

Systematic Psychometric Review of Self-Reported Instruments to  
Assess Patient Safety Culture in Primary Care

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Review article

# **Patient Safety Culture Assessments in Primary Care: A Scoping Review and Practical Recommendations**

## Review article

# Patient Safety Culture Assessments in Primary care: A Scoping Review and Practical Recommendations

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# Patient Safety Culture Assessments in Primary Care: A Scoping Review and Practical Recommendations

## ABSTRACT

**Objective** To review the literature on patient safety culture assessments in primary care and to offer practical recommendations for evaluating this aspect of care delivery.

**Methods** A literature search was performed using Medline, Web of Science, and Embase to analyse the state of the art on primary care patient safety culture assessments. Practical recommendations are provided, based on six instrumentation issues in implementation science.

**Results** Eleven studies assessed patient safety culture in a primary care setting of which most of them were published in high income countries and in the last four years, suggesting that patient safety culture assessment is a very new concept in primary care. A wide range of patient safety culture surveys was used, mainly among physicians and nurses. Finally, there are considerable differences in the used definition of the term 'patient safety culture' and its dimensions measured.

**Conclusion** The number of patient safety culture assessments in primary care is increasing. Due to the great variety in patient safety culture surveys, it is, however, difficult to compare results. A standard and widely validated questionnaire is needed in order to increase comparability. Therefore, recommendations for the development of relevant, psychometrically validated, and practical patient safety culture instruments are provided.

**Keywords:** Primary Care; Primary Care Setting; Primary Healthcare; Culture of Safety; Patient Safety Culture; Safety Climate

## INTRODUCTION

To date, primary healthcare entails greater risks and a greater likelihood of causing unintentional harm to patients due to early discharge from hospital, the pressure of short consultation, the fragmented nature of care services, the shift from complex and chronic care to primary healthcare, ... [1,2]. Patient safety is a key aspect of healthcare quality and has been defined as the '*avoidance, prevention, and amelioration of adverse outcomes or injuries stemming from the processes of healthcare*' [3].

The majority of patients are treated in primary care [4-7]. The Expert Panel on Effective ways of Investing in Health (European Commission) considers primary care as '*the provision of universally accessible, person-centered, comprehensive health and community services provided by a team of professionals accountable for addressing a large majority of personal health needs. These services are delivered in a sustained partnership with patients and informal caregivers, in the context of family and community, and play a central role in the overall coordination and continuity of people's care*' [8]. Numerous studies have revealed that patient safety incidents in primary care do occur: the median incident rate – derived from population-based record review studies – was 2 to 3 incidents for every 100 consultations of which 4% of these incidents may be associated with severe harm to the patient [9]. These incidents are mainly related to poor communication, administrative inefficiency, medication errors, and diagnostic errors [9]. However, the amount of incidents in primary care is often difficult to estimate as it depends on the accuracy of monitoring the quality of care delivered and incidents standardization [10,11]. Therefore, the number of incidents in primary care is probably a gross underestimation [11].

An important condition of patient safety management is a supportive patient safety culture (PSC) in order to identify possible weaknesses and to develop improvement strategies so recurrence of incidents can be minimized [7,12]. The most common definition of patient safety culture is: '*the product of individual and group values, attitudes, perceptions, competencies, and patterns of behaviour that determine the commitment to, and the style and proficiency of, an organization's health and safety management*' [13]. Measuring perceptions of PSC is already established in high-risk industries such as aviation, nuclear energy, and oil-drilling industry [14-16]. Hospitals are also aware of the importance of a just culture as an aspect of the organizational culture: '*an atmosphere of trust in which people are encouraged, even rewarded, for providing essential safety-related information, but in which they are also clear about where the line must be drawn between acceptable and unacceptable behaviour*' [17]. Furthermore, patient safety culture assessments have been observed to positively affect patient safety, since professionals report five times more incidents due to risk awareness [18].

The aim of this study was to explore the current status on patient safety culture assessments in primary care. Based on this literature review, practical recommendations are provided by using the six key instrumentation issues of Martinez *et al.* [19]. To the best of the authors' knowledge, no similar review on patient safety culture assessments in primary care has previously been conducted.

## METHODS

### Design

A scoping review was conducted to map the available evidence on patient safety culture assessments in primary care. Scoping reviews are used to identify knowledge gaps, set research agendas, and identify implications for decision-making [20]. They differ from systematic reviews in a number of ways: scoping reviews are used to present a broad overview of the evidence on a certain topic, irrespective of study quality, and are useful when examining areas that are emerging, to clarify key concepts and to identify gaps [21].

### Eligibility Criteria

Only cross-sectional studies that conducted a patient safety culture assessment in primary care were included. More specifically and in line with previous research/recommendations [22,23], studies that used a questionnaire approach to assess patient safety culture were considered eligible. The majority of tools to assess PSC in healthcare are quantitative. Consequently, qualitative approaches, editorials, and opinion papers were excluded. Furthermore, only articles published in English or Dutch were included. No country or date restrictions were applied.

### Search Strategy

A comprehensive literature search was conducted, searching the electronic peer-reviewed databases Medline, Web of Science, and Embase. The search strategy was divided into two categories: (1) primary care (i.e., general/family practice, ambulatory care, community care, and generalist care) and (2) patient safety culture. The search was performed using the following query: ('primary care safety' OR 'primary care' OR 'primary care setting' OR 'primary health care' [MeSH]) AND ('culture of safety' OR 'patient safety culture' OR 'safety climate'). In addition, bibliographies of included articles were hand searched for other relevant papers. Finally, the authors reviewed key texts, reports, and policy documents related to patient safety culture in primary care.

