NURSES' PERCEPTIONS OF SUPERVISORY LEADERSHIP FOR PATIENT SAFETY: A NARRATIVE SYNTHESIS

by

KATHLEEN ELIZABETH ARCHIBALD SAMOIL

BSc, University of Alberta, 2010

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF REQUIREMENTS FOR THE DEGREE OF

MASTER OF SCIENCE IN NURSING

In

THE SCHOOL OF GRADUATE STUDIES

Trinity Western University

Supervisory Committee:

Dr. Richard (Rick) Sawatzky, Trinity Western University

Dr. Sheryl Reimer-Kirkham, Trinity Western University

Kris Gustavson, Provincial Health Services Agency

Abstract

The question that this thesis sought to answer was whether discernible trends could be found in studies that involve the use of questionnaires to ascertain nurses' perceptions of supervisory leadership for safety in the context of patient safety culture. A focused literature search was conducted to retrieve relevant studies. The resulting 35 studies were analyzed using the knowledge synthesis method of narrative review. Narrative review was selected on the basis that it would allow for comparisons of studies that used different research designs and questionnaires. The sample of included studies comprised 24 studies that used the Hospital Survey on Patient Safety Culture, 6 studies that used the Safety Attitudes Questionnaire, 2 studies that used the Safety Climate Survey, 1 study that used the Survey on Safety in Nursing Homes and 1 study that used the RN4CAST. One study used qualitative interviews.

The result of this thesis was the determination that patient safety culture assessments should be interpreted in relation to the specific context in which the assessment is conducted. Results are therefore not generalizable and discernible trends among the studies could not be identified. Two important themes were identified in the narrative review. The first theme was the importance of the cultural background of the participants, including ethnicity or nationality, organizational culture of the worksite, and cultural milieu of the geographic location. The second theme was that the assessment of patient safety culture should be repeated at intervals and examined in the context of the workplace at the time of each assessment. There is benefit to combining qualitative and quantitative methods to assess patient safety culture.

Acknowledgements

I am grateful to all of you who supported me through this thesis, and particularly Dr. Sawatzky, Dr. Reimer-Kirkham, and Ms. Gustavson. To my entire cohort, in particular my confidante Danielle Chatterton, thank you for your knowledge and experience that enriched our program of study together. To Sam and Jo, words cannot do justice to the gratitude I have for your efforts to cultivate and support my lifelong learning.

Table of Contents

List of Tables

List of Figures

Chapter One: Introduction and Background

Introduction

Safety culture is a concept that permeates many complex, highly technical work environments including healthcare. Supervisory leadership for safety is an important dimension of patient safety culture for, as recognized long ago, ''(t)he supervisor or foreman is the key man in industrial accident prevention. His application of the art of supervision to the control of worker performance is the factor of greatest influence in successful accident prevention" (Heinrich as cited in Flin & Yule, 2004, p. ii47). Of interest in the present thesis is the dimension of nurses' perceptions of supervisory leadership for safety in the context of patient safety culture. The question underlying this thesis is whether trends can be found in studies that involve the use of questionnaires for assessing nurses' perceptions of supervisory leadership for safety in the context of in patient safety culture.

Underlying this topic is the genesis of safety culture as a modern industrial concept. This industrial perspective stems from the Chernobyl nuclear disaster (Cooper, 2000, p.113). Evaluating the Chernobyl incident, the Nuclear Energy Agency concluded that its occurrence was attributable to "a lack of 'safety culture'" and referred to the indicators thereof as including flaws in design, communication, and ultimately failure to "comply with established operational procedures" (2002). Thereafter, safety culture was recognized and adopted into high risk industries such as aviation, rail transportation, and off-shore petroleum production (Zhang, Weidmann, von Thaden, Sharma & Mitchell, 2002). It now finds its place in healthcare, where addressing and reducing the risk of harm and ensuring patient safety have become a "global imperative" (Donaldson & Philip, 2004). The Institute of Medicine noted in 1999, "(h)ealth care has much to learn from other industries about improving safety" (Kohn, Corrigan, & Donaldson,

2000, p.71). The National Steering Committee on Patient Safety in Canada stated that "(t)o improve safety, the healthcare system must develop and maintain a culture of safety" (2002, p.10). As to fostering and maintaining a positive patient safety culture, it has been held that:

> A culture of patient safety is created and maintained by two interdependent factors. The first is an institutional or organizational framework that enables and sustains a culture of patient safety. The second is the appropriate expertise, attitudes, behaviours and values of those who work within that system. Both of these conditions are necessary to the safe functioning of any health care institution. (Frank & Brien, 2009, p.5)

Concurrent with the growing awareness of patient safety culture has been the increased recognition of the need to assess it (Nieva & Sorra, 2003, p.ii17). Assessment of patient safety culture is undertaken with a view to addressing "weak safety culture as a causal factor" in avoidable adverse events and deaths (Flin, 2007, p.655). Patient safety culture "has become an important metric, because unlike many other safety measures, it is pertinent to all health care facilities providing hands-on patient care" (Castle, Wagner, Perera, Ferguson & Handler, 2011, p.23).

