

Measuring and Benchmarking Safety Culture: Application of the Safety Attitudes Questionnaire to an Acute Medical Admissions Unit

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Abstract

Objectives To assess the safety culture in an acute medical admissions unit (AMAU) of a teaching hospital in order to benchmark results against international data and guide a unit-based, integrated, risk management strategy.

Methods The Safety Attitudes Questionnaire (SAQ), a validated instrument for the measurement of safety culture, was applied to an AMAU. All AMAU healthcare staff (n = 92) were surveyed: doctors, nurses, healthcare assistants (HCAs) and allied healthcare professionals (AHPs). Safety attitude scores for the overall unit and individual caregiver types were assessed across six domains of safety culture.

Results When compared against an international benchmark, the AMAU scored significantly higher for four of the six safety domains: $p < 0.01$ for 'teamwork climate', 'safety climate' and 'stress recognition', and $p < 0.05$ for 'job satisfaction'. The difference between nurse manager scores and the overall mean for the study group was statistically significant for the domains of 'teamwork climate' ($p < 0.05$) and 'safety climate' ($p < 0.01$). HCAs scored significantly lower relative to staff overall with regard to 'working conditions' ($p < 0.05$) and 'perceptions of management' ($p < 0.01$).

Conclusions The SAQ was successfully applied to an AMAU setting giving a valuable insight into staff issues of concern across the safety spectrum: employee and environmental safety, clinical risk management and medication safety.

Keywords Safety culture, Medication safety, Patient safety

Background

High hazard industries such as aviation, nuclear energy and shipping have historically based their safety measures on retrospective data of employee fatalities and injuries [1]. However, in recent times, the focus has shifted to predictive measures of safety, in particular, to the evaluation of 'safety culture'. Safety culture has been defined as 'the product of individual and group values, attitudes, perceptions, competencies and patterns of behaviour that determine the commitment to, and the style and proficiency of, an organisation's health and safety management' [2]. Safety culture surveys used in the aviation industry investigate attitudes towards stress, hierarchy, teamwork and error. Researchers have found that these items are relevant to understanding error [3], predictive of performance [4] and sensitive to training interventions [5–7]. Attitudes regarding stress recognition are indicative of the extent to which individuals will place themselves in error-inducing conditions, whilst items investigating hierarchy and teamwork indicate the abilities of team members to manage threats and errors in a team environment [8].

Healthcare has come to be recognised as a high hazard industry because it involves a high risk of morbidity and mortality [1]. While new safety initiatives are continually being developed there are few tools available to measure the effect of interventions on outcomes [9]. Most safety parameters in healthcare are difficult or impossible to capture in the form of valid rates for several reasons: (1) events are uncommon or rare; (2) few have standardised definitions; (3) surveillance systems generally rely on self-reporting; (4) denominators (the populations at risk) are largely unknown and (5) the time period for exposure (patient day or device day) is unspecified [10]. In 1999, the Institute of Medicine made the recommendation in their report 'To Err is Human' that healthcare institutions should aim to improve their patient safety culture [11]. Since that time several research agencies, regulators and quality improvement experts have advocated the measurement of healthcare staffs' attitudes about the context of work [12]. If a valid and reliable measurement instrument

is used, culture data can serve as a benchmark for hospitals to gauge their performance in advancing the patient safety agenda [9].

The most commonly used and rigorously validated tool to measure safety culture is the Safety Attitudes Questionnaire (SAQ) [10]. Higher scores on this questionnaire are associated with lower rates of nurse turnover, catheter-related bloodstream infections, postoperative sepsis, decubitus ulcers and inpatient mortality [10]. The SAQ has been administered in a variety of inpatient and outpatient settings in over 200 sites across the US, UK and New Zealand [2]. Unlike many other safety climate scales, the SAQ has undergone comprehensive psychometric testing [1] and has been shown to have good construct validity and internal consistency [13]. Results have been used to benchmark safety cultures internationally in healthcare organisations [2, 13].

The setting for this study was a large acute teaching hospital in Ireland, comprising approximately 1,000 inpatient and day case beds. A comprehensive risk management programme has been established for several years incorporating the divisions of health and safety, clinical risk management and medication safety.

