SAFETY CULTURE IN AUSTRALIAN INTENSIVE CARE UNITS: ESTABLISHING A BASELINE FOR QUALITY IMPROVEMENT

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Background Workplace safety culture is a crucial ingredient in patients’ outcomes and is increasingly being explored as a guide for quality improvement efforts.

Objectives To establish a baseline understanding of the safety culture in Australian intensive care units.

Methods In a nationwide study of physicians and nurses in 10 Australian intensive care units, the Safety Attitudes Questionnaire intensive care unit version was used to measure safety culture. Descriptive statistics were used to summarize the mean scores for the 6 subscales of the questionnaire, and generalized-estimation-equations models were used to test the hypotheses that safety culture differed between physicians and nurses and between nurse leaders and bedside nurses.

Results A total of 672 responses (50.6% response rate) were received: 513 (76.3%) from nurses, 89 (13.2%) from physicians, and 70 (10.4%) from respondents who did not specify their professional group. Ratings were highest for teamwork climate and lowest for perceptions of hospital management and working conditions. Four subscales, job satisfaction, teamwork climate, safety climate, and working conditions, were rated significantly higher by physicians than by nurses. Two subscales, working conditions and perceptions of hospital management, were rated significantly lower by nurse leaders than by bedside nurses.

Conclusions Measuring the baseline safety culture of an intensive care unit allows leaders to implement targeted strategies to improve specific dimensions of safety culture. These strategies ultimately may improve the working conditions of staff and the care that patients receive. (American Journal of Critical Care. 2013;22:93-103)
Quality of care and patient safety have received unprecedented attention since the US Institute of Medicine published the seminal report *To Err Is Human*. Nonetheless, injury of the public remains a perennial concern, particularly in critical care, where the complexity of care and severity of illnesses make the health care system vulnerable to error. Recently, workplace safety culture has gained prominence as a crucial ingredient in patients’ outcomes and is increasingly being explored as a guide for quality improvement efforts.

Safety culture has been defined as “the product of individual and group values, attitudes, perceptions, competencies, and patterns of behavior that determine the commitment to, and the style and proficiency of, an organization’s health and safety management.” Carney et al described safety culture as “a professional culture that promotes effective and efficient communication among clinicians that is not hampered by hierarchical status or personality differences.” Organizations with a positive safety culture are characterized by communications founded on mutual trust, by shared perceptions of the importance of safety, and by confidence in the efficacy of preventive measures. As Davies et al remarked, culture is “the way we do things around here.”

The increasing interest in safety culture in health care stems from evidence from a range of industries (eg, aviation, chemical and nuclear processing, construction) that a relationship exists between safety culture and injury involvement and that employees who perceive a positive safety culture in the workplace are more likely to engage in safety-related behaviors than are personnel who perceive a negative culture. In health care, safety culture has been linked to safety performance, described as both safety compliance (eg, following rules and regulations, wearing protective clothing, and avoiding risky practices), and as safety participation, which reflects workers’ active involvement and commitment to safety. Safety culture has also been associated with safe work practices, injuries in nurses, workplace accidents, adverse events such as medication errors, and pressure ulcers and falls.

Several investigators have measured safety culture in intensive care units (ICUs). In a survey of 179 ICUs representing 7846 staff members in 3 countries (United States, United Kingdom, and New Zealand), Sexton et al found significant variation among clinical areas in responses to 6 safety factors: teamwork climate, safety climate, perceptions of management, job satisfaction, working conditions, and stress recognition. These findings were supported by a more recent study of 30 ICUs in the United States. Also, Huang et al reported varied perceptions between ICUs within a single health care facility in the United States and noted that ICU nursing directors tended to overestimate the attitudes of staff members, particularly for teamwork. Significant variations in attitudes between nurses and physicians and between different levels of staff (ie, frontline staff and management staff) have also been reported, particularly in the organizational culture factors of perceived working conditions and teamwork. Differences between nurses and physicians have also been reported in other clinical areas, such as the operating room.