### Study Selection and Data Abstraction

After removal of duplicates, the first selection of articles was made based on title and abstract. Papers selected for full-text review were screened according to the eligibility criteria. Two reviewers (MD and DV) independently investigated the relevance of the extracted papers by using self-designed screening forms. The items of the forms included: (1) study characteristics (i.e., authors, year, journal, country, method, sample size, and response rate), (2) characteristics plus result of the PSC assessment (i.e., questionnaire, target population, and result), and (3) PSC definitions plus dimensions.

### Data Analysis

First, all relevant data (study characteristics, characteristics plus result of the PSC assessment, and PSC definitions plus dimensions) were tabulated (see Appendix 1). Afterwards, a descriptive and narrative synthesis of the data was undertaken.

## RESULTS

### Results of the Search

The literature search yielded 360 potentially relevant studies after duplicates being removed. Based on reviewing titles and abstracts, 28 articles were selected for in-depth screening. Nine relevant papers were retained after the screening process. By screening the reference lists of the relevant studies, two additional papers were enclosed. Finally, a total of 11 articles was included in this literature review (see Figure 1). The most frequent reasons for exclusion were: the safety culture assessment took place in a hospital setting ( $n=4$ ) or the purpose of the study was to develop and/or validate a questionnaire ( $n=8$ ) (see Appendix 2).

### Study Characteristics

Table 1 presents the study characteristics. Resulting from the literature search, only a few published studies on PSC in primary care were identified [24-34]. Most studies ( $n=7$ ) originated from high income countries [24-27,29,30,33]. Four studies [28,31,32,34] assessed primary care PSC in the Eastern Mediterranean Region (EMRO), of which three [28,32,34] in an Arabic population. With the exception of two studies [28,33], all papers were published between 2013 and 2016. All studies conducted a cross-sectional anonymous survey with a sample size varying between 78 and 4.344 respondents. The response rate varied between 23.6% and 92%.

### Characteristics and Result of the PSC Assessments

A wide range of questionnaires was used to assess patient safety culture in primary care (see Table 2). Three studies [31,33,34] developed a questionnaire based on the Hospital Survey on Patient Safety Culture (AHRQ) and two [25,32] on the Medical Office Survey (AHRQ). Four studies [24,26,27,30] used a newly developed survey, respectively the Frankfurt Patient Safety Climate Questionnaire (FRASIK) [26], the SCOPE-PC [27], and the PC-Safequest [24,30]. One article [28] adapted the Safety Attitude Questionnaire (SAQ) and another one [29] combined the SAQ, PC-Safequest, and FRASIK. All studies conducted the survey to measure PSC among primary care professionals, as proposed in the eligibility criteria. Physicians and nurses were frequently invited to participate in the study [24-29,31-34], followed by technical and administrative staff [24,25,28,32,34], healthcare assistants/workers [24,26,27,31,32], and managers [24,28,31,33]. To a lesser extent, midwives [31-33], pharmacists [24,28], phlebotomists [24], and dentists [31] participated in the studies. One study did not specify which primary care professionals completed the patient safety culture survey and only made a distinction between clinical and non-clinical staff [30]. Another study administered the survey according to the primary care setting (dental care, dietetics, exercise therapy, physiotherapy, occupational therapy, midwifery, anticoagulation clinics, skin therapy, and speech therapy) [27]. The results of the PSC assessments ranged from 3.71 to 5.48 on a possible score of 5 and from 46% to 67%. It is, however, impossible to compare these results since different questionnaires were used.



## PSC Definitions and Dimensions

Table 3 provides an overview of the used definitions of the term 'patient safety culture' in the included studies. The most commonly used definition was the one, or a derivative from, the nuclear industry: *'The product of individual and group values, attitudes, perceptions, competencies, and patterns of behaviour that determine the commitment to, and the style and proficiency of, an organization's health and safety management'* [35]. However, six studies each used another definition [26,27,30-33]. As there are different questionnaires used to assess PSC in primary care, a large discrepancy between patient safety culture dimensions exists (see Appendix 1). Frequently enclosed dimensions were 'communication' [24,25,27,30-34], 'organisational learning' [25,27,31-34], 'teamwork' [24-27,29-34], 'staffing' [25,31-34], 'leadership' [24,25,30,32], and 'non-punitive response to error' [31,33,34].

## PRACTICAL RECOMMENDATIONS

According to the present review, a wide range of questionnaires to assess PSC in primary care exists. The availability of safety culture questionnaires is growing and there is a great variety between the surveys in terms of PSC definitions, enclosed dimensions, and data analysis. Some studies adapted and validated existing questionnaires; others developed new questionnaires. While translating and validating a particular survey - that is often originated from secondary care - modifications (i.e., deleting, adding, or adjusting dimensions) were often done. Therefore, comparability of the results is likely to be compromised. Moreover, the psychometric properties of many of these questionnaires are subject to criticism [36,37].

As Martinez *et al.* said [19]: *'implementation science faces the risk of constructing a magnificent house without bothering to build a solid foundation'*. The same authors described six critical instrumentation issues: (1) use of frameworks, theories, and models, (2) role of instrument psychometric properties, (3) use of 'home-grown' and adapted instruments, (4) choosing the most appropriate evaluation method and approach, (5) practicality, and (6) need for decision-making tools. These instrumentation issues can also be applied to health-focused implementation. As a result, some recommendations regarding PSC assessments in primary care can be defined.

### Instrumentation Issue 1: Use of Frameworks, Theories, and Models

*'Implementation research is ideally conducted when guided by theory. Theory defines the content of a construct and describes the relation among constructs'* [19].