Patient safety culture is often evaluated through survey questionnaires that are completed by those who work within healthcare systems. The purposes for assessing patient safety culture may vary. As Nieva and Sorra state, such evaluations are important to "diagnose safety culture to identify areas for improvement and raise awareness about patient safety" (2003, p.ii19) and the outcomes serve as "patient safety improvement tools" (p.ii20). Prominent examples of survey questionnaires in current use are the Manchester Patient Safety Framework (The University of Manchester, 2006), the Hospital Survey on Patient Safety Culture (Agency for Health Care Research and Quality, 2016a), the Safety Attitudes Questionnaire (SAQ) (Center for Healthcare

Quality & Safety, 2016), and the Patient Safety Culture Survey Tool (PSCS) (Ginsburg, Tregunno, Norton, Mitchell & Howley, 2014).

Patient safety culture survey questionnaires address many dimensions of patient safety culture. One of them is the perception of supervisory leadership for safety. Perception of safety is important as "(i)ncreasing empirical evidence supports the relationship between staff perceptions of safety culture and safety behaviours and outcomes in healthcare and in other industries" (Ginsburg et al., 2014, p.162). In this context, "(s)upervisor commitment to safety" found a place in patient safety culture assessment (Flin, 2007, p.662). Why is this dimension of patient safety important to measure? Supervisory leadership is seen "as one way to improve employees' safety behaviors and thereby reduce accident and injury rates" (Conchie, Moon, & Duncan, 2013, p.109). The leadership aspect of "supervisory leadership" comes from the survey questionnaires that measure participants' perception through questions concerning their supervisors' "values, attitudes, perceptions, competencies, and patterns of behaviour" (Agency for Health Care Research and Quality, 2016b, p.1). According to Flin, the measure of supervisory leadership in the context of patient safety fundamentally represents "the perceptions of ... supervisor prioritisation of safety" (2007, p.662). This is the dimension of patient safety culture assessment that is of interest in this thesis.

Definitions

Patient safety

The Canadian Patient Safety Dictionary defines patient safety as "the reduction and mitigation of unsafe acts within the healthcare system, as well as through the use of best practices shown to lead to optimal patient outcomes" (2003, p.11). Simply stated an unsafe act is

an "event/act/process that fail(s) to achieve the expected aim" (p.11) and in doing so intentionally or unintentionally compromises patient safety.

Safety culture, safety climate, and patient safety culture

According to Cooper, "(c)ulture is something that is mutual and reciprocal" (2000, p.223). Safety culture may be concisely defined as "those aspects of the organisational culture which will impact on attitudes and behaviour related to increasing or decreasing risk" (Guldenmund, 2000, p.251). In a healthcare context, some elaboration has been added. The Agency for Health Care Research and Quality (AHRQ) cites the following definition, which was originally framed by the Advisory Committee on the Safety of Nuclear Installations (ACSNI):

> The safety culture of an organization is the product of individual and group values, attitudes, perceptions, competencies, and patterns of behavior that determine the commitment to, and the style and proficiency of, an organization's health and safety management. Organizations with a positive safety culture are characterized by communications founded on mutual trust, by shared perceptions of the importance of safety, and by confidence in the efficacy of preventive measures. (as cited by AHRQ, 2016b, p.1)

According to Flin, the definition from ACSNI is "(t)he most widely accepted definition of safety culture" (2007, p.656). The phrase "safety climate" is a regularly seen or used in the context of safety culture. It is often used as the equivalent of "safety culture" (Halligan & Zecevic, 2011, p.3). In one study, the authors stated that patient safety culture is the same as patient safety climate (Nie, Mao, Cui, He, Li, & Zhang, 2013). More precisely, however, it is generally accepted that safety climate "is the visible feature of a safety culture" (Ausserhofer, Schubert, Desmedt, Blegen, De Geest, & Schwendimann, 2012, p.242), or "the surface features of the

safety culture discerned from the workforce's attitudes and perceptions at a given point in time" and "a snapshot of the state of safety providing an indicator of the underlying safety culture of a work group, plant or organisation" (Flin, Mearns, O'Connor, & Bryden, 2000, p.178). This distinction between safety climate and safety culture is important. Although "safety culture surveys" are regularly administered to participants in a healthcare setting, applying these definitions shows that surveying participants about their perceptions of patient safety culture is in fact a survey of safety climate and as such it contributes to an understanding of institutional safety culture (Flin, 2007, p.658). Safety climate is inextricably woven into safety culture. It is important to this thesis as it is the outward measure of perception of safety culture.

The Canadian Patient Safety Institute (CPSI) integrates patient safety into the ACSNI definition of safety culture and describes patient safety culture as one that:

> ... arises from attitudes, activities and enduring ethical values that are conducive to the safe delivery of patient care. More precisely, it refers to the commitment of health care practitioners and their institutions and organizations to minimize patient harm, promote the well-being of patients and health care providers, reduce the likelihood of adverse events, and communicate safety concerns – while at the same time learning from close calls and other events. (CPSI, 2004, p.9)

In comparing the two definitions, it can be seen that the definition of the CPSI is compatible with the earlier expression of safety culture given by ACSNI. If the CPSI definition differs, it is to the extent that it particularizes the healthcare context. It nonetheless captures the significance of shared values and attitudes, continuous improvement through learning, and the importance of communication as a vehicle to achieve a positive safety culture.

