Review

The patient safety culture: a systematic review by characteristics of Hospital Survey on Patient Safety Culture dimensions

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Abstract

Purpose: To learn the weaknesses and strengths of safety culture as expressed by the dimensions measured by the Hospital Survey on Patient Safety Culture (HSOPSC) at hospitals in the various cultural contexts. The aim of this study was to identify studies that have used the HSOPSC to collect data on safety culture at hospitals; to survey their findings in the safety culture dimensions and possible contributions to improving the quality and safety of hospital care.

Data sources: Medline (via PubMed), Web of Science and Scopus were searched from 2005 to July 2016 in English, Portuguese and Spanish.

Study selection: Studies were identified using specific search terms and inclusion criteria. A total of 33 articles, reporting on 21 countries, was included.

Data extraction: Scores were extracted by patient safety culture dimensions assessed by the HSOPSC. The quality of the studies was evaluated by the STROBE Statement.

Results: The dimensions that proved strongest were 'Teamwork within units' and 'Organisational learning–continuous improvement'. Particularly weak dimensions were 'Non-punitive response to error', 'Staffing', 'Handoffs and transitions' and 'Teamwork across units'.

Conclusion: The studies revealed a predominance of hospital organisational cultures that were underdeveloped or weak as regards patient safety. For them to be effective, safety culture evaluation should be tied to strategies designed to develop safety culture hospital-wide.

Key words: patient safety, safety culture, survey, hospital care, quality improvement

Background

Patient safety is a critical component of the quality of healthcare. It is increasingly recognised that strengthening safety culture in health organisations is important to continuously improving the quality of care. Strong safety culture is associated with achieving favourable outcomes, especially in hospitals [1, 2].

Safety culture comprises an understanding of values, beliefs and standards as regards what is important in an organisation and what

safety-related attitudes and behaviour are valued, supported and expected [3]. Organisations with a strong safety culture are characterised by good communication among staff, mutual trust and common perceptions of the importance of safety and the effectiveness of preventive measures [4, 5].

Safety culture is a multidimensional concept defined, in the health service context, as the product of values, attitudes, perceptions, competences and standards of individual and group behaviour that determine the administration's commitment, style and proficiency in managing patient safety [6].

Hospital safety culture assessment is being used as a management tool and encouraged by health policymakers and managers in countries around the world. The culture assessment has multiple uses: (i) building staff awareness on patient safety; (ii) evaluating the present state of patient safety culture (PSC) in the organisation; (iii) identifying strong points of safety culture and areas for improvement; (iv) analysing safety culture trends over time; (v) evaluating the impact on safety culture of initiatives and interventions to improve patient safety and (vi) drawing comparisons within and between health organisations [3].

In the 2000s, questionnaires and assessment instruments were developed to assist in understanding an organisation's safety culture and whether it is ready to receive measures to improve the safety and quality of care as well as to ascertain what factors may favour or hinder efforts in this respect. These questionnaires are based on a combination of dimensions; they are considered an efficient strategy and offer methodological advantages, such as assuring participant anonymity and lower costs than qualitative approaches [7]. Since the mid-2000s, such instruments have been the subject of a number of review studies, which have compared their overall characteristics and examined their psychometric properties [8–11].

The Hospital Survey on Patient Safety Culture (HSOPSC) created by the Agency for Healthcare Research and Quality (AHRQ) in the USA [12], is applicable to hospital staffs whose work influences patient care directly or indirectly—from housekeeping and security to nurses and physicians (clinical staff or non-clinical staff, such as unit clerks, staff in units such as pharmacy, laboratory/pathology, staff in other areas, such as administration and management). The HSOPSC has performed satisfactorily in psychometric analyses, as demonstrated by a number of studies [9–11], and is accessible to professionals the world over interested in assessing safety culture at their hospital. It is being used by hundreds of hospitals in the USA and several other industrialised and developing countries. By 2015, more than 60 countries had published studies using this instrument, which is available in some 30 different translations, backed by transcultural adaptation studies [13].

In this context, the study question here is: as measured by the HSOPSC in the various cultural contexts in which it has been used, what dimensions of safety culture in hospitals are classified as strong and weak?

Study objectives

This article sought to identify studies that have used the HSOPSC to collect data on safety culture at hospitals and to learn their chief findings relating to safety culture dimensions and possible contributions to improving the quality of hospital care.

We believe the HSOPSC to be a useful and accessible management tool for health personnel and managers interested in safer and better quality healthcare for hospital patients.

Methods

The systematic literature review conducted to meet the stated aims was guided by a protocol designed by the three authors, which was registered (No. 47865) with the international prospective register of systematic reviews (PROSPERO) at the University of York Centre for Reviews and Dissemination.

The search methodology and related findings are described in accordance with the relevant sections of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement [14].

Articles were selected by consulting the following data bases: MEDLINE (via PubMed), Web of Science and Scopus. The search strategy included combined terms using the Boolean operator 'OR' between keywords or similar MeSH terms; and terms with different meanings were combined using the Boolean operator 'AND' to refine the search. The search strategy used for MEDLINE is shown in Table 1. For the other data bases, the strategy was the same, but adapted to the characteristics of each. The search was complemented by consulting both the Research Reference List of articles that have used the HSOPSC, which is posted on the AHRQ website [13], and the references cited in the articles identified by the search.

Given the diversity of specific features displayed by instruments available for assessing PSC [9–11], it was opted to select articles that meet the following eligibility criteria: (i) studies using the HSOPSC to measure the dimensions of safety culture among staff at acute care hospitals and (ii) articles in English, Portuguese and Spanish. The following studies were excluded: those (i) in the form of letters, editorials, commentaries, case studies and reviews; (ii) with no abstract available; (iii) that focussed on only one category of hospital staff; (iv) that focussed on only one specific hospital unit or sector; (v) that focussed only on transcultural adaptation of the instrument, without reporting findings on safety culture; (vi) that used information from data bases for benchmarking, where eligibility and sampling criteria are not given and (vii) published in languages other than Portuguese, English and Spanish. The review period began in 2005, 1 year after the instrument was provided by the AHRQ, and ended on 31 July 2016. The exclusion criteria were based on the concept of safety culture itself, one of whose dimensions is defined as teamwork, as it was not the purpose of this review to learn about the safety culture of specific professional categories, but of members of the overall hospital staff. In the same way, priority was given to studies that assessed safety culture in several hospital units or sectors because the study question here was to ascertain the safety culture status in hospitals that had applied the HSOPSC for that purpose.

The HSOPSC measures 12 dimensions of safety culture, with from three to four items on each, totalling 42 items. The AHRQ recommends using the estimated mean percentage of positive responses obtained in each dimension as the measure of safety culture status. As an evaluative parameter, it suggests that any dimension for which the percentage of positive responses is 75% or more

Table 1 Search strategy in MEDLINE via PubMed[a]

Strategy	Keywords
#1	'Safety culture' (All fields) OR 'safety climate' (All fields) OR organisational culture [MeSH Terms]
#2	Hospitals [MeSH Terms]
#3	Patient safety [All fields]
#4	#1 AND #2 AND #3

[a]Period: 1 January 2005–31 July 2016. Languages: English, Portuguese and Spanish.

should be considered a strong or developed dimension of safety culture in the population studied. Meanwhile, any dimension for which the percentage of positive responses is 50% or less should be considered 'needing improvement' and should be prioritised in related investments [3]. However, early studies that assessed safety culture in hospitals using the HSOPSC aimed primarily not to assess safety culture, but to adapt the instrument transculturally for use in other countries. Many of these studies evaluating safety culture dimensions estimated mean scores ranging from 0 to 5 in each dimension, where a mean score closer to 5.0 denotes a dimension in which safety culture is strong among hospital staff.