To date, patient safety culture research has mostly focused on hospital-related issues. As a result, there is no widely accepted conceptual framework for patient safety in primary care settings and common definitions are often derived from secondary care or other industries like nuclear power or aviation. Varying definitions of the terms 'error', 'incident', 'report', and 'patient safety culture' have been used in research, limiting the comparability of results [38-45]. For example, one review [46] found 25 different definitions of the term 'medical error', which can influence proportion of reported incidents [39,41-44,47]. In addition, the present literature review indicates that several definitions of the term "patient safety culture" have been used, from *'the product of individual and*

*group values, attitudes, perceptions, competencies, and patterns of behaviour* to *'shared employee perceptions of the priority of safety at their organisation'*. These problems can reflect linguistic ambiguity, conceptual ambiguity, or both. The identification of key constructs associated with succinct and theoretically informed definitions is critical. In-depth qualitative research helps to understand the dimensions of a certain phenomenon. Therefore, qualitative research on the key aspects of patient safety culture in primary care can be a starting point for defining primary care patient safety. In addition, clearer and more consistent definitions would assist comparability of PSC results.

### **Instrumentation Issue 2: Need to Establish Instrument Psychometric Properties**

*'Unless instruments' psychometric properties are evaluated, confidence cannot be placed in study findings and/or interpretations'* [19].

The quality of a study mainly depends on the quality of the instrument. However, this literature review reveals that psychometric properties of many of these questionnaires are subject to criticism [36,37]. Therefore, it is recommended that the reliability and validity, which are viewed as the most basic and necessary psychometric properties, of PSC surveys should take top priority in the development of the instrument. The more evidence gathered that the instrument is really measuring what it is supposed to measure, the more confidence the researchers will have in the instrument and the interpretation of data.

### **Instrumentation Issue 3: Use of 'Home-grown' and Adapted Instruments**

*'Use of home-grown and/or adapted instruments without carefully attending to appropriate steps of instrument development or assessing and reporting psychometrics may compromise the portability of implementation outcomes to real-world settings'* [19].

Researchers are, due to lack of time and/or experience, often forced to rather quickly develop an instrument, without proper reliability and validity assessment. Moreover, researchers often adapt instruments by shortening their length or modifying wording. However, authors often do not report on how their instrument is adapted or how the adaptations may affect the instruments' psychometric properties. This literature review indicates that most PSC surveys were based on existing questionnaires, which are often derived from the hospital setting. Inevitably, modifications (i.e., deleting, adding, or adjusting dimensions) were often done. When adapting an existing instrument, researchers may consider accessing published reviews to identify available instruments or to determine whether instrument adaptation is necessary. When a relevant instrument needs modification, authors should report exactly how the instrument was adapted and report the effect of the adaptation on the instruments' psychometrics properties. When a new instrument is developed, the following steps should be followed: (1) carefully define what the construct is, ideally based on existing theories or definitions, (2) generate relevant, generically worded items, (3) administer the items to a small, representative sample of respondents to assess face validity, to identify missing items, and to assess the appropriate language, (4) remove irrelevant items or items that are difficult to understand, (5) administer the items to a larger sample, and (6) create a report that details the methods by which the instrument was constructed.

#### **Instrumentation Issue 4: Choosing the Most Appropriate Evaluation Method and Approach**

*'Use of one method (e.g., self-report) or one approach (i.e., qualitative or quantitative inquiry) may not be appropriate for the study questions, can lead to method bias, and/or limit the strength and contribution of research'* [19].

There are three main evaluation approaches: qualitative (interviews), quantitative (self-report or administrative data), and mixed-methods (combination of both qualitative and quantitative). Self-report is perhaps the most commonly used method, but is, however, prone to biases such as social desirability. According to the present literature review, the majority of tools to assess patient safety culture in healthcare are quantitative, using a self-report questionnaire. Research demonstrated that mixed methods approaches are more effective in assessing PSC, rather than using one method alone because *'the use of safety culture surveys as the only method of assessing safety culture is often of limited value in identifying strategies to potentially improve the safety culture'* [48,49].

#### **Instrumentation issue 5: Practicality**

*'Given that implementation science takes place in real world settings, identifying practical or pragmatic instruments is critical'* [19].

Practical (i.e., accessible) or pragmatic (i.e., actionable) instruments are often not top priority in the development process of a new instrument. In order to gain more practicality, instrument developers may consider the following recommendations: avoid commercialization, share the instrument with experts who can contribute to the evidence base, be conscious of the instrument's length, and use a common or easy-to-understand language.

#### **Instrumentation Issue 6: Need for Decision-making Tools**

*'Despite the relatively young state of implementation science, there are many instruments available, making the need for decision tools and repositories a priority'* [19].

In response to the issues discussed above, decision-making tools are needed in order to elucidate the quality and array of available instruments. Moreover, repositories with decision tools are critical to help researchers in building the instrument. Organisations or teams (e.g. the AHRQ) are encouraged to create decision-making tools for optimal instrument selection and to assist researchers in identifying relevant, psychometrically validated, and practical instruments for patient safety in primary care.

**CONCLUSION**

Healthcare can cause avoidable harm to patients. Primary care is not an exception and the relative lack of research in this area lends urgency to a better understanding of patient safety and the development of primary care oriented safety programs. In the last four years, the number of PSC assessments in primary care increased. Because of the great variety in surveys, it is, however, difficult to compare results. A standard and widely validated survey is needed in order to increase generalizability and comparability. Therefore, the present review provided recommendations for the development of relevant, psychometrically validated, and practical instruments.