Supervisory leadership

Flin and Yule define "supervisors" in the following passage:

> These are the first line managers, called supervisors, foremen, or team leaders in industry. In health care, these would equate to leaders (at an operational level) of established groups, such as ward sisters or leaders of more temporary groups such as an operating theatre team. (2004, p.ii47)

To this definition, they add the dimension of leadership:

> Supervisors have primary responsibilities for achieving the task and maintaining the wellbeing of the team. As they structure, coordinate, and facilitate work activities, both transactional and transformational leadership behaviours are very relevant at this level of management. (Flin & Yule, 2004, p.ii47)

While it is relevant but not central to this thesis, it is useful to note that transactional leadership is seen as "monitoring and reinforcing workers' safe behaviours" whereas transformational leadership is "(b)eing supportive" and "(e)ncouraging employee engagement in safety initiatives (Flin & Yule, 2004, p.ii46). Accordingly, from the standpoint of this thesis, perception of supervisory leadership for safety encompasses that dimension of patient safety culture evaluation that measures an individual's view of their direct supervisor's leadership in the area of patient safety, without distinction in the type of leadership demonstrated.

Problem and Study Purpose

Patient safety culture assessment results commonly are recorded as outcomes across a participant population that is generally defined organizationally by, for example, a unit, or institution. Missing from the literature is a broader analysis that compares results across and between instruments that are used to assess patient safety culture. As indicated above, the

perception of supervisory leadership for safety is an important dimension of patient safety culture survey questionnaires. No studies appear to have been conducted to compare results across different survey questionnaires to determine whether there are identifiable trends or characteristics in the data. If they can be found, it is possible that the results in the literature could serve use as a predictive tool for future surveys.

The purpose of this thesis was to examine reports of nurses' perceptions of supervisory leadership in relation to patient safety culture within and across different contexts of care. This purpose was accomplished by means of a narrative synthesis that isolated data from the literature on nurses as a participant group to which the patient safety culture instruments are administered and then examined the results for nurses' perceptions of supervisory leadership for safety. The data were analyzed to identify whether there were trends in the data within or among the instruments used, based on geographic location, type of institution, and nursing practice setting. The result of this thesis may serve to strengthen the evaluation of the supervisory leadership aspect of patient safety culture assessment and potentially may inform modification or improvement to this dimension of patient safety culture and its assessment for the future.

Why is this a significant topic for exploration? Nurses' perceptions of supervisory leadership for safety as it is expressed in patient safety culture survey questionnaires has been chosen based on several factors. Firstly, nurses represent the largest single group within the larger community of healthcare professionals (Institute of Medicine, 2009, p.123). They are present across the spectrum of healthcare contexts and practice areas. Secondly, leadership in safety culture is important "from the boardroom to the frontline" (Sammer, Lykens, Singh, Mains, & Lackan, 2010, p.157). The perception of "(s)upervisor commitment to safety" or "supervisor prioritisation of safety" is a critical component (Flin, 2007, p.662). It is known that

"first-line supervisors will provide the staff's primary point of contact with the management structure, and therefore, supervisors' behaviour and expression of views will influence the development of staff's opinions about management and their policies" (Clarke, 1999, p.187). It has been proposed that "(i)ndividual safe behaviour is ... mainly related to organizational involvement in safety, according to employees' perceptions" (Oliver, Cheyne, Tomás, & Cox, 2002, p.485). More pointedly, it has been stated that "(i)n the trenches of health care provision, the issues that work group leaders pay attention to play a critical role in the priorities taken by providers in their work" (Aarons, Farahnak, Ehrhart, & Sklar, 2014, p.8). This underscores the importance of perception as it relates to patient safety. Given the link between perception of supervisory leadership for safety and patient safety in practice, the significance of this indicator cannot be underestimated.

Project Description, Purpose, and Objectives

This thesis involved a review of previous studies concerning nurses' perception of supervisory leadership based on their responses to patient safety culture survey questionnaires. The purpose was to determine whether there were discernible similarities, differences or trends across the different studies and whether they can be related to any specific factor, including which survey questionnaire was used, differences in geographic location, and differences across institutions or nursing practice settings. It is an important question, the answer to which may assist in interpreting and evaluating the results of patient safety culture survey questionnaires and potentially may support the development of strategies to support and improve the perception of supervisory leadership for safety. Based on research conducted to prepare the thesis proposal, a systematic review of this question had not been previously been undertaken. However, there was a sufficient number of patient safety culture studies available that addressed the dimension of

nurses' perception of supervisory leadership for safety to allow for meaningful analysis to be conducted.