In Australia, Hewson used the Safety Attitudes Questionnaire to measure the perceptions of ICU staff on the effects of safety culture on their work environment.

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nursing, medical, and other staff members in 6 safety dimensions. Among nurses, mean scores were highest for job satisfaction and teamwork climate and lowest for perceptions of management; findings were similar among medical staff. Panozzo22 used the Hospital Survey on Patient Safety Culture (SAQ) to investigate the patient safety culture in a single ICU in South Australia. Although the survey results revealed that teamwork within the ICU was considered a strength, clinical incident reporting and clinical handovers (also termed handoffs) between care providers were identified as areas that needed improvement.

To date, understanding of the safety culture within Australian ICUs is limited. Studying the safety culture of an organization is one way to gain insight into patient safety and can provide the foundation for the development of appropriate interventions to improve patients’ safety if required. Thus, the aim of this study was to establish a baseline understanding of the safety culture that exists in a sample of Australian ICUs. On the basis of previous literature, we hypothesized that nursing and medical staff differ in the perceptions of the safety culture and that nurses in leadership positions (eg, managers, educators) and bedside nursing staff differ in the perceptions of the safety culture.

Method

For this descriptive, multisite, nationwide cross-sectional study, a paper-based self-administered survey of physicians and nurses was used. The study was approved by the human research ethics committee at Griffith University, Queensland, Australia, and by the respective ethics committees at the participating hospitals. Consent was implied by return of the surveys.

Sample and Sampling Procedure

The Australia and New Zealand Intensive Care Society Centre for Outcome and Resource Evaluation (CORE) database was used to generate a random sample of 10 (of 79 eligible units) Australian ICUs with 10 or more beds. A total of 10 different hospitals were invited to participate in the study. The CORE database is a voluntary national registry of ICU patients. At the time of the study, 167 of 186 critical care units in Australia and New Zealand contributed data to CORE. When 4 of the randomly selected ICUs declined to participate, 4 other units in 4 other hospitals were chosen purposively, to achieve geographic diversity in sampling. Initial contact with the units was made via e-mail to nurse managers and medical directors, and letters and telephone calls were used for follow-up. All nursing and medical staff working in the chosen units were invited to participate in the study if they were working full- or part-time, so long as they had worked in the unit for at least 2 shifts or a mean of 15 h/wk per the SAQ recommendations.23 Staff members who had worked in the ICU less than 1 month were excluded because limited exposure to the culture of the unit would preclude them from responding adequately to the survey.20

Data Collection

Data collection took place April through July 2009. The collection procedure was based on the guidelines for administration of the SAQ.23 Members of the research team were assigned to liaise with 1 to 2 local coordinators at each site who were nominated by the participating unit. The site coordinators were responsible for hand delivering the survey package to staff and for collecting the completed questionnaires. Sealed envelopes (containing the surveys whether completed or not) were returned; therefore, respondents remained anonymous. Site coordinators either collected the sealed envelopes from staff members individually or had a central box for return envelopes. Each survey package contained a cover letter, the survey, and an envelope for the completed survey. Two weeks after distribution of the survey, the site coordinator reminded staff members of the study and asked them to complete the survey if they had not yet done so. One month after initial distribution of the survey, the site coordinator placed the envelopes into a larger overnight mail pouch and mailed them to a member of the research team (W. C.).

Instrument

The ICU version of the SAQ16 was used, with permission, to measure safety climate. The SAQ is a rigorous modification and refinement of the Flight Management Attitudes Questionnaire, which has been used extensively in aviation research.18 The SAQ was chosen on the basis of its sound psychometric properties and its previous use in establishing benchmark safety culture data in a range of ICUs.12,18 The ICU version contains 30 items for measuring 6 domains (scales) of safety culture: teamwork climate (6 items), safety climate (7 items), job satisfaction (5 items), stress recognition (4 items), perceptions of hospital management (4 items), and working conditions (4 items). Items for the various scales include the following16:
The Safety Attitudes Questionnaire was chosen due to its sound psychometric properties and previous use in benchmarking safety culture data in intensive care units.