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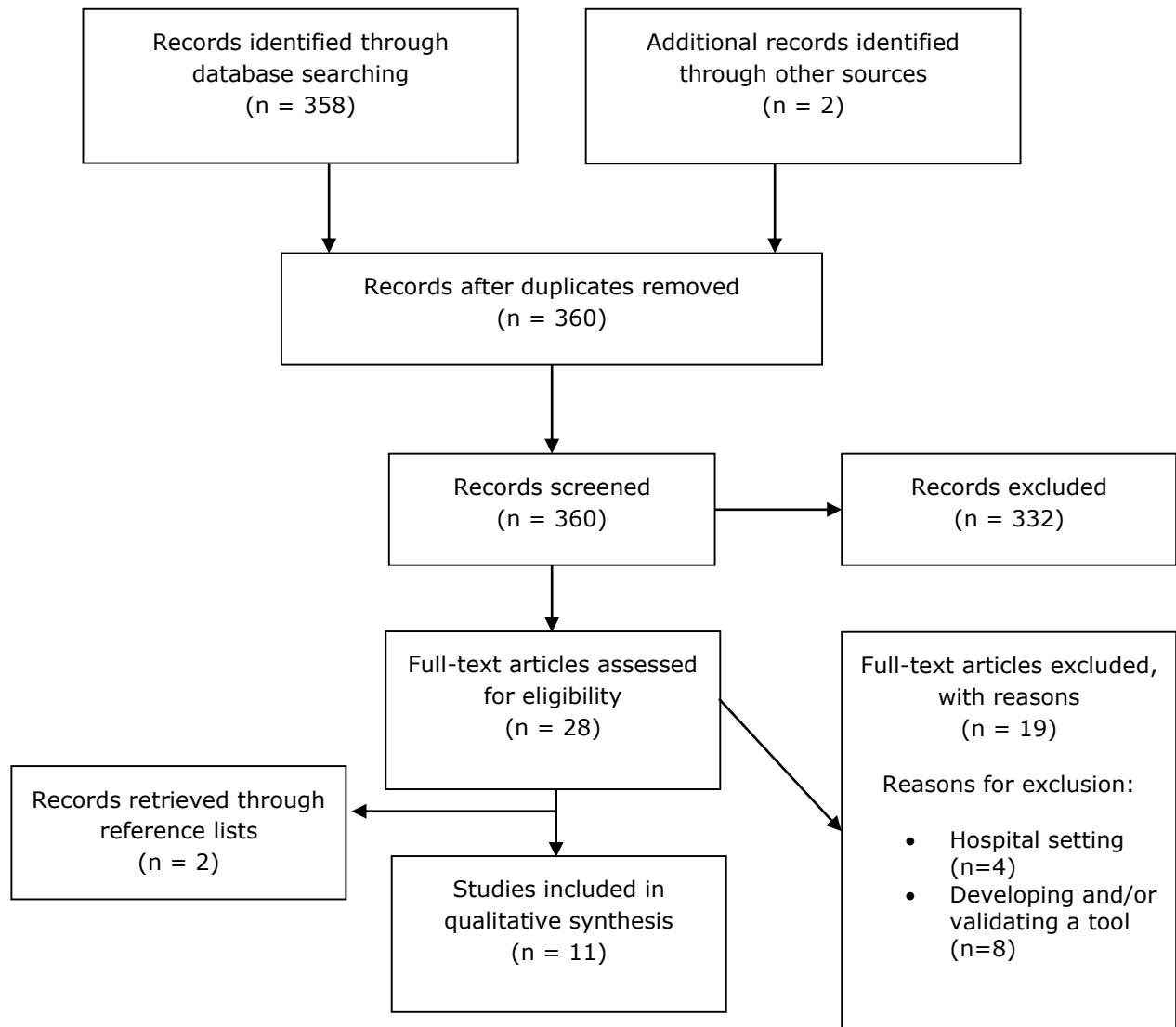
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**Figure 1** Flowchart of the Literature Search

**Table 1** Characteristics of the Studies Included in the Literature Review

<b>Authors (year)</b>	<b>Country</b>	<b>Sample size</b>	<b>Response rate</b>
Astier-Peña <i>et al.</i> (2015)	Spain	4.344	56.2%
Hoffmann <i>et al.</i> (2013)	Germany	2.111	58.5%
Verbakel <i>et al.</i> (2014)	The Netherlands	625	23.6%
Nabhan & Ahmed-Tawfik (2007)	Egypt	600	92%
Gehring <i>et al.</i> (2013)	Switzerland	630	50%
de Wet <i>et al.</i> (2012)	Scotland	563	84.4%
Bell <i>et al.</i> (2015)	UK	335	29%
Tabrizchi & Sedaghat (2012)	Iran	100	83.3%
Webair <i>et al.</i> (2015)	Yemen	78	71%
Bodur & Filiz	Turkey	180	85%
Ghobashi <i>et al.</i> (2014)	Kuwait	276	74.8%