Accordingly, the measures of interest to this systematic review were: in studies that reported in percentage form, the mean percentage of positive responses obtained on dimensions of safety culture and, in studies that opted to estimate measures ranging from 0 to 5, the mean scores estimated by dimension.

The 12 safety culture dimensions measured by the HSOPSC and their respective definitions are given in Table 2.

To begin with, two of the authors, independently, read the titles of the articles. After exclusion of duplicate articles and those that did not provide an abstract, the abstracts of articles not excluded at this first stage were evaluated independently. Articles were selected for inclusion in the review after independent readings of the complete texts. In cases where one of the two authors raised doubts as to whether or not to include an article in the review, a third evaluator who participated in designing the study was consulted and a final decision was taken by consensus among the three.

Data were drawn from the articles on the basis of the information about their authors, year of publication, study design, study period and site, study population characteristics, how the survey was administered, response rate and main findings on the safety culture dimensions specified by the authors.

The quality of the studies selected was evaluated using the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) tool [15], adapted into Portuguese, which has a 22-item checklist, known as the STROBE Statement. This option responded to the fact that all the studies using the HSOPSC used observational design as part of their method.

Results

The searches of the three data bases (MEDLINE, Web of Science and Scopus), on 24 September 2016, identified 888 relevant titles. To these were added 69 articles identified in the Research Reference List posted on the AHRQ website [13]. After eliminating duplicate titles, 824 articles were selected for reading. Of these, 563 were discarded for meeting at least one of the exclusion criteria, leaving 261 whose abstracts were read. After reading all the abstracts, 82 articles were selected for the complete text to be read. No additional articles were included from examining the references of the articles selected. Figure 1 shows a flowchart of the article selection process.

Finally, 33 studies [16–48] were included, which had been published between 2007 and 2016, all in English, except one in Spanish [19]. Figure 2 shows the studies by country where they were carried out and year of publication.

The 33 studies [16–48] originated from 21 countries at varying stages of development. The characteristics of the 33 studies are shown in Table 3.

All the studies included observational epidemiological design in their methodology and presented findings on the status of safety culture in their study sample. However, the studies' focus varied: (i) 11 studies focused primarily on evaluating the status of safety culture among hospital staffs [19, 22, 25–27, 30, 33, 34, 39, 41, 47]; (ii) 10 studies focused on psychometric validation of the HSOPSC [16, 18,

Table 2 Patient safety culture dimensions and definitions

| Patient safety culture dimensions	Definition: The extent to which…
	Unit level dimensions
Communication openness	Staff speak up freely if they see something that may affect a patient negatively and feel free to question those with more authority.
Feedback and communication about error	Staff are informed about errors that happen, are given feedback about changes implemented and discuss ways to prevent errors.
Teamwork within units	Staff support each other, treat each other with respect and work together as a team.
Non-punitive response to error	Staff feel that their mistakes and event reports are not held against them and that mistakes are not recorded in their personnel file.
Organisational learning–continuous improvement	Mistakes have led to positive changes and changes are evaluated for effectiveness.
Supervisor/manager expectations and actions promoting patient safety	Supervisors/managers consider staff suggestions for improving patient safety, praise staff for following patient safety procedures and do not overlook patient safety problems.
Staffing	There are enough staff to handle the workload and work hours are appropriate to provide the best care for patients.
	Hospital level dimensions
Teamwork across units	Hospital units cooperate and coordinate with one another to provide the best care for patients.
Handoffs and transitions	Important patient care information is transferred across hospital units and during shift changes.
Management support for patient safety	Hospital management provides a work climate that promotes patient safety and shows that patient safety is a top priority.
	Outcome dimensions
Frequency of events reported	Mistakes of the following types are reported: (1) mistakes caught and corrected before affecting the patient, (2) mistakes with no potential to harm the patient and (3) mistakes that could harm the patient, but do not.
Overall perceptions of patient safety	Procedures and systems are good at preventing errors and there is a lack of patient safety problems.

Source: Adapted from Sorra *et al.* [3].
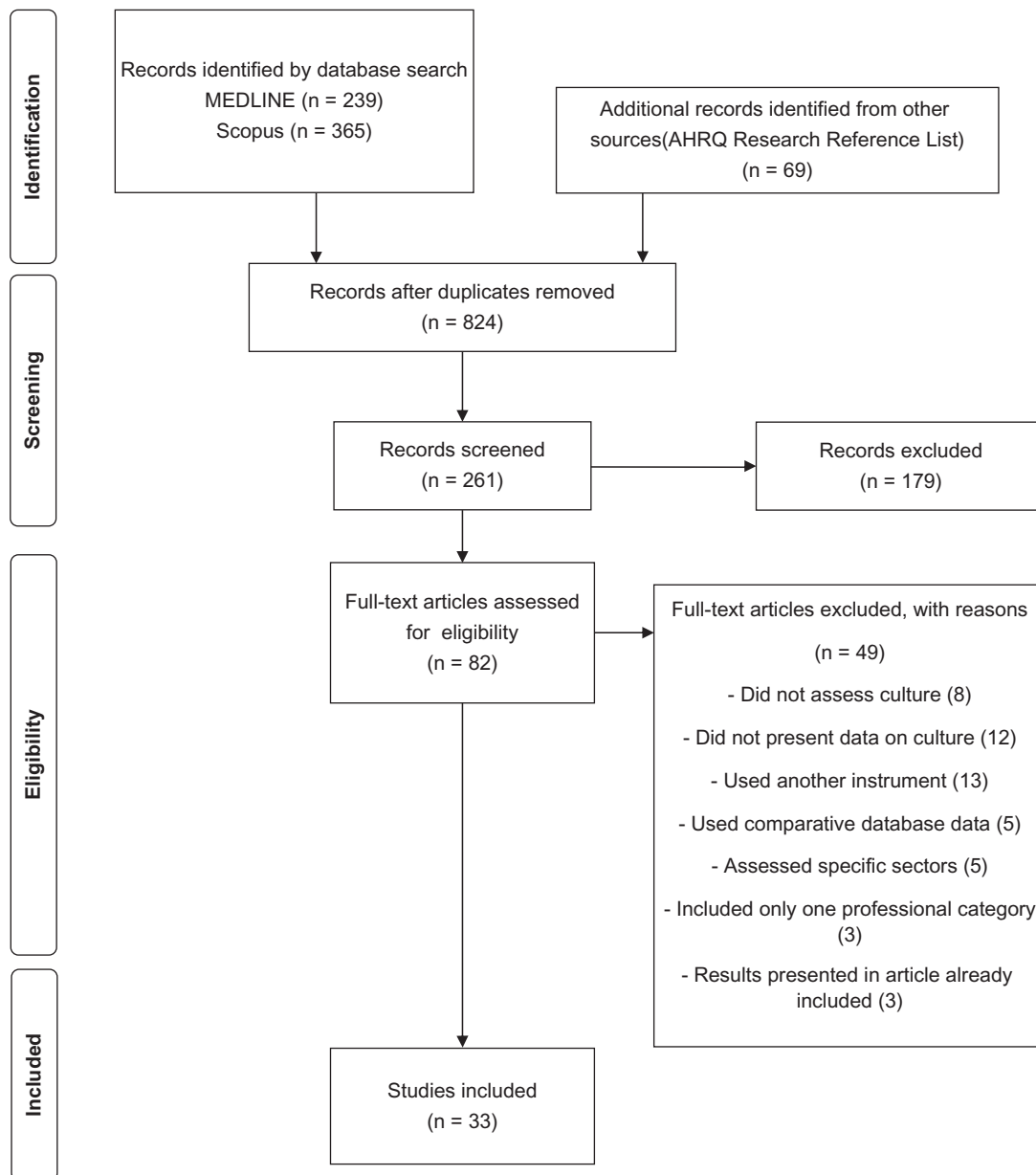
Figure 1 Study selection flowchart.