Data Analysis

The SAQ was not designed to provide a total SAQ scale score. Subscale scores were calculated and transformed to a scale of 0 to 100 (0 = disagree strongly, 25 = disagree slightly, 50 = neutral, 75 = agree slightly, and 100 = agree strongly). The number and proportion of respondents who scored positively, defined as 75 or greater, for each subscale (equivalent to agree slightly or agree strongly) were calculated as done previously. Cronbach $\alpha$ was used to measure the internal consistency reliabilities of each SAQ subscale. A $\chi^2$ test was used to examine variation in subscale scores across sites. Safety subscale scores were compared between professional groups (physicians vs nurses and nurse leaders vs bedside nurses) by using generalized-estimating-equations models to account for the clustered nature of the data. Classical generalized linear models and traditional regression models could not be used because they assume independence between observations. But, because individual responses from 1 ICU will not be “independent” of each other, some statistical correlation is expected. Adjustments for clustering effects are important when there is a correlation within a cluster. The variances of between-cluster comparisons may be significantly underestimated, a situation that may affect the results of hypothesis tests.

In order to calculate the mean scores for each role category, the responses were assumed to be normally distributed, and an identity link function was specified. These generalized-estimating-equations models provided adjusted means and standard errors, and $P$ values (obtained by using the Wald statistic), which were used to compare the differences between groups. The differences between professional groups were further evaluated after adjustments were made for potential confounders such as age, sex, and years of work experience. Subcategories of nurses were further collapsed to compare nurse leaders (nurse educators, nurse managers, clinical nurse consultants, charge nurses, and liaison nurses) with bedside nurses (both registered nurses and enrolled nurses, whose role is similar to that of licensed practical nurses in North America). The $\alpha$ level was set at 0.05. Content analysis was used to summarize the findings from the single open-ended question.

Results

In total, 10 ICUs from 4 of the 5 Australian states and 1 Australian territory were represented in the sample. A total of 672 responses (50.6% response rate) were received: 513 (76.3%) from nurses, 89 (13.2%) from physicians, and 70 (10.4%) from staff members who did not specify their professional group. The response rate varied widely by site, from a low of 27.5% to a high of 87.3%. The mean ages of the physicians and nurses were 35.1 years (SD, 8.1) and 35.8 years (SD, 8.6), respectively. Of the 563 respondents who reported their sex, 425 (75.5%) were female: 398 (83.3%) of the 478 nurses and 27 (31.8%) of the 85 physicians. Of the 548 respondents who reported their work status, 348 (63.5%) worked full time: 271 (58.5%) of the 463 nurses and 77 (90.6%) of the 85 physicians.

Table 1 displays the Cronbach $\alpha$ and mean subscale scores. Cronbach $\alpha$ reliabilities varied from 0.65 to 0.81. The number and proportion of responses that were positive (ie, scores ≥ 75) for each subscale were also computed (Table 2) and showed that the proportion of respondents who were positive was...
low, ranging from 18.8% to 48.1% for various subscales. An examination of the subscale scores from the 6 hospitals with the 3 highest and the 3 lowest response rates did not indicate any patterns of response. Perceptions of hospital management were ranked the lowest by 9 of the 10 sites. Working conditions were also ranked low consistently. Overall, teamwork climate had the highest rating, indicating that respondents were more positive toward the quality of collaboration between personnel than toward other domains. The χ² tests showed significant differences between sites for all scales except stress recognition (Table 2).