This thesis explored the results of patient safety culture survey questionnaires that recorded nurses' perceptions of supervisory leadership within and across healthcare practice settings. It was based primarily on quantitative studies. Qualitative research that met the inclusion criteria was also retrieved. Irrespective of the design, the studies were evaluated for their relevance to this thesis and the question of nurses' perception of supervisory leadership for safety. Some studies currently exist that examine and compare the results of patient safety culture survey questionnaires. For example, Ginsberg, Tregunno, Fleming, Flemons, Gilin and Norton (2008) compared perceptions of patient safety culture in six Canadian organizations. The present thesis, however, sought to isolate data that addressed solely the safety culture dimension of nurses' perceptions of supervisory leadership for safety, and compare results for this dimension across many studies that used different assessment tools in different of practice settings. From this, it would be established whether conclusions concerning this dimension were possible or further investigation was warranted. This analysis would also inform potential avenues to support or improve nurses' perceptions of supervisory leadership for safety. This would add to the growing body of knowledge related to the assessment of patient safety culture and the dimension of perception of supervisory leadership for safety.

The perception of supervisory leadership for patient safety is an important dimension of safety culture in healthcare as "lack of leadership has been attributed as a barrier to safety culture" (Sammer et al., 2010, p.158). The thesis drew data from literature reporting nurses' responses to questionnaires for measuring their perceptions of supervisory leadership for safety in the context of patient safety culture. These questionnaires' results "focus on perceptions of

what occurs in the daily life of the organization from the perspective of direct patient care providers and other staff (in this case nurses) who have an impact on patient safety" (Nieva & Sorra, 2003, p.ii18). While perception might ordinarily be thought to be of a qualitative nature, by using survey questionnaires it is measured by obtaining numerical responses to standardized questions. The results are then tabulated and reported as quantitative scores. Where research was based on qualitative instruments, the perception of participants was recorded as a narrative and emerging themes were identified.

Chapter Summary

This thesis is organized into five chapters. In Chapter 1, I have introduced the topic of safety culture and its adoption into healthcare as patient safety culture. The thesis purpose has been identified and I have stated the project description, purpose and objective, which focus on identifying existing patient safety culture studies in the literature that assess nurses' perception of supervisory leadership for safety and examining the data to determine whether there are discernible trends. Essential terms have been defined such as patient safety, patient safety culture and climate, and supervisory leadership. Chapter 2 discusses the importance of supervisory leadership in patient safety culture. Chapter 3 provides detail of the research design and methodology. Chapter 4 gives the research results. Chapter 5 provides discussion of the results and the conclusion of the thesis.

Chapter Two: Patient Safety Culture and Perception of Supervisory Leadership

This chapter examines safety culture survey questionnaires as a reflection of climate related to patient safety. Through the administration of these survey questionnaires, strengths and deficits may be identified and mitigation strategies subsequently developed. As this thesis examines supervisory leadership for patient safety culture, the discussion below focuses on these factors.

Supervisory Leadership and its Relationship to Patient Safety Culture

The dimension of patient safety culture that is of interest in this thesis is supervisory leadership for safety. It is an important aspect of the assessment of patient safety culture as it reflects the participant's perception of the prioritization of safety in the healthcare workplace. Pertinent to the perception of supervisory leadership, and as stated by Flin (2007):

> We tend to choose behaviours that will maximise reward and reduce the risk of punishment. In the workplace, expectations of how supervisors, managers (and peers) will respond to particular actions (e.g. prioritising safety over production targets) will to a significant extent determine which behaviours are executed. (p.659)

Why Measure Safety Culture?

Safety culture is regularly measured in high risk industries including healthcare. In this thesis, data were retrieved from the existing literature showing nurses' perception of their supervisory leadership for safety. As one study states, "it is important to investigate RN's experiences of their work setting as they are at the 'sharp end' of patient care and are an instrumental part of patient safety work" (Smeds Alenius, Tishelman, Runesdotter, & Lindqvist, 2013, Introduction, para.1). Assessment of safety culture within an institution is commonly accomplished using a questionnaire that asks participants to respond to a series of questions that

in general are answered using a Likert scale (Guldenmund, 2007). The aim of patient safety culture questionnaires is "to provide a metric by which implicit shared understandings about 'the way we do things around here' can be made visible and available as input for change" (Nieva & Sorra, 2003, p.ii21).

How Safety Culture is Measured

Patient safety culture questionnaires are a convenient tool for obtaining information from a group of participants. Patient safety culture questionnaires are organized and designed to assess specific dimensions. Some examples of those dimensions are teamwork, hospital management support, and supervisory leadership for safety. One author suggests that "...healthcare professionals are busy people undertaking critical tasks throughout their working day, which makes it impractical to investigate safety climate using methods that are either complicated, time consuming or expensive" (Smith, Zhao, Wang, & Ho, 2013, p.156). The administration of questionnaires addresses this concern by providing a convenient instrument for participants to complete.