Figure 2 Studies by country and year of publication.

Table 3 Characteristics of the selected studies

Reference (year)	Study site (HSOPSC Language)	Study design and period	Study population/setting/ sample size/participant characteristics	Survey administration mode/response rate/ number of HSOPSC dimensions	Study results Stronger	Study results Weaker	Study results Obs.	STROBE instrument items not fully covered
Hefner, Hilligoss, Knupp *et al.* [48]	USA (English)	Cross-sectional study; HSOPSC was administered between mid-2011 and 2013.	Eight departments at Ohio State University Wexner Medical Center (OSUWMC), comprising six hospitals and two campuses/1425 employees were included before Crew Resource Management (CRM) training and 1308 afterwards/Nurses (advanced practice registered nurses), doctors (physicians, including fellows and some residents) and staff were included.	Electronic mode/55% response rate (N = 784) pre-CRM and 51% response rate (N = 667) post-CRM/12 HSOPSC dimensions.	'Teamwork within units' (72% positive response rate).	Low pre-CRM scores: 'Non-punitive Response to Errors' (28%) and 'Handoffs and Transitions' (35%) 'Staffing' (42%), 'Teamwork Across units' (40%), 'Frequency of Events Reported' (46%), 'Overall Perceptions of Patient Safety' (48%) and 'Communication Openness' (49%). Low post-CRM scores: 'Non-punitive Response to Errors' (35%), 'Handoffs and Transitions' (42%), 'Staffing' (43%) and 'Teamwork Across units' (44%).	No dimension scored ≥75%, either pre- or post-CRM.	No descriptive statistics given for participating professional categories.
Kiaei, Ziaee, Mohebbifar *et al.* [47]	Iran (Persian)	Cross-sectional study/ hospitals of three central provinces of Iran (Tehran, Alborz and Qazvin) in 2013.	About 10 teaching hospitals of central provinces: Tehran, Alborz and Qazvin/552 hospital personnel/292 nurses (53.4%), 47 auxiliary health workers (8.6%), 36 physicians (7.6%), 31 operation room technicians (5.7%), 22 unit managers (4%), 15 speech therapists, audiologists or physiotherapists (2.7%), nine technicians (1.6%), five pharmacists (0.9%), one nutritionist (0.2%)	No information given on survey administration mode/none on response rate/12 dimensions of the HSOPSC.	No dimension scored ≥75%.	'Handoffs and Transitions' (54.49%), 'Frequency of event reporting' (55.63%).	'Teamwork within units' is known to be the strongest point of patient safety culture (PSC) in most related studies, but not in this study.	Participant inclusion criteria not stated. Not stated in what form (e.g. paper or electronic) questionnaires were distributed. Response rate not reported. Study limitations not stated.

Table continued

Table 3 Continued

Reference (year)	Study site (HSOPSC Language)	Study design and period	Study population/setting/ sample size/participant characteristics	Survey administration mode/response rate/ number of HSOPSC dimensions	Study results Stronger	Weaker	Obs.	STROBE instrument items not fully covered
			and eight other jobs (1.5%).					
Al-Mandhari, Al-Zakwani, Al-Kindi et al. [46]	Oman (English), compared with Taiwan (Chinese), Lebanon (Arabic) and USA (English)	Cross-sectional study; data collection period was not stated.	Eight regional hospitals operate under the Oman Ministry of Health/ professional and allied healthcare staff working in government hospitals in Oman/400 employees/ nurses (60.15%), physicians (21.01%), technicians (8.88%), pharmacists (4.31%) and others (5.58%).	Hard copy format/98% response rate ($N = 390$)/12 dimensions of the HSOPSC.	'Organisational learning–continuous improvement' (84%) and 'Teamwork within units' (83%).	'Hospital non-punitive response to error' (25.0%), 'Staffing' (30.0%) and 'Handoffs and transitions' (25.0%).	—	Data collection period not stated.
El-Jardali, Sheikh, Garcia, Jamal et al. [45]	Saudi Arabia (Arabic)	Cross-sectional study. December 2011 to March 2012.	The hospital comprises two sites, Site A (large—800 beds) and Site B (small—104 beds)/3000 employees were included/registered nurses (50.1%), technicians (12.0%), attending or staff physicians (6.1%) and unit assistants, clerks or secretaries (5.2%).	Mixed mode (electronic and hard copy format)/ 85.7% response rate ($N = 2572$)/12 dimensions of the HSOPSC	'Organisational Learning and Continuous Improvement' (79.6%) and 'Teamwork within units' (78.5%).	'Hospital non-punitive response to error' (26.8%), 'Staffing' (35.1%) and 'Communication openness' (42.9%).	When results on survey composites were compared with results from Lebanon and the USA, several areas requiring improvement were noted.	Participant inclusion criteria not stated.
Fujita, Seto, Kitazawa et al. [44]	Japan (Japanese)	Cross-sectional study in 2012.	Eighteen hospitals in Japan/12 076 healthcare workers/9.2% physicians, 46.4% nurses, 14.4% administrative workers and 30.0% other roles.	Hard copy format/72% response rate ($N = 8,700$)/12-dimension HSOPSC.	The highest-scoring dimension was 'Teamwork within hospital units' (total sample $T = 70\%$; high patient safety score $H = 79\%$; and lowest patient safety score $L = 63\%$).	'Hospital handoffs and transitions' ($T = 36\%$; $H = 41\%$; $L = 32\%$), 'Staffing' ($T = 40\%$; $H = 44\%$; $L = 38\%$), 'Non-punitive response to error' ($T = 43\%$; $H = 50\%$; $L = 37\%$) and 'Teamwork across units' ($T = 44\%$; $H = 52\%$; $L = 38\%$).	PSC scores were estimated for the total sample (T) and for two clusters, by two unit response patterns: those with the highest scores (High PSC units—H) and lowest scores (Low PSC units—L).	Reports that hospital participation was voluntary, but participant inclusion criteria not stated.
Eiras, Escoval, Grillo et al. [43]	Portugal (Portuguese)	Cross-sectional psychometric study.	Three hospitals, 4057 questionnaires were distributed; at the final dataset totalled 884 questionnaires.	Hard copy format/24.6% response rate ($N = 884$). The 12-dimension HSOPSC was confirmed.	'Teamwork within units' (70%), 'Organisational learning–continuous improvement' (65%) and 'Supervisor/ manager expectations	'Non-punitive response to error' (25%), 'Management support for patient safety' (37%) and 'Staffing' (39%).	Measurement of healthcare safety culture is still at a relatively immature stage in Portugal.	Data collection period not stated. No descriptive statistics of participant characteristics