Table 3 displays response comparisons between physicians and nurses and between nurse leaders and bedside nurses. Four subscales, job satisfaction, teamwork climate, safety climate, and working conditions, were scored significantly higher by physicians than by nurses. These differences remained significant even after adjustments were made for potential

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Whole sample (N = 672)</th>
<th>Site 1 (n = 62)</th>
<th>Site 2 (n = 78)</th>
<th>Site 3 (n = 65)</th>
<th>Site 4 (n = 48)</th>
<th>Site 5 (n = 34)</th>
<th>Site 6 (n = 149)</th>
<th>Site 7 (n = 88)</th>
<th>Site 8 (n = 70)</th>
<th>Site 9 (n = 40)</th>
<th>Site 10 (n = 38)</th>
<th>P&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job satisfaction</td>
<td>0.81</td>
<td>68.6 (19.2)</td>
<td>75.4 (18.7)</td>
<td>75.3 (17.4)</td>
<td>65.0 (15.6)</td>
<td>63.9 (20.4)</td>
<td>68.5 (19.7)</td>
<td>65.7 (19.1)</td>
<td>67.3 (20.2)</td>
<td>66.1 (19.7)</td>
<td>71.8 (18.7)</td>
<td>69.2 (17.1)</td>
</tr>
<tr>
<td>Teamwork climate</td>
<td>0.74</td>
<td>69.8 (16.2)</td>
<td>77.1 (16.2)</td>
<td>75.9 (13.1)</td>
<td>68.6 (16.1)</td>
<td>65.2 (17.5)</td>
<td>70.5 (15.3)</td>
<td>66.9 (14.1)</td>
<td>66.6 (16.6)</td>
<td>66.1 (18.8)</td>
<td>75.6 (14.7)</td>
<td>70.0 (15.3)</td>
</tr>
<tr>
<td>Safety climate</td>
<td>0.71</td>
<td>68.5 (14.9)</td>
<td>71.5 (15.7)</td>
<td>72.8 (13.7)</td>
<td>66.9 (14.4)</td>
<td>65.7 (14.4)</td>
<td>72.0 (13.9)</td>
<td>66.0 (14.7)</td>
<td>68.5 (15.2)</td>
<td>65.9 (17.0)</td>
<td>72.9 (14.7)</td>
<td>66.3 (11.3)</td>
</tr>
<tr>
<td>Working conditions</td>
<td>0.65</td>
<td>59.1 (18.9)</td>
<td>64.5 (19.5)</td>
<td>64.6 (13.8)</td>
<td>53.1 (18.8)</td>
<td>51.3 (17.9)</td>
<td>56.6 (22.6)</td>
<td>57.9 (19.0)</td>
<td>59.9 (18.3)</td>
<td>57.7 (20.5)</td>
<td>64.6 (16.2)</td>
<td>61.3 (15.7)</td>
</tr>
<tr>
<td>Perceptions of hospital</td>
<td>0.68</td>
<td>54.3 (20.2)</td>
<td>60.1 (20.5)</td>
<td>58.0 (18.8)</td>
<td>50.3 (18.4)</td>
<td>46.6 (21.9)</td>
<td>50.0 (23.2)</td>
<td>48.9 (18.7)</td>
<td>61.7 (15.9)</td>
<td>50.8 (21.5)</td>
<td>60.5 (21.1)</td>
<td>57.9 (17.7)</td>
</tr>
<tr>
<td>Stress recognition</td>
<td>0.69</td>
<td>68.6 (20.9)</td>
<td>63.9 (25.2)</td>
<td>69.4 (17.7)</td>
<td>69.1 (21.3)</td>
<td>73.8 (20.0)</td>
<td>60.1 (22.1)</td>
<td>70.2 (19.9)</td>
<td>67.1 (20.2)</td>
<td>70.5 (18.5)</td>
<td>67.0 (18.5)</td>
<td>70.9 (21.6)</td>
</tr>
</tbody>
</table>

* From χ² test.
confounders such as age, sex, and experience. Two subscales, working conditions and perceptions of hospital management were scored significantly lower by nurse leaders than by bedside nurses. These differences also remained significant after adjustments for potential confounders.

Table 4 provides a summary of the findings from the open-ended question. The most frequently mentioned recommendations to improve patient safety were related to communication and teamwork, staffing, education and training, and physical resources.