In 2003, an acute medical admissions unit (AMAU) was established in the hospital; a 59-bed short-stay, high-intensity unit to which all emergency medical patients are admitted following emergency department evaluation. Several studies have demonstrated the introduction of this AMAU has been associated with dramatic improvements in numerous healthcare quality indicators, including length of hospital stay, emergency 'wait' times and all-cause hospital mortality [14, 15]. The positive impact of the AMAU has been attributed to the novel structure of care it provides: the unit has introduced a focal point of acute activity during the critical hours immediately following admission, enabling the increased availability and responsiveness of senior decision makers [16]. We hypothesised that successful outcomes of this magnitude may be underpinned by a positive safety culture on the unit and that therefore the AMAU should compare favourably to other healthcare organisations in this regard. Our aim was to benchmark results for the AMAU against international data and use the findings to guide a strategy for a unit-based risk management programme.

Methodology

The SAQ is a 60-item survey, with several versions developed for different healthcare settings [2]. All versions consist of 30 identical core questions, eliciting caregiver attitudes through six subscales or domains: 'teamwork climate', 'safety climate', 'perceptions of management', 'job satisfaction', 'working conditions' and 'stress recognition', using a 5-point Likert scale. A further 30 items investigate additional aspects of safety, which vary according to the particular unit type being surveyed. We decided to base our survey on the 30 core items alone, rather than the total 60 items from the SAQ. Our decision was based on the fact that validation and benchmarking data have only been published for the core items and our belief that staff would be more likely to complete a shorter questionnaire. In addition to the core questions, the SAQ contains a 'Collaboration and Communication' section where respondents indicate the quality of teamwork they have experienced with each of the other healthcare groups in their clinical area according to a scale of 1–5 (1 = very low, 2 = low, 3 = adequate, 4 = high, 5 = very high). There is also a free narrative section for staff comments: 'What are your top three recommendations for improving patient safety in this clinical area?' The SAQ was adapted to suit the Irish healthcare setting using some simple translations of terminology (*e.g.* US 'Attendings' became 'Consultants'). Both the 'Collaboration and Communication' section and the staff recommendations section were included in the questionnaire we administered.

Previous use of the SAQ had focused on the significance of the data solely in terms of patient safety. Because of the generic nature of many of the questions, however, we considered the SAQ to be equally relevant to employee and environmental safety. We were aware that many incidents reported in our hospital did not slot neatly into a single division of the risk programme, *i.e.* health and safety, clinical risk management or medication safety. Furthermore, incidents reported to and analysed by different divisions frequently had common root causes, which we believed would benefit from a shared approach to solution development. We therefore decided to interpret the results of the SAQ from a holistic risk perspective and to aim for an integrated response from the three subsets of the risk programme.

Following discussion with key stakeholders, several briefing sessions were held with the different healthcare groups to explain the background and aims of the survey. All caregiver groups with direct patient contact were targeted: nurses, doctors, allied healthcare professionals (AHPs) (pharmacists, clinical nutritionists, physiotherapists, speech and language therapists, social workers) and healthcare assistants (HCAs).

Staff were surveyed during a 3-week period in June 2008, using a combination of both online and manual administration methods to optimise the response rate. An intranet-based reporting system for patient safety incidents has long been established in our hospital, so issues of computer access and concerns regarding confidentiality were not thought to be significant impediments. In addition, an online system presented multiple advantages for both the respondents and the survey administrators, including secure and immediate transmission of responses and ease of data analysis. Where staff had a hospital email address, they were sent online notification of the survey launch and an intranet link to the questionnaire. In addition, hard copies were distributed at meetings and hand-delivered to staff, as part of a pack that included a cover letter co-signed by the three investigators and an envelope for return of the survey via the internal mail. Reminders to complete the survey were issued as email shots and ward posters mid-way through the survey period.

Both full- and part-time staff were eligible for inclusion in the survey, if they had worked on the unit for at least 3 weeks prior to the administration of the questionnaire. Random sampling was not performed because small sample sizes in caregiver types would have threatened the anonymity of the respondents. Our aim instead was to seek as high a response rate as possible within each healthcare group. No personal identifying information was tracked, beyond the caregiver type and number of years' employment in the hospital generally and on the AMAU.

Each of the six subscales was scored by first converting the 5-point Likert scale to a 100-point scale as follows: 1 = 0, 2 = 25, 3 = 50, 4 = 75 and 5 = 100 [12, 17]. Items were reverse scored when necessary, so the higher the score, the more positive the attitude. Responses to each item in the scale were summed, then divided by the number of items in that scale to create a score scale that ranged from 0 to 100.

