3)
	Hospital management is doing a good job.	231 (30.1)	302 (39.3)	219 (28.5)	16 (2.1)
	The hospital constructively deals with problem employees.	161 (21.0)	327 (42.6)	233 (30.3)	47 (6.1)
	I am provided with adequate timely information about events in the hospital that might affect my work.	318 (41.4)	274 (35.7)	163 (21.2)	13 (1.7)
Working Conditions	The levels of staffing in this clinical area are sufficient to handle the number of patients.	180 (23.4)	509 (66.3)	52 (6.8)	27 (3.5)
	This hospital does a good job of training new personnel.	328 (42.7)	292 (38.0)	133 (17.3)	15 (2.0)
	All the necessary information for diagnostic and therapeutic decisions is routinely available to me.	357 (46.5)	185 (24.1)	143 (18.6)	83 (10.8)
	Trainees in my discipline are adequately supervised.	462 (60.2)	172 (22.4)	96 (12.5)	38 (4.9)

Table 3 compares the mean scores for each safety culture domain with the international benchmark [8,9]. The study hospital scored higher than the international benchmark in the domains '*Teamwork Climate*', '*Safety Climate*', '*Job Satisfaction*', '*Stress Recognition*', and '*Perceptions of Management*', and lower than the international benchmark in the domain '*Working Conditions*'.

Table 3: Comparing Safety Culture to the International Benchmark

	Study Hospital (mean, SD)	**International Benchmark (mean, CIs)**
Teamwork Climate	78.9 (18.7)	68.5 (68.0, 68.9)
Safety Climate	73.6 (20.4)	65.9 (65.5, 66.3)
Perceptions of Management	51.6 (24.9)	46.4 (45.9, 46.8)
Job Satisfaction	80.2 (21.3)	63.6 (63.0, 64.1)
Working Conditions	46.5 (25.8)	55.9 (55.3, 56.4)
Stress Recognition	71.9 (24.6)	67.8 (67.3, 68.3)

SD: Standard Deviation, CI: Confidence Interval

In the '*Communication and Collaboration*' section, the majority of respondents agreed that they experienced good collaboration with doctors, nurses and HSCPs. The collaboration that staff had the most positive attitude towards was nurses collaborating with other nurses (90.11), followed by HCAs collaborating with nurses (88.04).

Qualitative Results

Five themes emerged from the data, as follows: 1) Staffing Issues, 2) Patient-Focused Care, 3) Hospital Environment, 4) Safe Reporting Culture and 5) Training & Education. Illustrative quotations summarising each theme are detailed in **Table 4**.

Table 4: Emergent Themes and Supporting Quotations

Theme	**Supporting Quotations**
Staffing Issues • The need for more staff, for a better skill mix amongst staff, and better on-call staffing	'*Staffing levels are inadequate to safely treat patients.'* (SN60) *'Increased staffing, sick cover for staff especially at weekends/nights. Dangerous at present.'* (I6) *'Need more senior staff, poor staffing leads to delayed patient care on the regular, lack of experience of junior staff compromises patient care'* (SN135)
Patient-Focused Care • The need to prioritise patient safety and patient care	*'Less emphasis on patient turnover, beds etc., more on actual patient care'* (SN77) *'Prioritise patient safety all the time'* (SN112) *'Communication between nursing staff and medical staff, need more effort to ensure patient safety'* (CNM33)

Hospital Environment • Issues with management, the need for better resources and facilities	*'Better working facilities and computers and more storage space'* (HSCP24) *'Having no patients on trolleys and especially on wards- less crowded, cluttered clinical areas'* (CNS13) *'Better understanding by hospital management of what actually happens on ground level. Better input by hospital management to support current staff and new staff'* (CNS3)
Safe Reporting Culture • The ability to report and learn from medication errors and near misses without fear of punishment	*'Non blame-laying systems of reporting errors'* (SHO9) *'Culture of teaching when errors occur'* (SHO8)
Training and Education • The provision of regular training courses to staff	*'Continuous training & reassessment of all clinical staff'* (I33) *'Better planning and notice of education days/courses'* (SN7)

Abbreviations: SN=Staff Nurse, I=Intern, CNM=Clinical Nurse Manager, HSCP=Health and Social Care Professional, CNS=Clinical Nurse Supervisor, SHO=Senior House Officer

Staffing Issues: The most frequently mentioned topic was the need for better staffing in the hospital. A large proportion of the comments called for *"more staff"*, *"more nurses"* or *"more doctors"*. Respondents felt that high workloads due to the low number of staff relative to the number of patients in the hospital were responsible for high levels of stress amongst hospital staff: "*Staffing levels are inadequate to safely treat patients. Current staff are overworked and fatigued"* (SN60).