						and actions promoting patient safety' (63%).		given, possibly because the main aim was psychometric validation of the instrument used.
Agnew, Flin, Mearns [42]	Scotland (English)	Cross-sectional study in 2009.	A sample of National Health Service (NHS) acute hospitals, six NHS acute hospitals in Scotland/1866 clinical staff from many work/ area units at/nurses (53%), nursing or healthcare assistants (13%) and medical and dental consultants (22%).	Hard copy format/23% response rate/12-dimension HSOPSC.	'Teamwork within units' (73%).	'Handover' (32%), 'Hospital management support for patient safety' (38%), 'Teamwork across units' (39%), 'Non-punitive response to error' (44%), 'Staffing' (45%) and 'Feedback and communication about error' (45%).	—	Study design not indicated in title or abstract.
Amarapathy, Sridharan, Perera et al. [41]	Sri Lanka (not given)	Cross-sectional descriptive study to assess current PSC in a tertiary care hospital in Sri Lanka.	A tertiary care hospital/of 389 respondents, 16 (the smallest percentage, 4.1%) were consultants, while 214 (the largest percentage, 55%) were nursing officers. The rest were 52 medical officers (13.4%), 42 house officers (10.8%), 41 administrators (10.5%) and 24 PG-trainees (6.2%)	Hard copy format/no information on response rate/11-dimension version of HSOPSC	'Teamwork within units' (84.8%), 'Organisation learning–continuous improvement' (82.5%) and 'Overall perception of patient safety' (81.3%).	'Workload and staff' (15.7%), 'Frequency of events reporting as it occurs' (36.6%) and 'Non-punitive response to errors' (39.4%).	—	Data collection period not stated. Survey response rate not reported.
Davoodi, Mohammadzadeh, Shabestari et al. [40]	Iran (Persian)	Cross-sectional, analytical-descriptive study in the 3-months from April to June 2012	Twenty-five government hospitals in Khorasa Razavi Province (13 in Mashad and 12 in other cities) affiliated to Mashhad University of Medical Sciences/ 1200 clinical staff/nurses (77%), physicians (10%), laboratory staff (5.9%), radiology staff (3.5%), operation room staff (0.3%), general managers with no	Hard copy format/76% response rate ($N = 922$) 12-dimension version of HSOPSC	'Organisational learning–continuous improvement' (79.85%) and 'Teamwork within units' (71.92%).	'Non-punitive response to error' (21.57%), 'Staffing' (26.35%), 'Frequency of events reported' (42.85%) and 'Communication openness' (45.46%).	—	Possible study limitations were not stated. External validity of results was not discussed.

Table 3 Continued

Reference (year)	Study site (HSOPSC Language)	Study design and period	Study population/setting/ sample size/participant characteristics	Survey administration mode/response rate/ number of HSOPSC dimensions	Study results			STROBE instrument items not fully covered
					Stronger	Weaker	Obs.	
			specialty in therapeutic procedures (0.2%).					
Hamdan, Saleem [39]	Palestine (Arabic)	Cross-sectional design. Data were collected between July and August 2011.	About 11 general public hospitals in the West Bank/1460 clinical and non-clinical hospital staff/most participants were nurses and physicians (69.2%).	Hard copy format/ response rate = 51.2%/ 12-dimension version of HSOPSC.	'Teamwork within units' (71%) and 'Organisational learning and continuous improvement' (62%).	'Non-punitive response to error' (17%), 'Frequency of events reported' (35%), 'Communication openness' (36%), 'Hospital management support for patient safety' (37%) and 'Staffing' (38%).	—	—
Jones, Skinneer, High et al. [38]	USA (English)	Quasi-experimental design: a crossectional, descriptive study in s-sectional comparison of HSOPSC results from an intervention and static group/from February 2008 to March 2009.	Thirty-seven hospitals/ 4601 personnel/static group: nurses (27.0%), allied health staff (21.7%), non-clinical support staff (15.3%) clinical support staff (9.9 %), administration-management (11.7%) and the intervention group: nurses (32.0%), allied health staff (23.3%), clinical support staff (11.8%), non-clinical support staff (11.2%).	Hard copy format/ response rate = 75.3% (N = 3465)/12-dimension version of HSOPSC	Intervention group vs. static group: 'Organisational learning–continuous improvement' (76% vs. 71%), 'Teamwork within units' (82% vs. 80%) and 'Teamwork across hospital departments' (67% vs. 62%).	—	Mean positive response scores are not given for all dimensions and it is thus not possible to identify mean scores of <50%.	—
Nie, Mao, Cui et al. [37]	China (Chinese)	Cross-sectional study; from July to December 2011.	Thirty-two hospitals in 15 cities across China/1160 healthcare workers, physicians (surgical and internal clinicians)/the majority of respondents were nurses (66%), then surgical clinicians (33%) and internal medicine clinicians (30%).	Hard copy format/ response rate = 77% (N = 1160)/10-dimension version of HSOPSC	'Organisation learning–continuous improvement' (88%) and 'Teamwork within units' (84%).	'Feedback and communication about error' (50%) and 'Staffing' (45%).	—	—
Occeli, Quenon, Kret et al. [36]	France (French)	Cross-sectional study in January.	Seven hospitals in South-western France. At the selected hospitals/524 employees included:	Hard copy format/ response rate = 76.5% (N = 401)/10-dimension version of HSOPSC	—	'Overall perceptions of safety' (25.0–71.8%), 'Non-punitive response to error' (3.5–47.1%),	The article does not mention whether the findings revealed	—

			nurses (45.8%), auxiliary nurses (32.7%), physicians (13.9%) and others (7.6%).			'Staffing' (15.0–58.3%), 'Hospital management support for patient safety' (15.4–58.8%) and 'Teamwork across hospital units' (24.6–66.7%).	dimensions classified as stronger.	
Robida [35]	Slovenia (Slovene)	Cross-sectional psychometric in 2010.	Three acute general hospitals/all clinical and non-clinical staff (n = 1745).	Hard copy format/ response rate = 60% (N = 1048)/12-dimension version of HSOPSC	—	'Non-punitive response to error' (39% positive response rate), 'Staffing' (31%), 'Hospital management support for patient safety' (39%) and 'Teamwork across hospital units' (41%).	No PSC dimension reached the artificially set value of 75% of positive answers.	No descriptive statistics given on participant characteristic. Study limitations not discussed. External validity of results not discussed.
Abdelhai, Abdelaziz, Ghanem [34]	Egypt (Arabic)	Analytical, cross-sectional design study; data was collected from December 2011 to March 2012.	Cairo University Teaching Hospitals—Cairo/400 healthcare providers/219 (54.8%) were physicians, 99 (24.7%) nurses and 82 (20.5%) paramedical personnel.	Hard copy format/ response rate = 100% (N = 400)/12-dimension version of HSOPSC	'Overall perceptions of patient safety' (74.3%).	'Non-punitive response to error' (33.3%), 'Supervisor/manager expectations and actions promoting safety' (36.8%), 'Communication openness' (42%) and 'Teamwork across units' (42.3%).	—	Possible study limitations not reported.
Aboul-Fotouh, Ismail, EzElarab et al. [33]	Egypt (Arabic)	Cross-sectional study; data was collected from November 2008 to May 2009.	Ain Shams University hospitals/738 healthcare providers.	Hard copy format/ response rate = 69.1% (N = 510)/12-dimension version of HSOPSC	'Organisational learning' (78.2%).	'Non-punitive response to error' (19.5%); 'Handoffs and transitions' (24.6%), 'Hospital management support for patient safety' (27.2%), 'Adverse event reporting' (33.4%), 'Overall perception of safety' (33.9%), 'Communication openness' (34.6%), 'Teamwork across units' (38.0%), 'Feedback and communication about error' (39.7%), 'Supervisor/manager expectations and	—	—

