



Methodological aspects in the assessment of safety culture in the hospital setting: A review of the literature

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SUMMARY

A thematic literature review was undertaken to identify methodological aspects in the assessment of safety culture and critically examine how these have been addressed in hospital-based studies of safety culture, for the period 1999–2012. The literature search included an electronic database search (BNI, CINAHL, EMBASE, MEDLINE and PsycINFO), access to websites of organizations dedicated to the enhancement of patient safety, and a manual search of reference lists of the papers included. The analysis of the 43 records included in the review revealed that discussion regarding the measurement of safety culture in the hospital setting revolves around three methodological areas, namely: research approaches; survey tools for data collection; and levels of data aggregation. To advance these discussions, robust research is needed to clarify what dimensions belong to the core of safety culture and what the main sources of safety culture variability are. Studies using a mixed methods approach to assess safety culture would be useful, since they permit the in-depth research necessary to depict the multiple components of this construct.

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Introduction

Safety culture can be defined as “the values shared among organization members about what is important, their beliefs about how things operate in the organization, and the interaction of these with work unit and organizational structures and systems, which together produce behavioural norms in the organization that promote safety” (Singer et al., 2009, p. 400). The recognition, on the basis of evidence from healthcare and high risk industry, that safety culture plays a vital role in the establishment of patient safety programmes has led efforts to advance patient safety to focus on developing a strong safety culture (McCarthy and Blumenthal, 2006). The first steps in meeting this challenge are to develop robust measures of this construct and apply them to the existing healthcare culture, to gain situational awareness and to foster the ability to identify relevant strategies for cultural change (Kohn et al., 1999; Hellings et al., 2007).

The review

A thematic literature review was undertaken to identify recurrent aspects regarding the methodological approaches used to assess safety

culture and critically examine how these have been addressed in hospital-based studies of safety culture.

A comprehensive literature search of the most relevant published materials was conducted using the electronic databases BNI, CINAHL, EMBASE, MEDLINE and PsycINFO for the period 1999 to August 2012. The websites of organizations dedicated to the enhancement of patient safety, such as: the Agency for Healthcare Research and Quality; the Institute for Healthcare Improvement; the Institute of Medicine of the National Academy of Sciences; and the National Patient Safety Agency, were also accessed. Finally, a manual search of reference lists drawn from papers included in this review was also undertaken.

To facilitate effective utilisation of the electronic databases, a list of terms that could be introduced into the database search engine was carefully developed including categories outlined in the bibliographic search engine topic index (Pope et al., 2007). This list of terms included: patient safety culture, safety culture, organisational culture, organi* culture, patient safety climate, safety climate, organi* climate, non punitive culture, evaluation, assessment, measurement, patient safety and hospitals.

A total of 298 titles located from the sources outlined above were screened for relevance according to the inclusion and exclusion criteria in Table 1. From this initial screening 96 records were retained for abstract review, which led to the identification of 47 potentially relevant citations. Finally, 43 records were included in the review following full text screening by the first author (MJPM), with validation by two co-authors (MA, AW). Thematic analysis of the literature commenced with the first author carrying out an exhaustive reading of all the papers included. The main characteristics of the papers and major methodological aspects in

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Table 1
Inclusion and exclusion criteria for literature selection.

<i>Inclusion criteria</i>
<ul style="list-style-type: none"> • Empirical and theoretical literature that focused on the assessment of safety culture • Studies using quantitative, qualitative or mixed methods assessing (singular aspects of) patient safety culture in the hospital setting • Studies using quantitative, qualitative or mixed methods assessing (singular aspects of) patient safety culture in the hospital setting • Methodology literature on the assessment of safety culture related to hospital settings • Literature published between 1999 and 2012 • Literature published in English or Spanish
<i>Exclusion criteria</i>
<ul style="list-style-type: none"> • Literature focusing on occupational health and safety • Studies on assessment of safety culture conducted outside the hospital setting • Papers with no methodology section • Opinion papers (including anecdotal and discussion papers, editorials, letters to the editor, short communications, position and expert opinion papers) • Literature published prior to 1999 • Literature published in languages other than English or Spanish

the assessment of safety culture were systematically searched for and annotated. These aspects were then sorted and grouped into a preliminary set of themes which was re-examined for appropriateness and prominence (in terms of frequency of occurrence and importance for achieving high quality safety culture data) by the three authors.

Findings

This review revealed that the bulk of the discussion regarding the measurement of safety culture in the hospital setting revolves around three methodological areas considered crucial for the accurate measurement of safety culture: (1) research approaches; (2) survey tools for data collection; and (3) levels of data aggregation for conducting data analyses. The following sections outline the methodological considerations concerning these three aspects, while reviewing how they have been addressed in hospital-based studies assessing safety culture.