**Table 2** Characteristics and Result of the PSC Assessments

Authors (year)	Questionnaire	Target population	Result (mean on a possible score of 5 or %)
Astier-Peña <i>et al.</i> (2015)	Medical Office Survey (AHRQ)	Doctors, nurses, and administrative staff	3.71 (95% CI 3.70-3.73)
Hoffmann <i>et al.</i> (2013)	The Frankfurt Patient Safety Climate Questionnaire (FRASIK)	Healthcare assistants and doctors	4.11 - 4.71
Verbakel <i>et al.</i> (2014)	SCOPE-PC	Dental care, dietetics, exercise therapy, physiotherapy, occupational therapy, midwifery, anticoagulation clinics, skin therapy, speech therapy, and supporting staff (nurses and healthcare assistants)	4.03 (SD +/- 0.62)
Nabhan & Ahmed-Tawfik (2007)	Based on Safety Attitude Questionnaire (SAQ)	Primary healthcare managers, physicians, nurses, pharmacists, and technicians	3.89 (SD +/- 0.59)
Gehring <i>et al.</i> (2013)	Based on SAQ, FRASIK and PC-Safequest	Physicians and nurses	4.64 (SD +/- 0.59)
de Wet <i>et al.</i> (2012)	PC-Safequest	General practitioners, practice managers, reception/administrators, nurses, health visitors, pharmacists, and phlebotomists	5.48 (SD +/- 0.78)
Bell <i>et al.</i> (2015)	PC-Safequest	Clinical and non-clinical staff	5.10 (SD +/- 1.00)

Tabrizchi & Sedaghat (2012)	Based on Hospital Survey on Patient Safety Culture (AHRQ)	Head of centres, dentists, health workers, midwives, and physicians	57% (95% CI 55%-59%)
Webair <i>et al.</i> (2015)	Medical Office Survey (AHRQ)	Physicians, nurses, medical assistants, midwives, and non-clinical staff	67%
Bodur & Filiz (2009)	Based on Hospital Survey on Patient Safety Culture (AHRQ)	General practitioners, nurses, midwives, and health officers	46% (95% CI 43%-49%)
Ghobashi <i>et al.</i> (2014)	Based on Hospital Survey on Patient Safety Culture (AHRQ)	Physicians, nurses, technical, and administrative staff	61%

**Table 3** PSC Definitions

<b>Authors (year)</b>	<b>Questionnaire</b>	<b>Definition</b>
Astier-Peña <i>et al.</i> (2015)	Medical Office Survey (AHRQ)	<i>"The product of individual and group values, attitudes, perceptions, competencies, and patterns of behaviour that determine the commitment to, and the style and proficiency of, an organization's health and safety management"</i>
Hoffmann <i>et al.</i> (2013)	The Frankfurt Patient Safety Climate Questionnaire (FRASIK)	<i>"Shared employee perceptions of the priority of safety ... at their organization"</i>
Verbakel <i>et al.</i> (2014)	SCOPE-PC	<i>"The shared values, attitudes, norms, beliefs, practices, policies, and behaviours about safety issues in daily practice"</i>
Nabhan & Ahmed-Tawfik (2007)	Based on Safety Attitude Questionnaire (SAQ)	/
Gehring <i>et al.</i> (2013)	Based on SAQ, FRASIK and PC-Safequest	<i>"The product of individual and group values, attitudes, perceptions, competencies, and patterns of behaviour that determine the commitment to, and the style and proficiency of, an organization's health and safety management"</i>
de Wet <i>et al.</i> (2012)	PC-Safequest	<i>"The product of individual and group values, attitudes, perceptions, competencies, and patterns of behaviour that determine a team or organization's commitment to safety management"</i>

Bell <i>et al.</i> (2015)	PC-Safequest	<i>"Safety culture, in turn, determines how safety is managed by a team or organization. The attitudes, values, perceptions, and behaviours, which help to shape the team or organization's commitment to safety, collectively form the team's safety culture"</i>
Tabrizchi & Sedaghat (2012)	Based on Hospital Survey on Patient Safety Culture (AHRQ)	<i>"Organizational safety culture means that everyone knows the safety as his most important concern in the organization. Patient safety culture means as acceptance and actions of patient safety as the first priority in the organization"</i>
Webair <i>et al.</i> (2015)	Medical Office Survey (AHRQ)	<i>"A true safety culture is one in which every person in the organization recognizes their responsibilities in regard to patient safety and works to improve the care they deliver"</i>
Bodur & Filiz (2009)	Based on Hospital Survey on Patient Safety Culture (AHRQ)	<i>"The common values, beliefs, behaviours, perceptions, and attitudes of the staff in a healthcare center"</i>
Ghobashi <i>et al.</i> (2014)	Based on Hospital Survey on Patient Safety Culture (AHRQ)	<i>"The product of individual and group values, attitudes, perceptions, competencies, and patterns of behaviour that determine the commitment to, and the style and proficiency of, an organization's health and safety management"</i>

**Appendix 1** Data Extraction

Item	Reported data
<b>Author(s)</b>	Astier-Peña <i>et al.</i>
<b>Year</b>	2015
<b>Journal</b>	The European Journal of Public Health
<b>Country</b>	Spain
<b>Questionnaire</b>	Medical Office Survey (AHRQ)
<b>Target population</b>	Doctors, nurses, and administrative staff
<b>Methods</b>	Non-interventional prospective study
<b>Sample size</b>	4.344
<b>Response rate</b>	56.2%
<b>Safety culture definition</b>	<i>"The product of individual and group values, attitudes, perceptions, competencies, and patterns of behaviour that determine the commitment to, and the style and proficiency of, an organization's health and safety management"</i>
<b>Safety culture dimensions</b>	Patient safety and quality issues Information exchange with other setting Teamwork Work pressure and pace Staff training Office processes and standardization Communication openness Patient care tracking/follow up Communication about error Leadership support Organizational learning Overall perceptions of patient safety and quality
<b>Result</b>	Mean score = 3.71 (95% CI 3.70-3.73)
<b>Differences according to profession, gender, age, and clinical setting</b>	Professionals over 55 years, with managerial responsibilities, women, nurses, and administrative staff had better scores Professionals with more than 1500 patients and working for more than 11 years at primary care had lower scores