International benchmarking data had previously been published of six surveys involving 10,843 healthcare providers from 203 clinical areas across three countries [2]. Using resampling statistics [18], data from the six reference surveys were pooled and an overall mean and 95% confidence intervals were determined for each domain. The AMAU scores were then compared to the international benchmark. Resampling statistics were also used to reconstruct hypothetical populations for each of the caregiver groups, calculate an overall mean and standard deviation and determine which staff groups scored significantly different from the norm using a pooled variance method.

Results

Fifty-five of the 92 staff targeted completed the survey, giving an overall response rate of 60%. Response rates for individual healthcare groups ranged from a low of 44% for HCAs to a high of 100% for AHPs and nurse managers.

When compared against the international benchmark, the AMAU scored significantly higher for four of the six safety domains: 'teamwork climate', 'safety climate' and 'stress recognition' ($p < 0.01$) and 'job satisfaction' ($p < 0.05$) (Table 1).

Table 1 Comparison of AMAU safety scores with international benchmark for safety domains in SAQ [2]

	SAQ Safety Domain					
	Teamwork climate	Safety climate	Perceptions of management	Job satisfaction	Working conditions	Stress recognition
International benchmark (mean, CIs)	68.5 (68.0, 68.9)	65.9 (65.5, 66.3)	46.4 (45.9, 46.8)	63.6 (63.0, 64.1)	55.9 (55.3, 56.4)	67.8 (67.3, 68.3)
Ireland: AMAU (mean, SD)	73.7 (14.9)**	71.0 (15.8)**	48.0 (19.2)	67.9 (19.4)*	58.2 (21.9)	74.7 (17.1)**

* $p < 0.05$; ** $p < 0.01$

The result for 'teamwork climate' suggests that AMAU staff had significantly more positive attitudes relative to the international benchmark regarding speaking up, feeling supported by others, collaboration with their own colleagues/other professions and conflict resolution.

A significantly higher score for 'safety climate' on the AMAU indicates a more positive attitude towards the error reporting process and the investigation of incidents at ward level than the international norm. High scores for AMAU staff in relation to 'stress recognition' suggests a well-developed awareness that factors such as fatigue, excessive workload and tense/hostile situations, are error-producing conditions. Comparatively favourable attitudes were also found in relation to 'job satisfaction', a sub-scale which investigates staff morale, pride in the organisation and general contentment at the workplace.

Scores for the safety subscales for individual caregiver groups were calculated and compared to the overall mean for the total study population (Table 2).

Table 2 SAQ Scores [mean (SD)] for each domain according to caregiver type in the AMAU

Caregiver type	Teamwork climate	Safety climate	Perceptions of management	Job satisfaction	Working conditions	Stress recognition
AHPs (n = 12)	76.2 (11.5)	66.7 (11.9)	52.8 (11.5)	74.6 (14.8)	65.3 (14.4)	73.8 (17.0)
Doctors (n = 6)	73.6 (11.4)	68.5 (15.1)	51.0 (23.5)	58.3 (27.0)	54.2 (24.9)	75.0 (18.1)
Nurse managers (n = 7)	86.9 (11.6)*	7.8 (9.9)**	59.8 (19.4)	80.0 (10.8)	67.0 (17.6)	72.3 (14.8)
Staff nurses (n = 23)	74.4 (14.1)	72.5 (16.2)	48.4 (17.0)	66.1 (20.3)	58.4 (21.5)	74.2 (17.6)
HCAs (n = 7)	65.2 (19.9)	59.2 (14.3)*	23.8 (16.3)**	58.6 (16.5)	39.9 (28.9)*	80.4 (20.5)
Overall	75.6 (14.9)	71.0 (16.1)	48.9 (19.8)	67.2 (19.9)	59.8 (22.6)	74.5 (17.7)

* $p < 0.05$; ** $p < 0.01$

For all domains except stress recognition, nurse managers scored the highest and HCAs, the lowest. The difference between nurse manager scores and the overall mean was statistically significant for the domains of 'teamwork climate' ($p < 0.05$) and 'safety climate' ($p < 0.01$).

HCA's scored significantly lower relative to staff overall with regard to 'working conditions' ($p < 0.05$) and 'perceptions of management' ($p < 0.01$). The low scores for HCA's in relation to both of these domains were mirrored by this group's comments in the 'Recommendations' section of the survey. HCA's expressed concern regarding their lack of inclusion in nursing handover meetings and felt this deficiency in communication limited their ability to adequately manage special-needs patients. The need for greater training for HCA's and a clearer definition of their role was highlighted several times.