To be precise, while the survey questionnaires conducted are commonly referred to as patient safety culture surveys, it may be more accurate to consider them as safety climate surveys (Ginsberg et al., 2014). As described by Flin, "(t)he assessment of the underlying safety culture is normally conducted by measuring safety climate – namely by surveys of workforce perceptions of the management of safety and the prioritisation of safety against other organizational targets" (2007, p.658). Expressed another way, "(s)afety climate is a perceptual measure that can serve as a window through which culture can be viewed" (Ginsberg et al., 2014, p.162). Therefore, while it may popularly be considered that the survey questionnaires evaluate the existing safety culture of an institution, by addressing participants' perceptions of

the particular dimensions assessed, they address the safety climate, which is nonetheless an important aspect of safety culture. The distinction is important. The results may indicate areas of strength and weakness, or suggest areas of opportunity for reinforcing safety culture, but they do not definitively evaluate the safety culture of an institution. For some authors, this has been considered a limitation. It has been noted that "surveys are limited by their methodology and can only report on attitudes at the time that they are undertaken and perhaps also a little in the past" (Glendon & Stanton, 2000, p.199). It has also been stated that "a safety climate survey only gives an inkling of what a particular safety culture might be about" (Guldenmund, 2007, p.724). While this may be the case, when safety culture survey questionnaires are properly situated and understood, there can be an appreciation that resulting safety climate data supplies important information that contributes to an appraisal of the safety culture of the institution from which participants are drawn.

The Use of Patient Safety Culture Results

The implication of administering a patient safety culture survey is that the results will require further investigation. The results of a safety culture survey questionnaire are a gateway for further inquiry rather than a definitive answer to the state of an institutions safety culture. As aptly stated by Nieva & Sorra, "(r)ather than viewing the assessment results as an end point, the information should be considered the starting point from which action and patient safety changes emerge" (2003, p.ii21). Further, it has been suggested that "(t)he deeper aspects of culture in terms of underlying values, beliefs, and norms within an organization may be inadequately captured with self-report quantitative instruments" (p.ii22). How, then, can safety culture survey questionnaire results be usefully employed as a catalyst for sustainable change and improvement? If the patient safety culture survey questionnaire results are only a starting point,

it may be useful to clarify the results before moving forward. The results express the perception of the participant group quantitatively. Ginsburg et al. suggest that using "quantitative and qualitative approaches to obtain the breadth and depth of understanding afforded by these two methods, respectively" (2014, p.162). Nieva and Sorra state that for the results to become useful in improving institutional patient safety, there must be a means of "developing a shared organizational understanding of the data" and "identifying the range of potential actions" (2003, p.ii21). From a practical aspect, this may involve the delivery of "feedback and action planning sessions" by trained facilitators before determining a precise strategy (p.ii21).

Patient Safety Culture Questionnaires

A number of questionnaires have been used to measure patient safety culture in nursing care settings. Notable examples include the Hospital Survey on Patient Safety Culture (HSOPSC), the Safety Attitudes questionnaire short form (SAQ), the Safety Climate Survey, the Survey on Safety in Nursing Homes, and RN4CAST. They are described below.

Hospital Survey on Patient Safety Culture

The HSOPSC is a standardized instrument, available online, free of charge, self-administered by participants, and supported by user guides to assist researchers in administering the survey and interpreting the results (AHRQ, 2016b). It has been determined to be "psychometrically sound" (Sorra & Dyer, 2010, Conclusions para. 1). The HSOPSC consists of 42 questions to assess 12 dimensions of patient safety culture and it includes four statements to assess the dimension of interest to this thesis. In the HSOPSC, the dimension is entitled "Supervisor/Manager Expectations and Actions Promoting Patient Safety". Participants' responses to the four statements assessing this dimension are given on a five-point Likert scale

that ranges from a score of 1 to indicate "strongly disagree" to 5 for "strongly agree." (AHRQ, 2016a). The statements are given in Table 1.

Table 1

Hospital Survey on Patient Safety Culture

Supervisor/Manager Expectations and Actions Promoting Patient Safety

B1.	My supervisor/manager says a good word when he/she sees a job done according to established patient safety procedures.
B2.	My supervisor/manager seriously considers staff suggestions for improving patient safety.
B3.	Whenever pressure builds up, my supervisor/manager wants us to work faster, even if it means taking shortcuts.
B4.	My supervisor/manager overlooks patient safety problems that happen over and over.

(AHRQ, 2016a)

Statements B3 and B4 are reverse coded when the results are calculated. Scores of 4 or 5 on the Likert scale are considered positive for the purpose of scoring (Sorra, Gray, Streagle, Famolaro, Young, & Behm, 2016, p.30). Often, only the percentage of positive responses (PPR) is reported. PPR indicates the percentage of respondents who answered 4 or 5 to the statement (except in the case of those statements that are reverse coded where the PPR is based on the percentage of respondents who answered 1 or 2).

The HSOPSC provides two additional questions that ask respondents to give an overall patient safety grade and to state the number of adverse events they have reported in the preceding year. In addition, the HSOPSC includes questions that define the characteristics of the

respondent. These are work area or unit, length of employment at this hospital, length of employment in work area or unit, working hours per week, position, and length of time working in the profession or specialty (AHRQ, 2016a). The AHRQ reports that the HSOPSC is in use in 66 countries and has been translated into 31 languages, some of which were seen or referred to in the studies used in this thesis (2016b).