Item	Reported data
<b>Author(s)</b>	Hoffmann <i>et al.</i>
<b>Year</b>	2013
<b>Journal</b>	Annals of Family Medicine
<b>Country</b>	Germany
<b>Questionnaire</b>	The Frankfurt Patient Safety Climate Questionnaire
<b>Target population</b>	Healthcare assistants and doctors
<b>Methods</b>	Non-interventional prospective study
<b>Sample size</b>	2.111
<b>Response rate</b>	58.5%
<b>Safety culture definition</b>	<i>"Shared employee perceptions of the priority of safety ... at their organization"</i>
<b>Safety culture dimensions</b>	Teamwork climate Error management Perception of causes of error Safety of clinical processes Job satisfaction Safety of practice structure Receptiveness to healthcare assistants and patients Staff perception of management Quality and safety of medical care
<b>Score</b>	Mean score = 4,11 – 4.71
<b>Highest scoring dimension(s)</b>	Safety of practice structure Job satisfaction
<b>Lowest scoring dimension(s)</b>	Error management Perception of causes of error
<b>Differences according to profession, gender, age, and clinical setting</b>	Doctors had more positive perceptions compared to healthcare assistants



Item	Reported data
<b>Author(s)</b>	Verbakel <i>et al.</i>
<b>Year</b>	2014
<b>Journal</b>	International Journal of for Quality in Health Care
<b>Country</b>	The Netherlands
<b>Questionnaire</b>	SCOPE-PC
<b>Target population</b>	Dental care, dietetics, exercise therapy, physiotherapy, occupational therapy, midwifery, anticoagulation clinics, skin therapy, speech therapy, and supporting staff (nurses and healthcare assistants)
<b>Methods</b>	Non-interventional prospective study
<b>Sample size</b>	625
<b>Response rate</b>	23.6%
<b>Safety culture definition</b>	<i>"The shared values, attitudes, norms, beliefs, practices, policies, and behaviours about safety issues in daily practice"</i>
<b>Safety culture dimensions</b>	Open communication and learning from error Handover and teamwork Adequate procedures and working conditions Patient safety management Support and fellowship Intention to report events Organizational learning
<b>Score</b>	Mean score = 4,03 (SD 0,62)
<b>Highest scoring dimension(s)</b>	Open communication and learning from error Support and fellowship
<b>Lowest scoring dimension(s)</b>	Intention to report events Patient safety management
<b>Differences according to profession, gender, age, and clinical setting</b>	Occupational therapy and anticoagulation therapy deviated most from other professions in a negative way Physiotherapy deviated the most in a positive way

Item	Reported data
<b>Author(s)</b>	Nabhan & Ahmed-Tawfik
<b>Year</b>	2007
<b>Journal</b>	International Journal of Gynaecology and Obstetrics
<b>Country</b>	Egypt
<b>Questionnaire</b>	Based on: Safety Attitude Questionnaire (SAQ)
<b>Target population</b>	Primary healthcare managers, physicians, nurses, pharmacists, and technicians
<b>Methods</b>	Non-interventional prospective study
<b>Sample size</b>	600
<b>Response rate</b>	92%
<b>Safety culture definition</b>	/
<b>Safety culture dimensions</b>	/
<b>Score</b>	Mean score = 3,89 (SD 0,59)
<b>Highest scoring dimension(s)</b>	/
<b>Lowest scoring dimension(s)</b>	/
<b>Differences according to profession, gender, age, and clinical setting</b>	Managers had the highest score Highest positive safety score was reported from those who had been in the position for less than 6 months The highest positive safety score reported was the score for the 30-35 years age group

Item	Reported data
<b>Author(s)</b>	Gehring <i>et al.</i>
<b>Year</b>	2013
<b>Journal</b>	International Journal for Quality in Health Care
<b>Country</b>	Switzerland
<b>Questionnaire</b>	Based on: Safety Attitude Questionnaire (SAQ), PC-Safequest, and The Frankfurt Patient Safety Climate Questionnaire (FRASIK)
<b>Target population</b>	Physicians and nurses
<b>Methods</b>	Non-interventional prospective study
<b>Sample size</b>	630
<b>Response rate</b>	50%
<b>Safety culture definition</b>	<i>"The product of individual and group values, attitudes, perceptions, competencies, and patterns of behaviour that determine the commitment to, and the style and proficiency of, an organization's health and safety management"</i>
<b>Safety culture dimensions</b>	Teamwork Stress recognition Job satisfaction Working conditions Perception of management Safety systems and climate Global rating of safety in the office
<b>Score</b>	Mean score = 4,64 (SD 0,59)
<b>Highest scoring dimension(s)</b>	/
<b>Lowest scoring dimension(s)</b>	/
<b>Differences according to profession, gender, age, and clinical setting</b>	Physicians and less experienced staff provide positive scores Individuals working at medical centres were more likely to provide positive scores compared with single-handed offices

Item	Reported data
<b>Author(s)</b>	de Wet <i>et al.</i>
<b>Year</b>	2012
<b>Journal</b>	Journal of Evaluation in Clinical Practice
<b>Country</b>	Scotland
<b>Questionnaire</b>	PC-Safequest
<b>Target population</b>	General practitioners, practice managers, reception/administrators, nurses, health visitors, pharmacists, and phlebotomists
<b>Methods</b>	Non-interventional prospective study
<b>Sample size</b>	563
<b>Response rate</b>	84.4%
<b>Safety culture definition</b>	<i>"The product of individual and group values, attitudes, perceptions, competencies, and patterns of behaviour that determine a team or organization's commitment to safety management"</i>
<b>Safety culture dimensions</b>	Leadership Teamwork Communication Workload Safety systems
<b>Score(s)</b>	Mean score = 5,48 (SD 0,78)
<b>Highest scoring dimension(s)</b>	Leadership
<b>Lowest scoring dimension(s)</b>	Workload
<b>Differences according to profession, gender, age, and clinical setting</b>	Team members based mainly in the community had more negative perceptions An increasing number of years were associated with more negative reported perceptions Reported perceptions of respondents in the management group were significantly more positive General practitioners perceived the safety climate more positive