Table continued

Table 3 Continued

Reference (year)	Study site (HSOPSC Language)	Study design and period	Study population/setting/sample size/participant characteristics	Survey administration mode/response rate/number of HSOPSC dimensions	Study results			STROBE instrument items not fully covered
					Stronger	Weaker	Obs.	
Smits, Wagner, Spreeuwenberg, [32]	The Netherlands (Dutch)	A cross-sectional study was conducted from October 2006 to February 2008.	Twenty-eight hospital units of 20 hospitals in the Netherlands/nurses (74%), resident physicians (10%), medical specialists (6%) and managers (2%), other professions (5%).	Hard copy format/response rate = 56% (N = 542)/11-dimension version of HSOPSC	'Teamwork within units' (3.83), 'Communication openness' (3.72), 'Non-punitive response to error' (3.57).	actions promoting safety' (46.4%). 'Willingness to report' (2.78), 'Hospital management support' (2.82) and 'Teamwork across hospital units' (2.85).	—	—
Bagnasco, Tibaldi, Chirone et al. [31]	Italy (Italian)	Cross-sectional study.	A hospital in Northern Italy/1008 questionnaires were distributed/directors/coordinators, physicians, nurses/midwives, physiotherapists and technicians were involved.	Hard copy format/response rate = 71% (N = 724)/12-dimension version of HSOPSC.	'Organisational learning—continued improvement' (74% positive response).	'Hospital management support for patient safety' (28%), 'Staffing' (30%), 'Teamwork among hospital units' (30%) and 'Non-punitive response to error' (35%).	No dimension scored 75% or more.	No descriptive statistics of study participants presented.
Occelli, Quenon, Hubert et al. [30]	France (French)	A cross-sectional, descriptive study in 2007.	Six hospitals (three public and three private) in the Aquitaine region/488 professionals (268 were nursing staff).	Hard copy format/response rate = 65%/12-dimension version of HSOPSC.	—	'Non-punitive response to error' (13–52%), 'Staffing' (14–64%), 'Management support for patient safety' (7–67%), 'Handoffs and transition' (27–70%).	No dimension scored 75% or more.	—
Bodur, Filiz [29]	Turkey (Turkish)	Psychometric cross-sectional study in 2008	Three hospitals (one general, one teaching and one university hospital) in the metropolitan centre of Konya Province/physicians and nurses (n = 309).	Hard copy format/by hospital type, response rates were 56% for university hospitals, 72% for general public hospitals and 86% for teaching hospitals/10-dimension version of HSOPSC.	'Teamwork within units' (70%), followed by 'Overall perceptions of safety' (62%).	Items in the 'Frequency of events reported' (15%) and 'Non-punitive response to error' (24%).	—	Study participant inclusion criteria not stated.
Campbell, Singer, Kitch et al. [28]	USA (English)	Cross-sectional study in 2008.	Massachusetts General Hospital (MGH) a 900-bed acute care hospital/nurses and attending physicians (N = 4 283)/80% nurses and 20% physicians.	Mixed mode (electronic and hard copy format)/73% response rate (N = 2 163)/12 dimensions of the HSOPSC	'Teamwork within units' (85%).	'Handoffs and transitions' (45%) and 'Event reporting' (49%).	—	—
Chen, Li [27]	Taiwan (Chinese)	Cross-sectional design in 2007.	Forty-two hospitals (10 medical centres, 16 regional hospitals and	Hard copy format/response rate = 78.8%	'Teamwork within units' (94%) and 'Supervisor/manager expectations	'Non-punitive response to Error' (45%), 'Hospital Handoffs and	—	—

			16 community hospitals)/1788 professionals included/ 29.2% ($N = 230$) physicians, 60.6% ($N = 478$) nurses and 10.2% (80) administrators.	($N = 788$)/12-dimension version of HSOPSC	and actions promoting patient safety' (74%).	Transitions' (48%) and 'Staffing' (39%).	—	
EL-Jardali, Jaafar, Dimassi et al. [25]	Lebanon (Arabic)	Cross-sectional study in 2009.	Sixty-eight Lebanese hospitals participated in the study/sample = 12 250 employees/ physicians, nurses, clinical and non-clinical staff, pharmacy and laboratory staff, dietary and radiology staff, supervisors and hospital managers. Most respondents (57.8%) were nurses.	Hard copy format/ response rate = 55.56% ($N = 6807$)/12-dimension version of HSOPSC	'Teamwork within units' (82.3%), 'Hospital management support for patient safety' (78.4%) and 'Organisational learning and continuous improvement' (78.3%).	'Non-punitive response to error' (24.3%), 'Staffing' (36.8%) and 'Hospital handoffs and transitions' (49.7%).	—	Only percentage of respondents available was for nurses. Percentages of other professionals not given.
Hellings, Schrooten Klazinga et al. [25]	Belgium (Dutch)	Cross-sectional study before and after implementation approach. First measurement: between September and October 2005, except for the hospital five pilot (April–May, 2005); the second measurement: between April and August 2007.	Five hospitals- institutional status (private and public)/nurses (60.2%), head nurses (3.9%), nurse assistants (7.3%), physicians (9.0%), head physicians (1.8%), junior physicians (0.9%), pharmacists (0.5%), pharmacy assistants (1.1%), middle management (0.6%), technicians (4.8%), paramedics (5.3%) and others (3.4%).	Hard copy format/77% response rate in first survey ($N = 3940$) and 68% ($N = 3626$) in second survey/12-dimension version of HSOPSC	In both first and second surveys, the highest scoring was 'Teamwork within hospital units', even though no hospital scored ≥75%.	Lowest scores (<50%) at the five hospitals in first and second measurement were 'Non-punitive response to error', 'Staffing', 'Teamwork across hospital units' and 'Hospital handoffs and transitions'.	—	—
Olsen [24]	Norway (Norwegian)	Cross-sectional study validated two safety climate instruments: (1) Short Safety Climate Survey (SSCS) and (2) Hospital Survey on Patient Safety Culture-short form (HSOPSC-short). The surveys started in April 2006	A large regional hospital in Norway. The target group in the hospital included health workers and other personnel employed in the same working environment as the healthcare personnel/ nurses represented the largest job category	Hard copy format/hospital response rate was 55% ($N = 1919$)/HSOPSC-short form (five dimensions).	At the hospital level, the strong HSOPSC dimensions were 'Teamwork within units' (mean 3.84) and 'Supervisor/manager expectations and actions promoting safety' (mean 3.82).	Meanwhile, 'Organisational management support for safety' was the weakest dimension (mean 2.85).	—	—