**Discussion**

This study was the first multisite study to determine perceptions of safety culture within ICUs in Australia. Although we found some intersite variation, scores generally were 50 to 75 (neutral to agree slightly) for most subscales. This finding is similar to the results of the large international study undertaken a few years earlier by Thomas et al. who used the SAQ and reported on mean subscale scores for ICUs in the United States, the United Kingdom, and New Zealand. For example, variations in the mean scores for the 2 subscales safety climate and working conditions were 6 or less (of 100 possible), suggesting that in the 4 countries, ICU medical and nursing staff have consistent perceptions about these aspects of safety culture. Unfortunately, the mean scores on these subscales were less than a score of 75, which equates to agree slightly. Perhaps these findings indicate that some aspects of ICU culture cross geographic and cultural boundaries and can be improved on. Because of the proximity of Australia and New Zealand, the Australian and New Zealand Intensive Care Society, and joint ICU conferences, the responses to teamwork climate and stress recognition in our study were similar to the responses of the New Zealand sample in the study by Thomas et al. However, we found almost 10-point differences for the subscales job satisfaction and perceptions of management; scores in our sample were more positive than those in the New Zealand sample. Of interest, the results from our study of 10 Australian ICUs were most similar to those of the 53 ICUs in the United States in the study by Thomas et al. The reason for this finding is unknown but may reflect an influence of US ICUs and organizations such as the Society of Critical Care Medicine on the Australian ICU culture.

### Table 3

**Comparison of subscales of the Safety Attitudes Questionnaire by using generalized-estimation-equations (GEE) models**

<table>
<thead>
<tr>
<th>Score, mean (SD)</th>
<th>Job satisfaction</th>
<th>Teamwork climate</th>
<th>Safety climate</th>
<th>Working condition</th>
<th>Perceptions hospital management</th>
<th>Stress recognition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physicians</td>
<td>77.1 (2.2)</td>
<td>79.9 (1.9)</td>
<td>75.2 (1.7)</td>
<td>67.9 (2.2)</td>
<td>53.3 (2.7)</td>
<td>72.2 (2.2)</td>
</tr>
<tr>
<td>Nurses</td>
<td>67.6 (1.3)</td>
<td>68.8 (1.2)</td>
<td>67.8 (0.9)</td>
<td>57.6 (1.3)</td>
<td>54.5 (1.9)</td>
<td>68.6 (0.9)</td>
</tr>
<tr>
<td>P&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>.59</td>
<td>.12</td>
</tr>
<tr>
<td>Adjusted P&lt;.01</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>.39</td>
<td>.10</td>
</tr>
<tr>
<td>Nurses</td>
<td>67.8 (1.9)</td>
<td>68.8 (1.6)</td>
<td>67.9 (1.4)</td>
<td>56.1 (1.9)</td>
<td>52.0 (2.4)</td>
<td>68.6 (1.6)</td>
</tr>
<tr>
<td>Leaders</td>
<td>69.4 (1.6)</td>
<td>69.6 (1.4)</td>
<td>68.5 (1.2)</td>
<td>59.8 (1.6)</td>
<td>55.9 (2.2)</td>
<td>68.7 (1.1)</td>
</tr>
<tr>
<td>P&lt;.13</td>
<td>.60</td>
<td>.68</td>
<td>.04</td>
<td>.04</td>
<td>.96</td>
<td>.96</td>
</tr>
<tr>
<td>Adjusted P&lt;.01</td>
<td>.10</td>
<td>.49</td>
<td>.62</td>
<td>.009</td>
<td>.01</td>
<td>.89</td>
</tr>
<tr>
<td>Nurses</td>
<td>72.2 (2.2)</td>
<td>68.6 (0.9)</td>
<td>68.7 (1.1)</td>
<td>68.6 (1.6)</td>
<td>68.7 (1.1)</td>
<td></td>
</tr>
<tr>
<td>Bedside</td>
<td>75.2 (1.7)</td>
<td>67.8 (0.9)</td>
<td>57.6 (1.3)</td>
<td>54.5 (1.9)</td>
<td>68.6 (0.9)</td>
<td></td>
</tr>
<tr>
<td>P&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjusted P&lt;.01</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* GEE adjusted.