Item	Reported data
<b>Author(s)</b>	Bell <i>et al.</i>
<b>Year</b>	2015
<b>Journal</b>	Journal of Evaluation in Clinical Practice
<b>Country</b>	UK
<b>Questionnaire</b>	PC-Safequest
<b>Target population</b>	Clinical and non-clinical staff
<b>Methods</b>	Non-interventional prospective study
<b>Sample size</b>	335
<b>Response rate</b>	29%
<b>Safety culture definition</b>	<i>"Safety culture, in turn, determines how safety is managed by a team or organization. The attitudes, values, perceptions, and behaviours, which help to shape the team or organization's commitment to safety, collectively form the team's safety culture"</i>
<b>Safety culture dimensions</b>	Workload Communication Leadership Teamwork Safety systems
<b>Score(s)</b>	Mean score = 5,10 (SD 1,00)
<b>Highest scoring dimension(s)</b>	Leadership and safety systems
<b>Lowest scoring dimension(s)</b>	Workload
<b>Differences according to profession, gender, age, and clinical setting</b>	Managers rated their practices significantly higher on safety culture measure. Moreover, more experience is associated with more negative perceptions Practices with more registered patients provided lower safety climate scores

Item	Reported data
<b>Author(s)</b>	Tabrizchi & Sedaghat
<b>Year</b>	2012
<b>Journal</b>	Acta Medica Iranica
<b>Country</b>	Iran
<b>Questionnaire</b>	Based on: Hospital Survey on Patient Safety Culture (AHRQ)
<b>Target population</b>	Head of centres, dentists, health workers, midwives and physicians
<b>Methods</b>	Non-interventional prospective study
<b>Sample size</b>	100
<b>Response rate</b>	83.3%
<b>Safety culture definition</b>	<i>"Organizational safety culture means that everyone knows the safety as his most important concern in the organization. Patient safety culture means as acceptance and actions of patient safety as the first priority in the organization"</i>
<b>Safety culture dimensions</b>	Teamwork across units of health centres Head of center support for patient safety Staffing Non-punitive response to error Feedback and communication about error Communication openness Teamwork within units Organizational learning Head of center expectations and actions Frequency of events reported Overall perception of safety
<b>Score(s)</b>	Mean score = 57% (95% CI 55%-59%)
<b>Highest scoring dimension(s)</b>	Teamwork across units of health center Teamwork within units Head of center support for patient safety
<b>Lowest scoring dimension(s)</b>	Non-punitive response to error
<b>Differences according to profession, gender, age, and clinical setting</b>	/

Item	Reported data
<b>Author(s)</b>	Webair <i>et al.</i>
<b>Year</b>	2015
<b>Journal</b>	BMC Family Practice
<b>Country</b>	Yemen
<b>Questionnaire</b>	Medical Office Survey (AHRQ)
<b>Target population</b>	Physicians, nurses, medical assistants, midwives and non-clinical staff
<b>Methods</b>	Non-interventional prospective study
<b>Sample size</b>	78
<b>Response rate</b>	71%
<b>Safety culture definition</b>	<i>"A true safety culture is one in which every person in the organization recognizes their responsibilities in regard to patient safety and works to improve the care they deliver"</i>
<b>Safety culture dimensions</b>	Teamwork Work pressure and pace Staff training Office processes and standardization Communication openness Patient care tracking/follow up Communication about error Leadership support Organizational learning Overall perceptions of patient safety and quality
<b>Score(s)</b>	Mean score = 67%
<b>Highest scoring dimension(s)</b>	Teamwork Organizational learning
<b>Lowest scoring dimension(s)</b>	Work pressure and pace Patient care tracking/follow up
<b>Differences according to profession, gender, age, and clinical setting</b>	/

Item	Reported data
<b>Author(s)</b>	Bodur & Filiz
<b>Year</b>	2009
<b>Journal</b>	International Journal for Quality in Health Care
<b>Country</b>	Turkey
<b>Questionnaire</b>	Based on: Hospital Survey on Patient Safety Culture (AHRQ)
<b>Target population</b>	General practitioners, nurses, midwives, and health officers
<b>Methods</b>	Non-interventional prospective study
<b>Sample size</b>	180
<b>Response rate</b>	85%
<b>Safety culture definition</b>	<i>"The common values, beliefs, behaviours, perceptions, and attitudes of the staff in a healthcare center"</i>
<b>Safety culture dimensions</b>	Manager expectations and actions promoting safety Organizational learning Teamwork within units Communication openness Feedback and communications about errors Non-punitive response to errors Staffing Management support for patient safety Teamwork across units Handoffs and transitions Overall perceptions of safety Frequency of event reporting
<b>Score(s)</b>	Mean score = 46%
<b>Highest scoring dimension(s)</b>	Teamwork within units Overall perceptions of safety Teamwork across units
<b>Lowest scoring dimension(s)</b>	Frequency of event reporting Non-punitive response to error
<b>Differences according to profession, gender, age, and clinical setting</b>	Patient safety culture scores decreased as seniority increased