On analysis of the 'Collaboration and Communication' section, teamwork ratings from each healthcare group were found to differ considerably by caregiver type, with the largest differences in perceptions of teamwork between doctors and staff nurses (Table 3). Doctors rated teamwork with staff nurses as 4.17 out of 5.00. However, this high score was not reciprocated by staff nurses, who scored communication and collaboration with doctors at just 2.87 out of 5.00. This trend was repeated with the other caregiver types — nurse managers, AHPs and HCA's — with doctors allocating a higher teamwork rating to each of these healthcare groups than was reciprocated. Each healthcare group, with the exception of nurse managers, rated teamwork within their peer group higher than with any of the other caregiver types.

Table 3 Teamwork ratings by and of each healthcare professional type on the AMAU

	Mean ratings of teamwork by				
	AHP	Doctors	Nurse managers	Staff nurses	HCA's
AHP	4.75	3.50	4.71	3.55	2.67
Doctors	2.67	4.40	3.57	2.87	2.00
Nurse managers	4.25	4.17	4.50	3.87	3.29
Staff nurses	3.92	4.17	4.83	3.87	3.71
HCA's	2.91	3.25	3.43	2.70	4.00

When the comments in the 'Recommendations' section of the SAQ were considered in tandem with the results for the safety domains and the 'Collaboration and Communication' section, a set of safety themes emerged, of relevance to all divisions of the hospital risk programme (Table 4).

Table 4 Safety concerns on the AMAU, as highlighted by the SAQ

Theme	Issues
Communication	<p>Concern expressed by nursing staff regarding difficulty in getting patient transfer handovers completed in time.</p> <p>Need to establish a unit-based 'safety representative' role, to ensure staff safety concerns can be highlighted.</p> <p>All staff expressed a desire for more comprehensive feedback on individual performance from managers.</p> <p>Need for improved communication between different healthcare groups; in particular between medical and nursing staff; request for provision of communication courses for all grades of staff to improve teamwork.</p> <p>Request that a contact list for the multidisciplinary team be displayed and regularly updated at ward level.</p>
Security	<p>Additional training requested by nursing staff for security guards, particularly in relation to problem-solving and language skills.</p> <p>Recommendation for continued implementation of hospital anti-social behaviour policy to safeguard staff and patients.</p> <p>Request that security measure of swipe-card access to the AMAU be reinstated.</p> <p>Need for greater restriction of visitors entering hospital after 10 pm.</p>
Equipment/facilities	<p>Request for:</p> <ul style="list-style-type: none"> individual vital signs monitoring equipment for all side rooms; an air and an oxygen point at all bedsides; additional moving and handling equipment, e.g. hoists, monkey bars, slings; additional general equipment: chairs, footstools, beds with side rails, cushions. <p>Concern expressed regarding blocked showers and resultant flooding in bathrooms, increasing the risk of slips/falls.</p>
Medication safety	<p>Request for supply of tabards specifying 'Do Not Disturb' to enable nursing staff to complete medication rounds without unnecessary interruptions.</p> <p>Concern expressed by nursing staff regarding risk posed by illegible/unclear prescriptions.</p>
Healthcare assistants	<p>Request for clarification of the job description for HCA's; clearer distinction required between HCA and janitor roles.</p> <p>Request from HCA's that they be involved in nursing handover meetings.</p> <p>Additional training requested by HCA's regarding management of patients requiring one-to-one supervision, e.g. patients with dementia or suicidal ideation.</p>
Patient issues	<p>Concern expressed by nursing staff regarding the locating of patients of both genders within the same bays on wards, as a result of pressure on bed availability.</p>
Education	<p>Requests for additional clinical in-service training for nursing staff.</p>

Discussion

Although the SAQ has been implemented in multiple hospital environments, to our knowledge this is the first application of the SAQ to an AMAU setting and its first use in an Irish healthcare organisation. We were interested in investigating if the SAQ scores for the AMAU compared favourably with international data. Our thesis was based on the substantial impact on morbidity and mortality already achieved by the unit in the context of a long-established, and well-accepted, hospital-wide risk management programme. The AMAU scored significantly higher than the international benchmark for four of the six domains, confirming our hypothesis.