Table continued

Table 3 Continued

Reference (year)	Study site (HSOPSC Language)	Study design and period	Study population/setting/ sample size/participant characteristics	Survey administration mode/response rate/ number of HSOPSC dimensions	Study results			STROBE instrument items not fully covered
					Stronger	Weaker	Obs.	
Blegen, Gearhart, O. Brien et al. [23]	USA (English)	and September 2007, respectively. Psychometric cross-sectional study Survey was administered before the first intervention (March to June 2006) and again at the end of the project (March 2007).	(50%). 'Non-nurses' was not described. Three hospitals; the survey was administered to 454 healthcare staff before and after a series of multidisciplinary interventions/(434 before, 368 after) were mostly registered nurses (30% before, 33% after), followed by medical residents (24%, 27%), pharmacists (12%, 12%) and attending physicians (10%, 13%). The remainder were other nursing care providers (12%, 5%), therapists (5%, 6%), administrators and managers (2%, 2%) and others (5%, 2%).	Hard copy format/ response rate pre-intervention = 96% (N = 434); response rate at project end = 81% (N = 368/)/11-dimension version of HSOPSC.	'Teamwork within units' (78%).	'Non-punitive response to error' (40%) and 'Hospital handoffs and transitions' (42%).	—	—
Smits, Wagner, Spreeuwenberg et al. [22]	The Netherlands (Dutch)	Cross-sectional study surveyed in May–June 2005 and 11 in May–June 2006.	Nineteen hospitals (nine general hospitals, nine teaching hospitals and one university hospital)/ a total of 1889 hospital staff participated in the study/participants were 1174 registered nurses (62.7%), 50 resident nurses (2.7%), 65 clerks/secretaries (3.5%), 69 resident physicians (3.7%), 109 medical specialists	Hard copy format/1889 respondents at 87 units in 19 hospitals completed the questionnaire. Response rates were scored for 67 of the 87 units: there was no reliable information about the number of people having received a questionnaire in 20 units. The mean response rate (known	'Teamwork within units' (mean 3.88) and 'Openness of communication' (mean 3.78).	'Teamwork across hospital units' (mean 2.85), 'Hospital management support' (mean 2.97) and 'Frequency of event reporting' (mean 2.99).	—	—

				(5.8%), 58 managers (3.1%) and 346 others (18.3%).	for 67 units) was 80% (25–100%). The number of respondents per unit ranged from seven to 53 (mean of 22)/11-dimension version of HSOPSC.			
Al-Ahamadi [21]	Saudi Arabia (English)	Cross-sectional study during May–August, 2008.	The study population comprised all medical and administrative staff at all public and private hospitals in Riyadh/ nurses (63.7%), physicians (8.8%) and technicians (8.1%); the last category was dieticians (0.4%).	Hard copy format/ *re*sponse rate = 47.4% (*N* = 1224)/12-dimension version of HSOPSC.	'Organisational learning' (75.9%), 'Teamwork within units' (70%).	'Handoffs and transitions' (47.6%), 'Communication openness' (44.2%), 'Staffing' (31.2%) and 'Non-punitive response to error' (21.1%).	—	Study limitations not stated.
Sine, Northcutt [20]	USA (English)	Mixed method study: cross-sectional study (Phase 1); focus group using techniques of interactive qualitative analysis (Phase 2).	A medium-sized urban hospital setting.	Hard copy format/ response rate not given/ 12-dimension version of HSOPSC.	'Teamwork within units' (89%), 'Management Support for Patient Safety' (81%) and 'Organisational Learning' (80%).	'Non-punitive response to error' (45%).	—	Study participant characteristics not given. No information given on sample size.
Saturno, Gama, De Oliveira-Sousa *et al.* [19]	Spain (Catalan, Basque Galician and Spanish)	Cross-sectional study. No information on data collection period is given.	Twenty-four hospitals (5 large—>500 beds, 13 medium—200–499 beds and six small—<200 beds)/6257 health professionals (*N* = 6257) (physicians, nurses, pharmacists, physiotherapists, psychologists, etc.). The sample comprised mostly nurses (61.1%).	Hard copy format/ response rate = 40%/ 12-dimension version of HSOPSC.	'Teamwork within units' (71.8%) 'Supervisor/ manager expectations/ actions' (61.8%).	'Adequate staffing' (27.6%) and 'Hospital management support for patient safety' (24.5%).	—	Data collection period not specified.
Smits, Christiaans-Dingelhoff, Wagner, Wal, Groenewegen [18]	The Netherlands (Dutch)	Psychometric cross-sectional study. The Dutch version of the HSOPSC was distributed at eight hospitals in the Netherlands in June 2005.	Eight hospitals (four general, three teaching and one university) in the Netherlands of eight hospitals/nurses (59.8%), medical consultants (6.8%), resident physicians (6.0%), administrative staff (4.3%), trainee	Hard copy format/583 staff members completed the questionnaire (response rate not available)/11-dimension version of HSOPSC.	'Teamwork within units' (3.89), 'Communication openness' (3.76); 'Adequate staffing' (3.73), 'Non-punitive response to error' (3.61) and 'Supervisor/ manager expectations/ actions' (3.58).	'Teamwork across hospital units' (2.82).	—	—

Table continued

Table 3 Continued

Reference (year)	Study site (HSOPSC Language)	Study design and period	Study population/setting/ sample size/participant characteristics	Survey administration mode/response rate/ number of HSOPSC dimensions	Study results			STROBE instrument items not fully covered
					Stronger	Weaker	Obs.	
Jones, Skinner, Xu, Sun, Mueller [17]	USA (English)	Cross-sectional study in 2005 and 2007.	nurses (2.6%) or in management (2.4%). Twenty-four Critical Access Hospitals (CAHs) in 2005 (1995 eligible employees); in Spring 2007, 21 of these 24 CAHs chose to participate in a reassessment (1963 eligible employees). Respondent demographics by position were consistent in 2005 and 2007: respectively, nurses (35 and 37%); allied health personnel (28 and 24%); support personnel (12 and 12%); administrators and managers, (12 and 12%); providers, (7 and 6%); and others (7 and 8%).	Hard copy format/ response rate (2005) = 70.4%; response rate (2007) = 70.0%/12- dimension version of HSOPSC.	In the first assessment (2005): 'Teamwork within departments' (80%). In the second assessment (2007): 'Teamwork within departments' (81%), while 'Organisational learning–continuous improvement and 'Supervisor/manager expectations and actions promoting patient safety', achieved 75% scores.	'Non-punitive response to error' scored lowest (50% in 2005 and 52% in 2007).	No dimension scored <50%.	—
Hellings, Schrooten, Klazinga et al. [16]	Belgium (Dutch)	Cross- sectional study was conducted from March to November 2005.	Five general hospitals/ 3940 individuals: 2813 nurses and assistants (71.40%), 462 physicians (11.73%), 397 physiotherapists, laboratory and radiology assistants, social workers (10.08%) and 64 pharmacists and pharmacy assistants (1.62%).	The questionnaire was distributed on paper/ response rate = 77% (N = 9940)/11 dimensions of HSOPSC version.	'Teamwork within hospital units' scored highest (70%).	'Hospital management support for patient safety' (35%), 'Non-punitive response to error' (36%), 'Hospital transfers and transitions' (36%), 'Staffing' (38%) and 'Teamwork across hospital units' (40%).	—	—

23, 24, 29, 31, 35–37, 43]; (iii) five studies evaluated safety culture by investigating relations between dimensions of the culture and characteristics of the hospitals or participants [28, 40, 42, 44, 45]; (iv) four studies evaluated the effects on PSC of investments in improving the quality and safety of healthcare at hospitals [17, 20, 38, 48]; (v) two studies investigated associations between safety culture and outcome variables [21, 32] and (vi) one study [46] evaluated safety culture among hospital staffs and made comparisons with studies in other countries.