Item	Reported data
<b>Author(s)</b>	Ghobashi et al.
<b>Year</b>	2014
<b>Journal</b>	Epidemiology Biostatistics and Public Health
<b>Country</b>	Kuwait
<b>Questionnaire</b>	Based on: Hospital Survey on Patient Safety Culture (AHRQ)
<b>Target population</b>	Physicians, nurses, technical and administrative staff
<b>Methods</b>	Non-interventional prospective study
<b>Sample size</b>	276
<b>Response rate</b>	74.8%
<b>Safety culture definition</b>	<i>"The product of individual and group values, attitudes, perceptions, competencies, and patterns of behaviour that determine the commitment to, and the style and proficiency of, an organization's health and safety management"</i>
<b>Safety culture dimensions</b>	Non-punitive response to error Staffing Communication openness Supervisor/manager expectations and actions promoting safety Feedback and communication about error Organizational learning continuous improvement Teamwork within center units Center handoffs and transitions Teamwork across all PHC center units Center management support for patient safety Frequency of event reporting among all staff Overall perceptions of safety
<b>Score(s)</b>	Mean score = 61%
<b>Highest scoring dimension(s)</b>	Teamwork within centre's units Organizational learning
<b>Lowest scoring dimension(s)</b>	Non-punitive response to error Frequency of event reporting Staffing Communication openness Center handoffs and transitions
<b>Differences according to profession, gender, age, and clinical setting</b>	/

**Appendix 2** Excluded Articles and Reason for Exclusion

Article	Reason for exclusion
González-Formoso <i>et al.</i> (2011) Adverse events analysis as an educational tool to improve patient safety culture in primary care: a randomized trial.	Study protocol
Mira <i>et al.</i> (2015) Interventions in health organisations to reduce the impact of adverse events in second and third victims.	Impact of interventions on second and third victims rather than a safety culture measurement
Verbakel <i>et al.</i> (2013) Measuring safety culture in Dutch primary care: psychometric characteristics of the SCOPE-PC questionnaire.	Purpose of the study was to modify and validate the existing SCOPE for all professions in Dutch primary care (SCOPE-PC)
Zwart <i>et al.</i> (2011) Patient safety culture measurement in general practice. Clinimetric properties of SCOPE	Purpose of the study was to modify and validate the existing Hospital Survey (AHRQ) to the SCOPE for general practice
Bondevik <i>et al.</i> (2014) Patient safety culture in Norwegian primary care: a study in out-of-hours casualty clinics and GP practices	Study aimed to assess the variations in safety attitudes, related to profession, age, gender, and clinical setting
Hovik <i>et al.</i> (2009) What is most important for safety climate: the company belonging or the local working environment? A study from the Norwegian offshore industry	The aim of the study was to examine health and safety climate in the petroleum industry

Gallego <i>et al.</i> (2012) Investigating patient safety culture across a health system: multilevel modelling of differences associated with service types and staff demographics	The aim of the study was to investigate whether safety culture varies according to the type of service in a large healthcare system
Newham <i>et al.</i> (2014) Development and psychometric testing of an instrument to measure safety climate perceptions in community pharmacy	The aim of the study was to develop and validate a safety culture instrument
McGuire <i>et al.</i> (2012) Patient safety perceptions of primary care providers after implementation of an electronic medical record system	The study focused on changes in perceptions of patient safety
Bondevik <i>et al.</i> (2014) The safety attitudes questionnaire – ambulatory version: psychometric properties of the Norwegian translated version for the primary care setting	The paper describes only the results of a validation process
Frankel <i>et al.</i> (2008) Revealing and resolving patient safety defects: the impact of leadership walkrounds on frontline caregiver assessments of patient safety	Hospital setting
Verbakel <i>et al.</i> (2015) Effects of patient safety culture interventions on incident reporting in general practice	The aim of the study was to assess the effects of patient safety culture assessments on risk awareness
Alameddine <i>et al.</i> (2015) Assessing health-care providers' readiness for reporting quality and patient safety indicators at primary health-care centres in Lebanon: a national cross-sectional survey	No safety culture assessment included
Pohl <i>et al.</i> (2013) Use of a comprehensive patient safety tool in primary care practices	The tool used in the study was to measure the extent to which patient safety practices were rigorously and systematically implemented

de Wet <i>et al.</i> (2010) The development and psychometric evaluation of a safety climate measure for primary care	The aim of the study was to develop and test a safety climate measurement tool
Hutchinson <i>et al.</i> (2006) Use of a safety climate questionnaire in UK healthcare: factor structure, reliability and usability	The aim of the study was to develop and test a safety climate measurement tool
Kirk <i>et al.</i> (2007) Patient safety culture in primary care: developing a theoretical framework for practical use	The aim of the study was to develop and test the MaPSaF
Ulrich & Kear (2014) Patient safety culture in nephrology nurse practice settings: initial findings	Hospital setting
Randmaa <i>et al.</i> (2014) SBAR improves communication and safety climate and decreases incident reports due to communication errors in an anaesthetic clinic: a prospective intervention study	Hospital setting
Chen & Li (2010) Measuring patient safety culture in Taiwan using the Hospital Survey on Patient Safety Culture (HSOPCS)	Hospital setting
Gaal <i>et al.</i> (2010) Patient safety in primary care: a survey of general practitioners in the Netherlands	The purpose of the study was to gain better insight into what GP's consider unsafe practices and what they judge to be risk factors for patient safety in primary care
Modak <i>et al.</i> (2007) Measuring safety culture in the ambulatory setting: The Safety Attitudes Questionnaire-ambulatory version	The purpose of the study was to determine reliability
Wallis <i>et al.</i> (2011) Assessing patient safety culture in New Zealand primary care: a pilot study using a modified Manchester Patient Safety Framework in Dunedin general practices	Qualitative approach