Measuring patient safety climate: a review of surveys

J B Colla, A C Bracken, L M Kinney, W B Weeks

Objective: Five years ago the Institute of Medicine recommended improving patient safety by addressing organizational cultural issues. Since then, surveys measuring a patient safety climate considered predictive of health outcomes have begun to emerge. This paper compares the general characteristics, dimensions covered, psychometrics performed, and uses in studies of patient safety climate surveys.

Methods: Systematic literature review.

Results: Nine surveys were found that measured the patient safety climate of an organization. All used Likert scales, mostly to measure attitudes of individuals. Nearly all covered five common dimensions of patient safety climate: leadership, policies and procedures, staffing, communication, and reporting. The strength of psychometric testing varied. While all had been used to compare units within or between hospitals, only one had explored the association between organizational climate and patient outcomes.

Conclusions: Patient safety climate surveys vary considerably. Achievement of a culture conducive to patient safety may be an admirable goal in its own right, but more effort should be expended on understanding the relationship between measures of patient safety climate and patient outcomes.

RESULTS

The nine surveys reviewed were designed to be used in different types of settings: five for general evaluation of patient safety climate in healthcare settings, two for within hospital units, and two for use in specific healthcare locations (table 1). Seven were designed for individuals to complete while two were designed for teams to complete together (Strategies for Leadership: An Organizational Approach to Patient Safety (SLOAPS) and Medication Safety Self Assessment (MSSA)).

All the surveys used a 5-point Likert scale, mostly to measure respondents’ attitudes about various aspects of patient safety. Two (SLOAPS and MSSA) measured the degree to which safety actions had been implemented to address patient safety concerns. There was a large range in the number of items to be completed (from 19 to 194).

Seven of the nine surveys evaluated five common dimensions of patient safety climate: leadership, policies and procedures, staffing, communication, and reporting. Most also addressed other dimensions of patient safety climate.

The quantity and quality of psychometric testing varied considerably across surveys. They were not reported at all for the SLOAPS or Culture of Safety Survey (CSS) but were comprehensive and sound for the Veterans Administration Patient Safety Culture Questionnaire (VHA PSCQ), the Hospital Transfusion Service Safety Culture Survey (HTSSCS), the Hospital Survey on Patient Safety (HSOPS), and the Safety Attitudes Questionnaire (SAQ).

These surveys have been used primarily for intra- and inter-institutional comparisons. Three have also been used to compare the safety climate in a healthcare setting with that of high hazard industries such as aviation, nuclear energy, and shipping pay considerable attention to assessing safety. Historically, their safety measures have been based on retrospective data of employee fatalities and injuries. Recently, driven by the awareness that organizational, managerial, and human factors rather than simply technical failures are prime causes of accidents, these industries have focused on predictive measures of safety. One particular focus is the evaluation of “safety climate”, a term that generally refers to the measurable components of “safety culture” such as management behaviors, safety systems, and employee perceptions of safety.

Because the healthcare industry involves high risk for morbidity and mortality, it is considered to be a high hazard industry. Five years ago the Institute of Medicine (IOM) recommended that healthcare organizations should work to enhance their patient safety culture. Since then, surveys measuring patient safety climate in healthcare organizations have begun to emerge.

While researchers have reviewed surveys available to measure organizational culture in health care and have identified characteristics of tools available for measuring patient safety climate, there has been no systematic review of instruments measuring the safety climate within the healthcare setting. We therefore sought to identify, review, and report on available surveys with an eye toward their association with patient outcomes.
in aviation (SAQ\textsuperscript{31} and Safety Climate Survey (SCS)\textsuperscript{24}) and naval aviation settings (Patient Safety Cultures in Healthcare Organizations (PSCHO)\textsuperscript{19}).

Only two have been used to evaluate associations between patient safety climate scores and process measures theorized to be associated with improved patient outcomes. Contrary to expectation, favorable scores on the CSS were not associated with the adoption of best practices and expert opinion.\textsuperscript{34} Favorable scores on four out of six dimensions of the SAQ were associated with lower nurse turnover.\textsuperscript{22}

Only the SAQ has been used to explore the relationship between safety climate scores and patient outcomes. Favorable scores were associated with shorter lengths of stay, fewer medication errors, lower ventilator associated pneumonia rates, and lower bloodstream infection rates.\textsuperscript{22} They were also associated with lower risk adjusted patient mortality rates.\textsuperscript{26}

**DISCUSSION**

A number of surveys that measure patient safety climate are available. They vary considerably with regard to general characteristics, dimensions covered, psychometrics performed, and uses in studies.

Although it was not our intention to endorse one survey over another, these results can provide general guidance in the choice of an appropriate instrument. Firstly, users should prefer surveys that have been shown to be reliable by comprehensive and sound psychometric testing. Secondly, survey selection should depend on its purpose. For example, for use in a particular setting or for a particular condition (such as the ICU or for the purposes of improving transfusions), a survey that has already been used to evaluate that setting or condition might be preferred. Alternatively, for considering the association between climate and patient safety outcomes, the survey that has been most extensively used for this might be chosen.

Our findings are limited in several ways. Firstly, the measurement of patient safety climate is a dynamic field and we did not report on surveys currently under development but not yet published. Secondly, some aspects of the surveys that we examined—for instance, psychometrics or current use in clinical trials—may have been performed but are not yet published. Thirdly, many surveys had several iterations, making it difficult to pinpoint specific characteristics of any one. Finally, some may believe that improvement of patient safety climate is an admirable goal in its own right, even if evidence linking it with actual patient improvement is limited.