Safety Attitudes Questionnaire

The Safety Attitudes Questionnaire short form (SAQ) is organized to assess teamwork climate, safety climate, job satisfaction, stress recognition, perceptions of management at unit and hospital level, and working conditions (Center for Healthcare Quality & Safety, 2016). The SAQ is a self-administered questionnaire that is available online and free of charge to users. It has been determined to have "generally good psychometric properties" (Sexton et al., 2006, "Limitations," para.1). The SAQ comprises 36 statements to measure six dimensions. Five of those statements address "Perception of Management." They are shown in Table 2.

Table 2

Safety Attitudes Questionnaire Perception of Management

24.	Management supports my daily efforts.
25.	Management doesn't knowingly compromise patient safety.
26.	Management is doing a good job.
27.	Problem personnel are dealt with constructively by our (unit management).
28.	I get adequate, timely info about events that might affect my work, from (unit management).

(Center for Healthcare Quality & Safety, 2016)

Participants provide two responses to each of these statements, one for unit management and one for hospital management. The score for unit management corresponds to the dimension of interest in this thesis. As with the HSOPSC, participants in the SAQ answer on a five-point Likert scale ranging from 1 to indicate "strongly disagree" to 5 for "strongly agree." Scoring instructions for the SAQ indicate the method for the calculation and the conversion to a percentage score for the measured dimensions, based on participants' responses and reverse scoring for negatively worded questions (Centre for Healthcare Quality & Safety, 2016).

Other instruments

The Safety Climate Survey (SCS) includes one statement that falls within the dimension of nurses' perceptions of supervisory leadership for patient safety. The statement is "The physician and nurse leaders in my clinic area listen to me and care about my concerns" (Almutairi, 2013, p.191; Di Benedetto, 2011, p.606). Responses are given on a five point Likert scale where 1 indicates "strongly disagree" and 5 indicates "strongly agree" (Almutairi, 2013, p.191).

The Survey on Resident Safety in Nursing Homes (SRS) comprises 53 statements that are rated by participants on a 5 point Likert scale ranging from 1 for "strongly disagree" to 5 for "strongly agree" (Singer, 2012, p.105). For the purpose of this thesis, three of the statements are considered to bear a relationship to supervisory leadership for safety.

Table 3

Survey on Resident Safety in Nursing Homes Perception of Unit Management

Supervisor listens	Management in my unit (my managers and supervisors) listens to CNAs (clinical nurse assistants).

	Management in my unit (my managers and supervisors) listens to staff ideas and suggestions about resident safety.
Supervisor priorities (Singer, 2012, p.109)	Management in my unit (my managers and supervisors) does not knowingly compromise the safety of patients.

The RN4CAST has been used in conjunction with aspects of the HSOPSC. The RN4CAST was developed to provide an alternate to historic methods of human resources planning. It provides a scientific basis for nursing workforce planning and forecasting and for altering the focus from "simple projections in demand and supply of labour to impact on patient safety and quality" (Sermeus et al., 2011, Discussion, Policy and scientific impact of the project, para. 1).

Chapter Summary

In this chapter, I have reviewed the importance of supervisory leadership in patient safety culture. Supervisory leadership for safety is one dimension of the assessment of safety culture. It is a significant workplace influence on the perception of safety culture. I have also discussed how patient safety culture is measured and the use that is made of the results of patient safety culture questionnaires. A description of the HSOPSC, SAQ, and other data collection instruments used in the included studies has been provided.

Chapter Three: Research Method, Design, and Procedures

The following chapter discusses the thesis methodology. Data collection, literature review and search, inclusion and exclusion criteria are examined below. A detailed explanation is given so that one may clearly understand how the findings were uncovered and this method can be readily replicated. The purpose of the analysis was to "explore the relationships between the individual studies" and assess what they reveal about perceptions of supervisory leadership in relation to patient safety culture within and across different contexts of care the similarities and differences across studies of nurses' perceptions of supervisory leadership for safety (Pope, Mays, & Popay, 2007, p.81). This exploration was used to demonstrate whether there are similarities and differences in the data such that trends may be identified that are relevant to the question asked in this thesis.

Method of Analysis

The thesis used the approach of narrative synthesis for the analysis of data. Narrative synthesis "refers to an approach to the systematic review and synthesis of findings from multiple studies that relies primarily on the use of words and text to summarise and explain the findings of the synthesis" (Popay et al., 2006, p.5). Narrative synthesis was chosen because it is suited to a project using both quantitative and qualitative studies and the individual survey questionnaires used in those studies. Pope, Mays and Popay (2007) noted that the product of the synthesis governs the approach undertaken. For example, the realist synthesis approach may result in "the production of new knowledge and/or theory through a process of integration and/or re-interpretation of the original studies" (p.95). Alternatively, the narrative synthesis approach "stops short of the formal integration or re-interpretation of different evidence sources, aiming rather to juxtapose findings from multiple sources and highlight key messages from a body of

literature" (p.95). The purpose of this thesis more appropriately fits the latter statement and the outcome may inform further avenues of research beyond the scope of this thesis. The narrative synthesis approach is often used as the initial step in undertaking a systematic review. Other methods of analysis, such as statistical analysis, may be employed if, as the narrative synthesis progresses, they become relevant to answering the question posed by this thesis.