A sub-theme that emerged was the need for a better skill mix amongst staff members. Respondents commented that there was a lack of senior staff, notably senior nurses, in the hospital, which resulted

in staff balancing supervision of less experienced staff with caring for patients: "*Increase nursing staffing level to allow adequate on-the-job training and education of new staff. Difficult to teach and care for patients at the same time"* (CNM23). Retention of senior staff members was also considered an issue: *'Staff retention of senior nurses to act as support and mentor new staff'* (CNM25).

Respondents also mentioned the lack of cover for staff who had to take sick leave: *"Need to cover sick leave rather than letting other staff to cover"* (SN128), and that staffing levels at night-time were particularly low: "*More staffing - particularly on night shifts."* (SN56).

Patient-focused care: A major theme was the importance of having a patient-centred approach to patient care. Respondents mentioned feeling under pressure to discharge patients early due to a shortage of beds: *"Less emphasis on discharges and more on patient care"* (SHO7). Respondents also associated patient safety with better inter-professional communication and teamwork *"Better communication between multidisciplinary team"* (SN149), and better handover "*Improved/formalised handover in the mornings from on call staff"* (I10). Clinical pharmacist involvement, continuity of care and appropriate bed allocation were also seen as important factors in improving patient safety.

Hospital Environment: The third major theme was the hospital environment, and impact of hospital factors such as infrastructure and management on patient safety.

Poor resources and facilities were frequently mentioned as barriers to patient safety in the hospital: *"Having no patients on trolleys and especially on wards - less crowded, cluttered clinical areas"* (CNS13). Respondents were concerned with a lack of single occupancy rooms for patients with infectious diseases: *"Need more single rooms for infective patients"* (SN32), and requested better equipment: *"Adequate/availability of functioning equipment, supplies and stock"* (SN48), improved facilities: *"More wheelchair + disability access to toilets + bathrooms"* (CNS13), updated clinical areas:

"New ICU, New operating theatres" (C8), and better resources: *"Easy access to children's BNF & guidelines on wards"* (SHO26).

Safe Reporting Culture: A minor theme that emerged from the data was the need for a safe reporting culture in the hospital. Respondents felt that in order to improve patient safety, staff members needed to feel safe to report any errors they might make and receive appropriate feedback on those errors: '*Better error reporting and learning from errors*' (HSCP29). Survey respondents reported associating error reporting with fear: '*A more open attitude to human error- it should be a learning exercise to fill out an incident report- NOT the end of the world!*' (O11), and mentioned a lack of clarity as to where incident forms went after they were filled out: '*Where do all the incident forms go?*' (CNM24).

Training & Education: A second minor theme was the importance of ongoing education and upskilling in maintaining patient safety. Respondents linked the provision of educational opportunities with improved patient safety: *"Allow time for study days, so patients will get better care"* (R26), but reported finding it difficult to attend training sessions due to staff shortages: "*Need more time for training, not always sufficient numbers to facilitate staff leaving ward*" (CNM40). Respondents also felt that better training should be provided to new staff: *"Proper training for junior staff"* (SN42).

DISCUSSION

This study used a mixed methods approach to explore healthcare provider's perceptions of the safety culture of an Irish hospital. While the quantitative results of the survey suggest that hospital staff have generally positive perceptions of the safety culture in the hospital, the qualitative data revealed several barriers to patient safety.

The hospital scored above the international benchmark in five out of six domains of the SAQ, indicating a generally positive safety culture. The hospital had a mean score higher than 70 in four of the safety culture domains. The high score for the domain '*Job Satisfaction'* indicates that staff are proud of their work and have good levels of morale. A positive score for '*Safety Climate'* indicates a strong organizational commitment to safety and a positive attitude towards the error reporting process. The hospital's score for the domain '*Stress Recognition'* demonstrates healthcare providers' awareness of the effects that stress and fatigue can have on their performance and the risks of errors occurring. Respondents' high scores in the domain '*Teamwork Climate'* were also highlighted in the '*Communication and Collaboration'* section of the questionnaire, in which the majority of each of the staff groups surveyed reported good quality interactions with doctors, nurses and HSCPs. This suggests that hospital staff have positive attitudes towards asking questions in the workplace, speaking up, support from other staff members, and conflict resolution.

The hospital scored above the international benchmark in the domain '*Perceptions of Management*', indicating that staff feel supported by hospital management and approve of the work that management does. However, this score was substantially lower than those of the other four domains in which the hospital scored positively, and the qualitative data suggested that there are aspects of respondents' relationships with hospital management that could be improved upon [8]. A possible explanation could be the fact that the Irish hospital system has been underfunded and persistently overcrowded in recent years, with high proportions of patients managed on trolleys in the first 24 hours following admission due to lack of hospitals beds [14,15]. This situation has put pressure on hospital

managers to prevent patients from spending too much time on trolleys, which can result in frontline staff feeling under pressure to discharge patients, and not feeling supported by management.