Regarding their participants, 26 (78.8%) of the 33 studies stated that these were mainly nurses [16–19, 21–30, 32, 36–42, 44–47], in proportions ranging from 27% [38] to 80% [28]. Five studies did not give the demographic characteristics of the sample [20, 31, 35, 43, 48].

Approximately 85% of the studies ($N = 28$) collected their data using the instrument on paper [16–19, 21–27, 29–44, 46], achieving response rates ranging from 23% [42] to 100% [34].

Quality assessment of the studies

Of the articles included in this review, 45.5% ($N = 15$) contemplated the criteria of the STROBE Statement [16, 18, 21–25, 27, 28, 30, 32, 33, 37–39]. Of those that did not contemplate the STROBE criteria; four presented no descriptive statistics on the participants [17, 26, 31, 48]; three did not state the study participant inclusion criteria [29, 44, 45]; two failed to specify the data collection period [19, 46]; two did not discuss the study's external validity or limitations [34, 40]; one did not state the study design in their title or abstract [42]; one did not report the response rate [41]; one stated neither the data collection period nor descriptive statistics on the participants [43]; one did not discuss the study's limitations [21]; one stated neither the inclusion criteria, how data were collected, response rate nor the study's limitations [47]; one did not give descriptive statistics on the participants nor discuss its limitations and external validity [35] and lastly, one study did not give descriptive statistics on its participants or information on sample size and response rate [20] (Table 3).

As regards the status of PSC, which was the main focus of this review, most of the studies were found to estimate scores for safety culture dimensions as mean percentages of positive responses to their component items, with the exception of four [18, 22, 24, 32] which estimated mean scores from 0 to 5 (Table 3).

The main safety culture dimensions that scored highest percentages of positive responses in the studies and, therefore, are classified as strong or developed dimensions, were: (i) 'Teamwork within units' (78–89%) [20, 23, 26–28, 37, 38, 41, 45, 46] (ii) 'Organisational learning–continuous improvement' (71–88%) [17, 20, 21, 26, 33, 37, 38, 40, 41, 45, 46]. In studies that estimated dimension scores from 0 to 5, the strongest dimensions were: (i) 'Teamwork within units' (3.78–3.89) [18, 22, 24, 32]; (ii) 'Communication openness' (3.72–3.78) [18, 22, 32] and (iii) 'Supervisor/manager expectations and actions promoting patient safety' (3.58–3.82) [18, 24] (Table 3).

The main safety culture dimensions that scored 50% or fewer positive responses and, therefore, can be classified as weak, were: (i) 'Non-punitive response to error' (3.5–47%) [16, 20, 21, 23, 25–27, 29–31, 33–36, 39, 40, 42–46, 48]; (ii) 'Staffing' (14–45%) [16, 19, 21, 25–27, 30, 35–37, 39–43, 45, 46, 48]; (iii) 'Handoffs and transitions' (24.6–49.7%) [16, 21, 23, 26–28, 30, 33, 42, 44, 46, 48]; (iv) 'Teamwork across units' (24.6–44%) [16, 25, 31, 33–36, 42, 44, 48]; (v) 'Hospital management support for patient safety' (15.4–39%) [16, 19, 31, 33, 36, 39, 42, 43]; (vi) 'Frequency of event reported' (15–49%) [28, 29, 33, 39–41]; (vii) 'Communication openness'

(36–45.5%) [21, 34, 39, 40, 45] and 'Feedback and communication about error' (39.7–50%) [37, 42]; (viii) 'Supervisor/Manager Expectations and Actions Promoting Patient Safety' (36.8–46.4%) [33, 34] and (ix) 'Overall Perceptions of Patient Safety' (25–33.9%) [33, 37]. In studies that estimated scores from 0 to 5, by dimension, the weakest dimensions were (i) 'Hospital management support for patient safety' (2.82–2.97) [22, 24, 32] and (ii) 'Frequency of event reported' (2.78–2.99) [22, 32] (Table 3).

Discussion

Interest in PSC has been growing since the 2000s, when health systems were challenged to offer safe, better quality care. This interest arose from a concern over safety shortcomings in structures and work processes, recognition of the high risk of incidents and complexity inherent to healthcare provision.

There is mounting evidence of the influence of safety culture on patient clinical outcomes, examples of which are rates of infection and readmission [49–51]. In this regard, developing and strengthening safety culture is a prominent means of managing and minimising risk in health organisations. The first step in setting this whole process in motion is to assess the current status of safety culture [52]. Safety culture assessment makes it possible to identify significant safety issues in work routines and working conditions and to manage them prospectively and to monitor safety-related changes and outcomes.

Nurses accounted for the largest proportion of participants in ~80% of the studies included in this review [16–19, 21–30, 32, 36–42, 44–47], suggesting that this professional category is inclined to collaborate and engage with surveys on patient safety, as has been found in other contexts [53]. Nonetheless, when the intention is to ascertain the status of culture at the level of the organisation as a whole, all professional categories should be encouraged to participate in safety culture surveys.

In 10 of the 33 studies included in this review [16, 18, 23, 24, 29, 31, 35–37, 43], the main aim was the psychometric validation of translated versions of the HSOPSC, pointing to an interest in the various countries in assessing safety culture among hospitals staffs.

Although all the studies offered findings on safety culture among hospitals staffs, they differed in focus, illustrating how broadly safety culture assessment is applicable to management. For example, Hefner *et al.* [48] evaluated the impact on PSC of implementing Crew Resource Management (CRM), a strategy that is being used to strengthen PSC by applying a systematic approach to training teams in interpersonal communication, teamwork, leadership and decision-making [54]. One quasi-experimental study [38] evaluated how training applied to a set of 23 hospitals impacted PSC and then compared this with a static group of 14 hospitals. Intervention group HSOPSC scores were significantly higher than static group scores in three dimensions assessing the flexible and learning components of safety culture [38]. In one US study [17], the authors used results from a rural-adapted version of the HSOPSC to plan, execute and evaluate a 2-year patient safety programme in 24 Critical Access Hospitals. The HSOPSC detected changes in safety culture over time when managers used a change strategy to execute specific practices that support the four components of an informed, safe culture.

The data collection method most used among the studies (85% $N = 28$) was administration of the questionnaire on paper, which is shown by comparative data usually to produce a higher response rate than when web surveys are used [3]. The response rates in these studies ranged from 23 to 100%. Two studies are particularly

notable for having used a mixed method [28, 45] and obtaining response rates of 85.7% and 73%, respectively. Response rates are important because low values can limit the ability to generalise findings to the hospital as a whole. When response rates are low, there is a danger that the large number of staff who did not respond to the survey might have responded very differently from those who did respond, which is one of the major possible biases of cross-sectional studies. Accordingly, the decision to use a survey on paper, a web survey or a mixed data collection method should consider the various factors that may influence the response rate, such as the available resources, the means used to assure respondent anonymity, the hospital's experience with web surveys and so on [3].