The discrepancy in safety attitude scores between different caregiver types, *i.e.* higher scores associated with managers/professional grades and lower scores amongst junior staff/non-professional grades, is consistent with published research that reports better safety attitudes from those staff towards the top of the hierarchy in organisations [8, 17]. Significantly higher scores for 'teamwork climate' and 'safety climate' for nursing managers might be explained by a sense of unit ownership and responsibility, fostered by their roles as ward operational managers. In contrast, the significantly lower scores for HCAs in relation to 'perceptions of management' and 'working conditions' was highly suggestive of a staff group who feel somewhat disenfranchised relative to their colleagues, with a diminished sense of autonomy in relation to their working environment.

Substantial discrepancies in perceptions of teamwork exist on the AMAU, specifically between physicians and non-physicians, with the high scores attributed by doctors to other healthcare groups not being reciprocated. These findings mirror results of previous applications of the SAQ to the ICU and theatre settings [19]. Such discrepancies have been suggested to be related to differences in status, authority, gender, training and patient care responsibilities. They might also result from different concepts of what constitutes effective teamwork. In addition, as was evident here, caregiver groups generally rate communication and collaboration as best amongst their own colleagues, with lower scores being assigned to staff from other professions [19]. Positive teamwork attributes such as approachability and willingness to express concerns have obvious implications for patient and staff safety and have been linked to job satisfaction and nursing turnover [19].

To date, the primary source of information regarding safety issues in our hospital has been an online reporting system for all types of risk occurrences, *i.e.* those involving staff, environmental and patient safety. In common with many hospitals, we trend the number and types of errors reported as an indicator of patient safety. However, such an indicator is limited in its usefulness, as only a fraction (10– 20%) of the errors that occur are known to be submitted to reporting systems, and therefore reporting rates cannot be considered to be indicative of occurrence rates [10]. This has prompted a search for an alternative means of tracking patient safety in hospitals. Techniques such as chart review and observational studies, although effective at detecting additional incidents, are labour-intensive and therefore difficult to sustain on an ongoing basis [20, 21]. Trigger tool methodology [22] for the detection of adverse drug events (ADEs) has been piloted successfully in the hospital's Emergency Department. However, its full-scale application for the real-time detection and notification of ADEs is not feasible without recourse to a computerised ADE surveillance programme, currently unavailable in our organisation. In contrast to the above methodologies, the measurement of safety culture is inexpensive, sustainable and requires no technological support. Furthermore, safety culture has the inherent value of being a 'leading' rather than a 'lagging' indicator of safety, in that it influences processes – and therefore, in turn, outcomes – in a healthcare organisation [23]. Hospitals have traditionally focused on retrospective surveillance of patient outcomes, typically injuries reported via incident reporting systems, as an indicator of the success of risk management programmes. Conversely, high reliability organisations (HROs) are inclined to focus 'upstream' in the chain of organisational action in their search for safety data, focusing on structures and processes in preference to outcomes. Like HROs, the work of healthcare organisations is often both complex and high risk and safety researchers have advocated that healthcare institutions adopt the safety learning practices of HROs where possible [24].

We recognise several limitations to our study. First, we are aware that the measurement of safety culture in healthcare is as yet in its infancy and its association with outcome data has only begun to be investigated. Secondly, staff perceptions of teamwork can vary over time and can be influenced by acute events within a unit [19], so results must be interpreted with caution. Finally, we considered the results of the SAQ from a holistic perspective of safety, even though the SAQ has only been validated in a patient safety setting. Although a model demonstrating how safety climate impacts on both patient and staff outcomes in terms of injuries has been proposed, limited research into this concept has been undertaken to date [25].

The next stage in the safety culture project will involve feedback of the results to staff and hospital management by means of presentations, ward posters and a written report. Under Irish legislation (Safety, Health and Welfare at Work Act 2005) employers are obliged to establish safety teams, which include staff representatives, in order to identify and manage workplace risks. We plan to pilot an integrated approach to safety on the AMAU by establishing a unit-based safety team to address the full spectrum of safety issues (staff, patient and environmental) arising on the wards. Such unit-based safety programmes, managed by a local staff, have been shown to improve safety culture and reduce medication errors, length of stay and potentially nursing turnover [26]. In combination with other sources of data such as incident reporting and safety team walkarounds on the AMAU, the safety issues highlighted by the SAQ will set the agenda for a unit-specific risk management programme.

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