Literature Search and Screening

The foundation of this thesis is an analysis of the literature that addresses the patient safety culture dimension of nurses' perceptions of supervisory leadership for safety. Literature searches were conducted using PubMed, CINAHL Complete, and Web of Science databases. The search terms were "nurs*", "patient safety culture", and "survey." The use of a wildcard "*" was selected to generate results that included alternate terms such as "nursing", "nurse", or "nurses."

Identical search terms were used for each of the three databases. Results were limited to the period of 2011 to 2016 as it was considered that this was sufficient to ensure that the literature reflected current and recent results. It was expected that it would also yield a number of results that was manageable and suitable for addressing the question. Initial screening of the search results was conducted on the basis of the title of the article. Where necessary, the abstract was also reviewed. Only full-text articles available in English were considered. Articles were included in subsequent screening if the title and, where necessary, the abstract indicated that the article would contain information addressing the question of nurses' perceptions of supervisory leadership in a patient safety context. Articles were sorted according to the database in which they had been found. Using Microsoft Excel, a spreadsheet entry was made for each study. The spreadsheet was organized alphabetically based on the surname of the lead author. Entries

recorded the database, assessment instrument used, whether the article measured patient safety culture, whether the article contained data from nurses, whether that data included nurses' perceptions of supervisory leadership for safety, the area of practice, and the geographic location where the study was conducted. The results of the database searches and screening are shown in Table 4.

Table 4

Results of literature search and screening

Database	Search Results	Selected for full text screening
PubMed	197	38
CINAHL Complete	54	22
Web of Science	165	52
Total articles included for subsequent full-text screening	416	112*
		* Includes 5 duplicate studies

Inclusion and Exclusion

After initial screening, the remaining articles were reviewed for inclusion and exclusion. Articles were sorted into Microsoft Excel spreadsheets based on the instrument that had been used to assess patient safety culture. Three separate spreadsheets were created, one each for HSOPSC, SAQ, and other instruments. Articles were included if they reported frontline nurses' perceptions of supervisory leadership for safety in the context of patient safety culture. Conversely, if an article addressed an issue other than patient safety culture such as safety in

general, preventive safety interventions, or occupational health and did not report on perceptions of supervisory leadership, it was excluded. In cases where an article reported on patient safety culture and did not report results specific to nurses' perceptions of supervisory leadership or reported only an aggregate score for all professions, it was excluded. Studies aimed at validating a patient safety survey questionnaire were included if they met the inclusion criteria provided the study supported a conclusion that the survey questionnaire was a valid and reliable instrument. To limit leadership to supervisory leadership for safety, articles were only included where they reported on unit level hierarchical leadership. Therefore, where an article assessed leadership among peers or at a level higher than the unit such as hospital management, it was excluded. Where duplicate articles were found after the inclusion and exclusion criteria were applied, the article was considered only once in the analysis. The searches were repeated October 30, 2016 to ensure that they were up to date. Alerts in PubMed and Web of Science did not generate additional studies subsequent to October 30, 2016 that met inclusion criteria. From the total of 40 articles identified for inclusion, five duplicate copies of studies were removed. This reduced the number of articles included in this thesis to 35. An overview of the search, screening and inclusion/exclusion process is shown in Figure 1 below.