* GEE adjusted for age, sex, and work experience.

### Table 4

**Participants’ recommendations to improve patient safety**

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Response frequency (N = 895)</th>
<th>Verbatim responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication and teamwork</td>
<td>317 (35%)</td>
<td>Foster better communication between doctors and nurses</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Promote standardization and adherence to protocols</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Provide better handovers</td>
</tr>
<tr>
<td>Staffing</td>
<td>235 (26%)</td>
<td>Improve staffing levels</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Consider skill mix, experience, and required expertise</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Better rostering practices to support staff circumstances</td>
</tr>
<tr>
<td>Education and training</td>
<td>222 (25%)</td>
<td>Offer formal (classroom) educational opportunities</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Provide clinical (bedside) training to both new and experienced staff</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Better learning from clinical incidents</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Clinical nurse educator positions needed</td>
</tr>
<tr>
<td>Physical resources</td>
<td>51 (6%)</td>
<td>Ensure needed equipment is available</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maintain/service equipment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Redesign bed space to improve the safety of the environment</td>
</tr>
</tbody>
</table>

* AJCC AMERICAN JOURNAL OF CRITICAL CARE, March 2013, Volume 22, No. 2 www.ajcconline.org*
Importantly, overall, the proportion of respondents who rated the various subscales positively (ie, scores ≥ 75) was less than 50%. According to high-reliability organization theory, achieving high reliability requires a safety culture that is highly uniform in both safety attitudes and experiences. In other words, having many people strongly support safety principles and engage in the appropriate behaviors is not enough—almost everyone must do so almost all the time. Our findings suggest that improvements in safety culture in Australian ICUs may be warranted if a goal is to achieve high uniformity and reliability.

Overall, teamwork climate, job satisfaction, and stress recognition were the 3 most highly rated subscales in our study. These findings are similar to those of previous single-site ICU studies in Australia. The importance of teamwork in a critical care setting should not be underestimated. Teamwork behaviors, including communication, leadership, coordination, and decision making, are crucial for providing optimal patient care in an ICU. If the teamwork domain requires improvement, several programs, such as TeamSTEPPS and the Anaesthetists’ Non-Technical Skills, are available to provide training in this area.

The subscale hospital management consistently received the lowest score, indicating that respondents were least positive toward managerial action at the level of hospital administration. This finding is consistent with the results of previous research, suggesting that hospital management is viewed as a problem in many ICUs and may be associated with poorer outcomes for patients. In an Australian study of frontline ICU nurses (ie, nurses working in direct patient care), leading by example, effective communication, ability to think outside the management square, knowing your staff, and stepping up in times of crisis were perceived as characteristics of strong leaders. Most likely, close contact between frontline staff and senior leaders opens lines of communication and provides leaders with an opportunity to demonstrate their commitment to creating a culture of safety. One way to obtain this close contact is by instituting executive walk rounds in which hospital executives circulate throughout inpatient care areas to declare the executives’ commitment to open communication and safety and to obtain direct feedback from frontline personnel. The benefits of executive walk rounds were demonstrated in a study by Thomas et al, after such rounds were started, a number of safety issues were addressed. Plausibly, in that study, ICU nurse leaders’ lower perceptions of management signaled a need for increased support from higher levels of hospital administration in fulfilling the leaders’ role in quality-improvement efforts. Because of the shortage of nurses, efforts to create and maintain a work milieu conducive to increasing nurses’ satisfaction may be beneficial.

We found differences in attitudes between physicians and nurses: physicians scored 4 safety domains significantly higher than did nurses. These findings are consistent with the results of 2 previous US studies. Conceivably, the differences may reflect a need to target safety culture interventions slightly differently for different professional groups, as suggested by Carney et al, who recommended that safety interventions explicitly address profession-based differences. Although much remains unknown about the cause of differences between physicians and nurses and whether or not these differences have an impact, research in other areas of health care has shown that lower-status persons are less likely than persons of higher status to speak up about areas of concern. Thomas et al note the fundamental differences between physicians and nurses, including status and authority, sex, training, and patient care responsibilities, and suggest that training in conflict resolution, effective methods of opinion and knowledge assertion, listening skills, and conducting collaborative rounds might be beneficial.