Research Approaches to Measuring Safety Culture in the Hospital Setting

In the hospital setting, assessment of safety culture has primarily been approached using quantitative methods. Table 2 shows that all twenty studies that assessed safety culture using quantitative methods used self-administered questionnaires. Quantitative surveys have been useful in eliciting snapshots of individuals' shared beliefs, values and norms concerning a wide range of safety issues (Nieva and Sorra, 2003). The reason for this is that questionnaires can be distributed to large samples relatively easily and economically, and the cultural mindset of the organisation can thereby be represented comprehensively and relatively quickly (Clarke, 2000; Reiman and Oedewald, 2002). Furthermore, given that questionnaires produce numerical data amenable to statistical analysis, quantitative surveys have allowed researchers and practitioners to make both intra- and inter-organisational comparisons of safety cultures (Clarke, 2000; Reiman and Oedewald, 2002; Nieva and Sorra, 2003; Colla et al., 2005).

Studies using self-administered questionnaires to measure safety culture are, however, methodologically limited (Schein, 1990; Sexton et al., 2000; Reiman and Oedewald, 2002; Scott et al., 2003; Nieva and Sorra, 2003). Questionnaires are unlikely to elicit deeper aspects of the organisation's culture, such as the core assumptions or primary beliefs and values held by staff (Schein, 1990; Cooper, 2000; Glendon and Stanton, 2000; Guldenmund, 2000; Reiman and Oedewald, 2002; Marshall et al., 2003; Nieva and Sorra, 2003; Scott et al., 2003; Hopkins, 2006). As Nieva and Sorra (2003, p.ii22) point out: "individuals embedded in a culture are often unconscious of and inarticulate about the culture that surrounds them". Thus, clarification of

individuals' core assumptions, beliefs and values is unlikely to be achieved simply by asking them to rate their personal agreement with a number of statements (Hopkins, 2006). Moreover, self-administered questionnaire studies provide only descriptive data; while they do provide summaries of beliefs, values and norms expressed by individuals concerning safety culture and any correlations that exist between them, they do not provide explanatory information to help interpret data patterns and/or potential correlations (Reiman and Oedewald, 2002; Hopkins, 2006).

As Table 2 shows, in this review only one qualitative study (Waring, 2007) was identified that attempted to achieve a more in-depth understanding of specific aspects of safety culture. This qualitative study enabled participants not only to state their beliefs, values and norms concerning the factors being researched, but also to illustrate and augment them. Analysis of such narratives enabled researchers to unveil individuals' core assumptions and beliefs concerning particular aspects of safety and to draw conclusions about how they influenced their values, norms and behaviours (Reiman and Oedewald, 2002).

While superior to quantitative measures in terms of the depth of data accessible, assessments of hospital safety culture based on qualitative methodologies are limited in terms of breadth. As outlined earlier, the qualitative study identified (Waring, 2007) explored only narrow aspects of safety culture. Moreover, assessments of safety culture based on qualitative methodologies tend not to be generalisable in the statistical sense. The very nature of qualitative research demands the use of small samples, which impedes findings derived from this type of research from being directly generalisable. However, qualitative research is transferable by "analytic generalisation" (Yin, 2009, pp. 31–33). This means that findings of assessments of hospital safety culture based on qualitative methodologies can be generalised to the theory of safety culture, which may be applicable far beyond the particular samples studied (Clarke, 2000; Marshall et al., 2003; Yin, 2009).

Recognising that every research method has advantages and disadvantages, researchers (Glendon and Stanton, 2000; Reiman and Oedewald, 2002; Nieva and Sorra, 2003; Scott et al., 2003) have suggested that mixed methods approaches could provide superior data relating in this case to the assessment of safety culture. For instance, personal interviews and focus groups can be used to interpret and deepen self-administered questionnaire findings (Glendon and Stanton, 2000; Guldenmund, 2000; Reiman and Oedewald, 2002; Nieva and Sorra, 2003; Scott et al., 2003; Kirk et al., 2006). Similarly, observation, documentary analysis and systems audits have been shown to provide complementary information regarding organisational conditions, official and unofficial norms and the behaviours people display (Cooper, 2000; Scott et al., 2003; Kirk et al., 2006).

Despite the potential advantages of using mixed methods for the assessment of safety culture, only Cook et al. (2004) employed this approach. They carried out a multi-method study aimed at exploring the influence of organisational conditions and hospital staff cognitions on the reporting and management of errors. If it had not been for its methodological flaws (poor sampling, data collection methods and analysis), the study could have provided great breadth and depth of information regarding the characteristics of the aspects of safety culture explored.

Survey Tools for the Collection of Safety Culture Data

In this review, the development and evaluation of questionnaire survey tools for the collection of safety culture data was identified as a central aspect in the methodological debate on the assessment of safety culture in the hospital setting. In this section, questionnaire tools used in assessing safety culture in the hospital setting will be reviewed to illustrate their strengths and limitations, thus providing an overview of the current state of the art in this methodological area.

Table 2 shows that self-administered questionnaire assessments of hospital safety culture have been undertaken using a wide variety of tools for data collection. Table 3 presents the main characteristics of

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