Given the findings of the IOM reports on patient safety, efforts to improve patient safety are critical. However, managers would be remiss if they anticipate that measures of patient safety climate reliably indicate patient safety outcomes. Organizational climate is a challenge to change.\textsuperscript{27} Even though others have shown a relationship between organizational climate scores and employee safety in other high hazard industries,\textsuperscript{16, 24, 31} health care is fundamentally different. In the healthcare setting unsafe practices are experienced by the customer rather than by the employee, and are reimbursed by a third party but frequently do not entail expense to the employer.

While surveys of safety climate may detect employee concerns about patient safety and may help foster communications around the topic of patient safety, there is only limited evidence that survey scores are related to patient safety outcomes. Until more evidence is available, administrators

<table>
<thead>
<tr>
<th>Name of survey</th>
<th>SLOAPS</th>
<th>PSCHO</th>
<th>VHA PSCQ</th>
<th>HSOPS</th>
<th>CSS</th>
<th>SAQ</th>
<th>SCS</th>
<th>MSSA</th>
<th>HTSSCS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setting appropriate for use</td>
<td>General</td>
<td>General</td>
<td>General</td>
<td>General</td>
<td>Multiple units</td>
<td>Multiple units</td>
<td>Pharmacy</td>
<td>Transfusion</td>
<td></td>
</tr>
<tr>
<td>To be completed by individuals</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>No of items (demographics not included)</td>
<td>58</td>
<td>82/32</td>
<td>71</td>
<td>42</td>
<td>34</td>
<td>60</td>
<td>19</td>
<td>19</td>
<td>27</td>
</tr>
<tr>
<td>Uses 5-point Likert scale</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Measures implementation of actions</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Common dimensions covered</td>
<td>Leadership</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Policies and procedures</td>
<td>Yes</td>
<td>Partial</td>
<td>Yes</td>
<td>Partial</td>
<td>No</td>
<td>Partial</td>
<td>Yes</td>
<td>Partial</td>
<td>No</td>
</tr>
<tr>
<td>Staffing</td>
<td>Yes</td>
<td>Partial</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Partial</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Communication</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Reporting</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Total no of dimensions</td>
<td>9</td>
<td>5 (16)</td>
<td>13</td>
<td>12</td>
<td>4</td>
<td>6</td>
<td>20</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Psychometrics performed</td>
<td>Item analysis</td>
<td>No</td>
<td>Partial</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Partial</td>
<td>No</td>
</tr>
<tr>
<td>Exploratory factor analysis</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Confirmatory factor analysis</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Partial</td>
<td>No</td>
</tr>
<tr>
<td>Cronbach’s alpha</td>
<td>No</td>
<td>No</td>
<td>-0.45-0.90</td>
<td>0.63-0.83</td>
<td>“Poor”</td>
<td>0.68-0.81</td>
<td>“Good”</td>
<td>0.44-0.84</td>
<td>0.61-0.85</td>
</tr>
<tr>
<td>Test/retest reliability</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Partial</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Correlated composite scores across dimensions</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Partial</td>
</tr>
<tr>
<td>Analysis of variance across services</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Partial</td>
<td>Yes</td>
</tr>
<tr>
<td>How used in studies</td>
<td>Intra institutional comparisons</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Inter institutional comparisons</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Partial</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Inter industry comparisons</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Association with reporting rates</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Association with process measures</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Association with patient outcomes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Pre v post intervention studies</td>
<td>Partial</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

SLOAPS, Strategies for Leadership: An Organizational Approach to Patient Safety; PSCHO, Patient Safety Cultures in Healthcare Organizations; VHA PSCQ, Veterans Affairs Administration Patient Safety Culture Questionnaire; HSOPS, Hospital Survey on Patient Safety; CSS, Culture of Safety Survey; SAQ, Safety Attitudes Questionnaire; SCS, Safety Climate Survey; MSSA, Medication Safety Self Assessment; HTSSCS, Hospital Transfusion Service Safety Culture Survey.
and policymakers should be cautious in the interpretation of these surveys.

ACKNOWLEDGEMENTS

The authors acknowledge the contributions of collecting and organizing data by Diana M. Luan, RN, MPA, MS, Doctoral Candidate, Center for the Evaluative Clinical Sciences, Dartmouth College, Hanover, NH; Health Science Specialist, Field Office, Veterans Health Administration, National Center for Patient Safety and Quality Scholars Program, Veterans Administration Medical Center, White River Junction, VT, USA.

Authors’ affiliations

J B Colla, Department of Community and Family Medicine, Dartmouth Medical School, Hanover, NH, USA
A C Bracken, Departments of Pediatrics and of Internal Medicine, Dartmouth Medical School, Hanover, NH, USA
L M Kinney, Veterans Health Administration, White River Junction Field Office, Hanover, NH, USA
W B Weeks, Veterans Administration National Quality Scholars Fellowship Program; White River Junction Field Office, National Center for Patient Safety; Veterans’ Rural Health Initiative, Veterans Administration Medical Center, White River Junction, VT, USA

This work was supported in part by the Department of Veterans Affairs, Veterans Health Administration, Health Services Research and Development Service (project no. REA 03-098).

None of the authors has any potential conflict of interest.

Dr Weeks is the Principal Investigator at the Veterans Administration Medical Center, White River Junction, VT, USA. The views expressed in this article do not necessarily represent the views of the Department of Veterans Affairs or the United States government.

REFERENCES