In our study, nurse leaders and bedside nurses were similar in their perceptions of the safety culture. Nurse leaders did rate perceptions of hospital management lower (less positively) than did bedside nurses. Other investigators have reported significant differences between ICU leaders and bedside staff, a finding that may reflect the tendency of leaders to have more direct contact with senior hospital managers. However, contrary to our results, in other studies, nurse leaders perceived safety climate more positively than did bedside staff, a finding that might reflect the leaders’ active involvement in quality improvement and patient safety initiatives.

Finally, the qualitative, open-ended question allowed respondents to share their thoughts and recommendations. The in-depth feedback and recommendations provided by frontline staff should be regarded as key information in the development of safety action plans. Consistent with this idea of obtaining both qualitative and quantitative data on

Having many people strongly support safety principles and behave appropriately is not enough—almost everyone must do so almost all the time.
Nurse leaders and bedside nurses were similar in their perceptions of the safety culture. In addition, the results of a study of more than 2300 nurses working in critical care units showed an association between organizational climate and nurses’ intention to leave their jobs. More recently, Vigorito et al found that an SAQ action plan was associated with a decrease in catheter-associated bloodstream infections and a trend toward better job satisfaction for staff. Finally, in their review and proposed model of teamwork, one aspect of safety culture, Reader et al identified beneficial outcomes for staff, such as job satisfaction and morale. Although these benefits are beginning to emerge, more work is required to demonstrate these benefits more clearly.

Limitations

Our study had several limitations. First, because we did not know which sites had declined to participate in the study, we could not contact them to find out their reasons for not participating. Thus, we could not determine if the sites that declined to participate differed from the sites that agreed to participate. Second, only 89 physicians responded to the survey, a relatively small sample. Third, the response rates from some sites were low, even though the surveys were hand delivered as recommended by the SAQ administering guidelines. Although the guidelines suggest that response rates of 60% to 80% can be achieved by using hand delivery, our response rate was 50%. And, because the surveys were anonymous, we had no way to follow up non-responders. Our overall response rate was slightly higher than the rates of Huang et al and Singer et al but less than the rate of Sexton et al. Although the generalizability of the research to other settings may be limited by the response rate, of note, the pattern of results was similar to the pattern of other international studies. Fourth, the reliability of 3 scales—working conditions, perceptions of hospital management, and stress recognition—was less than 0.70; thus, our results should be interpreted cautiously. These subscale reliabilities are somewhat lower than those of Huang et al, who reported results of 0.67 to 0.73 for the same 3 subscales. Of interest, Blegen et al also found low reliability scores for another validated safety culture survey. Perhaps, the measurement of safety culture requires refinement in particular settings. Finally, cross-sectional analysis does not allow any insights into whether ICU culture is stable over time or changes along with transitions in the workforce.

We have several recommendations for future research. First, research into both the reasons behind the differences in nurses’ and physicians’ attitudes...
and the significance of the differences may help inform future patient safety initiatives. Second, longitudinal studies to evaluate the effects of safety activities over time may be beneficial. In a recent study of 71 ICUs in the United States, Sexton et al found that patient safety programs influenced perceived safety climate. Future studies might also investigate the associations between safety culture and patient outcomes, as Huang et al did recently, as well as patient satisfaction, staff satisfaction, and retention, and other clinical outcomes such as adverse events.

In conclusion, in this study, less than half of the respondents identified the safety culture in 10 Australian ICUs as positive. Differences between physicians and nurses and between nurse leaders and bedside nurses suggest that initiatives to improve safety culture may require tailoring the programs to particular subgroups within the unit. Importantly, measuring an ICU’s baseline safety culture allows leaders to implement targeted strategies to improve specific dimensions of safety culture, improvements that may ultimately improve the working conditions of staff and the care patients receive.

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REFERENCES


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