The hospital scored below the international benchmark for the domain '*Working Conditions*', indicating that respondents were dissatisfied with their work environment, staffing levels, and the quality of equipment and resources, which was reflected in the qualitative results. As mentioned previously, these comments were made in the context of an underfunded hospital system. Relatively poor pay and conditions have led to high levels of emigration amongst healthcare professionals [16,17], and the ensuing staff shortages have increased the level of pressure on healthcare providers.

It should be noted that this survey was carried out between December and January, when peak levels of winter influenza contribute further to hospital overcrowding [18]. This could be considered a particularly stressful time of year for healthcare providers, which may have contributed to generally negative nature of the qualitative data [19].

The phrasing of the question *'What are your top 3 recommendations for improving patient safety in your clinical area?'* may also have led to the negative tone of the qualitative data. Respondents were prompted to consider which aspects of their clinical area could have the most negative impacts on patient safety. This is in contrast to the quantitative element of the SAQ, in which only 2 of 32 statements were negatively phrased. The open comments section of the questionnaire was completed by 71.6% of survey respondents. It is possible that respondents with the most positive perceptions of safety culture in the hospital did not complete this section, which may have contributed to the negative nature of the qualitative data.

The quantitative results of the SAQ were similar to those found in other studies. As indicated by the international benchmark, hospitals tend to score well on the domains '*Teamwork Climate'*, '*Safety Climate*', '*Job Satisfaction'* and '*Stress Recognition'*, and usually receive lower scores in the domains '*Perceptions of Management'* and '*Working Conditions*' [8]. This was the case in studies carried out by Nguyen *et al* in hospitals in northeast Italy [6], Kaya *et al* in Turkish hospitals [5], and Relihan *et al* in the

Acute Medical Admissions Unit (AMAU) of another Irish hospital [9]. In contrast, Kristensen *et al* [20] used the SAQ in Danish hospital units and found that *'Stress Recognition'*, *'Perceptions of Management'*, and *'Safety Climate'* received the lowest mean scores.

Qualitative methods have been used in other studies to investigate hospital safety culture, for example the study by Relihan *et al.* also analysed the responses to the question, *'What are your top 3 recommendations for improving patient safety in your clinical area?'*. Issues highlighted by study participants referred to communication, security, equipment/facilities, medication safety, HCAs, patient issues, and education [9]. The HSOPS also contains an open comments section, which reads *'Please feel free to write any comments about patient safety, error, or event reporting in your hospital'* [4]. Boussat *et al.* found that staffing and hospital management support were the most commonly reported issues, followed by organisation and cooperation, and adverse event reporting [7]. There is considerable agreement between the results of these studies and those reported here, indicating that the same patient safety issues are faced in many clinical settings, regardless of size or location.

We recognise a number of limitations to this study. Staff perceptions of safety culture are a subjective measure of patient safety and are likely to change with time. As mentioned previously, this study was carried out during one of the busiest times of the year for a hospital, which may have contributed to some of the negative responses to the SAQ. Every effort was made to maximise survey distribution and staff participation, however due to the short time period and the distribution methods used, it is likely that not all staff members had an opportunity to complete the questionnaire, which may have contributed to the low response rate.

We believe that the use of a mixed methods approach in this study has provided a rich, detailed depiction of the safety culture in an Irish hospital. The results of this study will inform future work on the design of an intervention to improve patient safety. As safety culture is an inexpensive and practical indicator of safety, the efficacy of any future intervention could be measured by carrying out another SAQ.

CONCLUSIONS

This mixed methods study used the SAQ to investigate the safety culture of an Irish hospital. Although the hospital scored highly in four out of six domains of safety culture, the qualitative data provided in the open comments section of the SAQ indicated a number of areas in which patient safety could be improved. Staff perceived the major barriers to improving patient safety as the shortage of staff, the need for more patient-focused care, and the hospital environment. Respondents felt that cultivating a culture of safe error reporting and improving opportunities for training and education would have a positive impact on patient safety. The results of this study will inform future research and the design of an intervention to improve patient safety in hospitals.

COMPLIANCE WITH ETHICAL STANDARDS

Competing Interests: The authors A Delaney and D O'Mahony are employed by the study hospital, however they were not involved in data analysis or writing the manuscript.

Ethical Approval: Ethical approval for this study was granted by the Clinical Research Ethics Committee of the Cork Teaching Hospitals.

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