Of the 33 studies included, nine used random surveys [18, 19, 22, 26, 27, 40, 41, 46, 47]. Random samples are one efficient (low-cost) option for cross-sectional studies in that they enable characteristics of the population to be determined from a small number of participating units [55]. The probable explanation is that the studies using random sampling included larger numbers of hospital units [18, 19, 22, 26, 27, 40, 47]. Put differently, the User's Guide provided by the AHRQ [3] recommends that, if the hospital has a staff of fewer than 500, efforts should be made to include them all in the study.

Against the STROBE Statement checklist, the studies were generally of good quality and about half the studies met all the requirements listed for observational epidemiological studies [16, 18, 21–25, 27, 28, 30, 32, 33, 37–39]. It should be noted, however, that some editors have proven reticent in view of the fact that the STROBE initiative seeks to formalise the description of studies conducted in such a heterogeneous field of research as epidemiology, particularly as regards observational studies. This initiative, they claim, may not favour the execution and description of singular, creative studies [15]. The studies included were found to feature a diversity of objectives and methods, which may have contributed to whether or not they met the items listed in the STROBE Statement.

Characteristics of the patient safety culture dimensions

The central aim of this review was to ascertain the characteristics of PSC at hospitals in the various cultural contexts. Dimensions in which safety culture was classified as strong and weak were identified.

'Teamwork within units' scored higher in countries at various different stages of development and in studies with different temporal characteristics [20, 23, 26–28, 37, 38, 41, 45, 46]. The process of providing healthcare is intrinsically interdisciplinary. Teams generally comprise people who work together to achieve definite, shared goals, where each component has specific competences, tasks and functions in specialised work, uses shared resources and communicates in order to coordinate and adapt to change. Observational studies of team behaviour as it relates to high standards of clinical performance have identified patterns of communication, coordination and leadership that provide support for effective teamwork [56].

'Staffing' scored low in ~60% of the studies (N = 18) [16, 19, 21, 25–27, 30, 35–37, 39–43, 45, 46, 48]. The results suggest that, in the contexts of more than half the hospitals participating in the studies, staff felt overloaded by the unsuitability of personnel to their work activities, which can prejudice the quality of care provided.

'Organisational learning–continuous improvement' was perceived as strong by participants in 33% (N = 11) of the studies [17, 20, 21, 26, 33, 37, 38, 40, 41, 45, 46]. This dimension relates to learning in health organisations, which does not consist in a single intervention, but is a continuous phenomenon occurring in formal and informal learning. It is fundamentally important to manage learning requirements in healthcare systems because these are complex, interconnected, dynamic systems where all have tasks and responsibilities in executing the assigned functions, communicating and conveying the flow of relevant information and collectively providing safe care for patients [57]. In the context of patient safety, where the main goal is to reduce avoidable harm resulting from healthcare, 'Frequency of Events Reported' (an outcome decision) has the potential to contribute continuously to learning. Safety incident reports make it possible to identify the possible causes of failures in work processes and structures. However, the outcome dimension 'Frequency of Events Reported' did not prove strong in all the studies included in this review, but needed improvement in the various countries represented.

'Teamwork across units' captures respondents' perceptions of coordination and cooperation among hospital units with a view to providing the best possible healthcare to patients. This dimension could be improved in all the organisations considered in the set of studies included in this review, while in 30% (n = 10) of the studies, this dimension was considered weak and scored <50% positive responses [16, 25, 31, 33–36, 42, 44, 48].

Similarly, 'Handoffs and transitions' proved weak in 36% (N = 12) of the studies [16, 21, 23, 26–28, 30, 33, 42, 44, 46, 48] and needing improvement in all the studies included. 'Handoffs and transitions' are targeted by quality improvement efforts in health organisations because they entail high risk of safety incidents and can lead to loss of important information and to fragmentation of patient care [58].

Lastly, a culture of blame appears to exist in the hospitals overall. In nearly 70% of the studies (N = 22) [16, 20, 21, 23, 25–27, 29–31, 33–36, 39, 40, 42–46, 48], the dimension 'Non-punitive response to error' proved weak. A punitive culture with regard to the occurrence of safety incidents discourages staff from reporting, makes it difficult to discover possible causes and thus prevents learning from mistakes. In a strong safety culture, individuals feel comfortable about drawing attention to potential risks or actual failures, with no fear of censure by managers [59]. Wachter (2013) claims the 'no-blame' approach was responsible for many of the advances made by the patient safety movement in its first decade, but argues that most adverse events result from multiple causes and are unintentional. Occasionally, however, blame may be appropriate in certain situations that involve individuals who commit frequent, careless errors, who fail to accompany developments in their speciality or who choose to ignore sensible safety standards. Wachter (2013) cites the emergence of the concept of a 'just culture' (instead of a 'no-blame' culture) as a way to shift the (appropriate) no-blame focus back onto the care process. The assumption is that competent collaborators make mistakes and there is a need to make individuals (and institutions) accountable for blameworthy errors or conditions.

In this connection, the HSOPSC is being reviewed to construct a new version absorbing suggestions from user feedback from around the world, which include incorporating the 'just culture' concept (https://www.ahrq.gov/professionals/quality-patient-safety/patientsafetyculture/hospital/update/index.html).

Study limitations

The authors recognise that this study has a number of limitations. Firstly, as regards the data bases consulted, it was decided to restrict the search to the three bases because they were considered suitable for collecting all the eligible articles according to the proposed subject and objectives and because they were available to the authors in their academic setting. With a view to correcting any kind of selection bias, we consulted the Research Reference List available on the AHRQ website at https://www.ahrq.gov/professionals/quality-pati ent-safety/patientsafetyculture/resources/index.html and, from it, added another 69 articles to those obtained in the database searches.

Another issue that should be highlighted is that this review searched for articles in English, Portuguese and Spanish only. It is possible that this search strategy may have failed to retrieve some articles, although we have identified no articles published in other languages, not even in the Research Reference list posted on the AHRQ website, leading us to believe that, by and large, such articles have been published in English and Spanish. No published article using the HSOPSC in Latin American countries was identified.

Another important potential limitation of this review was the authors' choice not to conduct a meta-analysis. The rationale behind this is that the findings of the studies included are difficult to generalise and compare, for the following reasons: the studies occurred in different time periods, they used different sampling strategies and were conducted in hospital contexts in countries at different stages of development, which entail different capacities for investment in improving the quality and safety of care at the study hospitals.

Conclusion

This systematic review demonstrated that the assessment of safety culture in health organisation settings had received special interest on the part of health researchers, managers and practitioners in various parts of the world.

The set of studies included in this review reveals that hospital organisational cultures are predominantly underdeveloped or weak as regards patient safety and comprise dimensions that require strengthening. In particular, it underlines the need to think about: (i) strategies directed to prepare personnel to offer safe, quality healthcare; (ii) work processes surrounding shift changes and handovers, so as to prevent loss of important information about patients and their treatment; (iii) cooperation, integration and coordination of teamwork among the hospital units, in order to prevent fragmentation of care; and lastly and (iv) the culture of blame, which should give way to a 'just culture' approach, which would counter the urge to blame, enhance professional and institutional accountability and prioritise the identification of systemic failures and, consequently, proceed to mitigate them.

Use of the HSOPSC to measure safety culture in hospital organisations proved efficient, applicable to the various objectives of the studies included in this review and adaptable to the different cultural and organisational development contexts. The findings of these safety culture assessment studies are highly useful and constitute a knowledge base for taking specific improvement action.

Acknowledgements

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