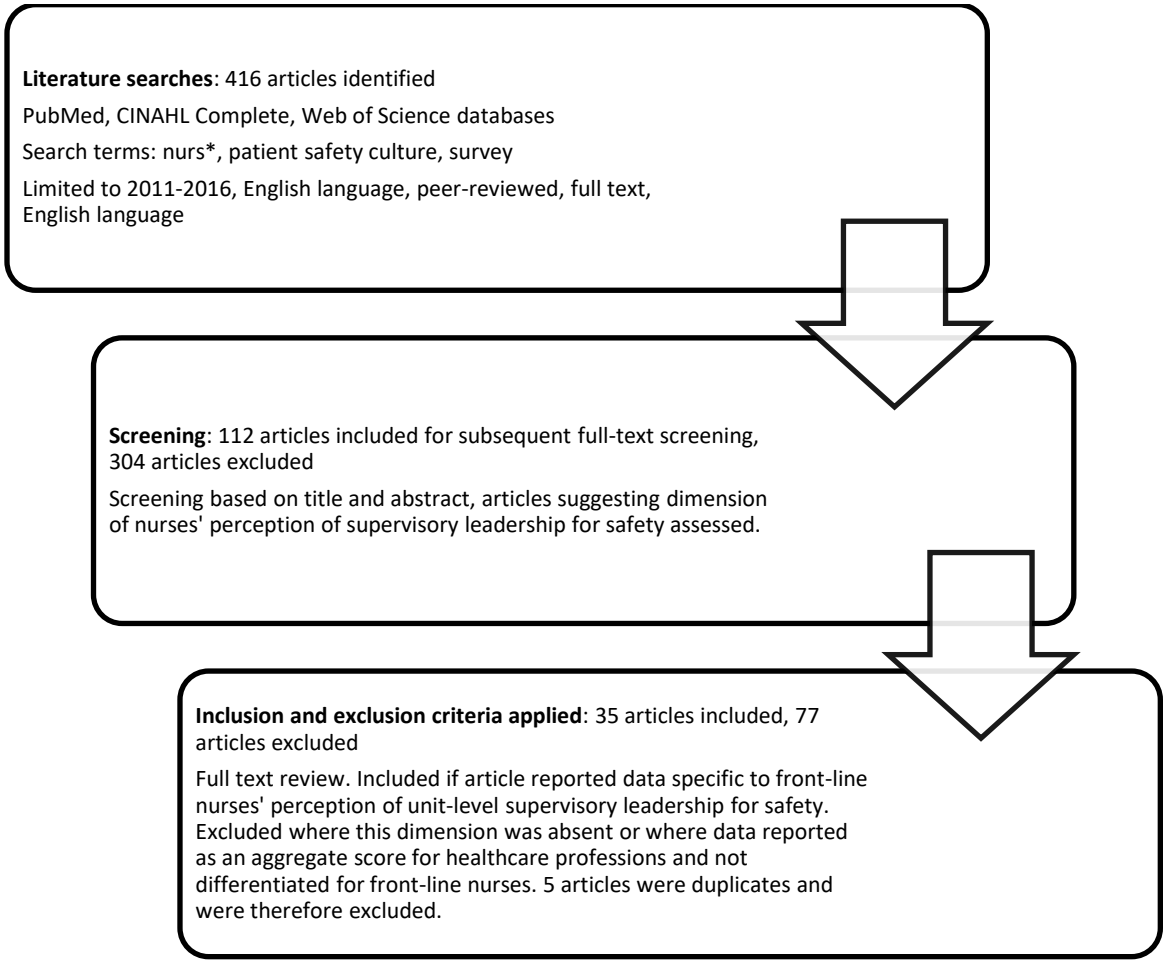

Figure 1: Diagram illustrating search, screening and inclusion/exclusion process

Data Extraction

The purpose of this thesis was to examine reports of nurses' perceptions of supervisory leadership in relation to patient safety culture within and across different contexts of care, to determine whether there were discernible similarities, differences or trends across different studies. It would also examine whether the results could be related to any specific factor, including which survey questionnaire was used, differences in geographic location, and differences across institutions or nursing practice settings. To accomplish this, data extracted from each selected study were categorized and recorded in Microsoft Excel. Articles that were included for full-text screening were sorted according to the database in which they had been

found. The full text of each screened-in study was read and an entry was made in the spreadsheet for each study. The spreadsheet was organized alphabetically based on the surname of the lead author. Entries recorded the database, instrument used, whether the article measured patient safety culture, whether it contained data from nurses, whether that data included perceptions of supervisory leadership for safety, the area of practice, and the geographic location where the study was conducted. Only those articles that contained data recording nurses' perceptions of supervisory leadership for safety in the context of patient safety culture were included.

Studies that met inclusion criteria were then sorted in Microsoft Excel spreadsheets according to the patient safety culture assessment tool that was used in the study. Data were extracted to show the size of the participant group, the result for the perceptions of supervisory leadership for safety, the result for individual questions or statements to which participants responded if it was given in the study, and other pertinent information recorded by the authors such as contextual influences on the study outcomes or limitations on the conclusions. This allowed the characteristics of the included studies to be examined, and "patterns across the studies" to be described.

Quality Assessment

Every included study was evaluated for quality using the QualSyst assessment tool developed by Kmet, Lee, and Cook (2004). Quality is defined by Kmet et al. "in terms of the internal validity of the studies, or the extent to which the design, conduct and analyses minimized errors and biases" (p.2). The QualSyst tool, consisting of two questionnaires to be used based on either a qualitative or quantitative study, was employed to assess quality for every study used in this thesis. QualSyst was chosen as it was developed by the authors to provide "standard criteria for simultaneously assessing the quality of diverse study designs" (p.2).

Extrapolating from "existing published tools, relying particularly upon the instruments developed by Cho et al. (1994) and Timmer et al. (2003) for quantitative studies, and the guidelines suggested by Mays and Pope (2000) and Popay et al. (1998) for qualitative studies," Kmet et al. developed a "pragmatic systematic review tool" in the form of the QualSyst questionnaires for qualitative and quantitative studies (p.3). Accordingly, QualSyst was selected for its versatility in application to the studies relied on in this thesis. The manuals and checklists created by Kmet et al. are provided in Appendices D through G.

After evaluating the studies for quality, the QualSyst score was converted to a percentage. Quality alone was not used to exclude studies from this thesis as "all studies have weaknesses – the question is whether they matter and how much in the circumstances of the review" (Pope, Mays, & Popay, 2007, p.32). Accordingly, a study that might have been considered to be of low quality could be included and noted as such if it contained information that was relevant to this systematic review although the results may not have been considered to have as much weight as studies of higher quality (Mays, Pope, & Popay, 2005).

Ethical Considerations

This thesis was a systematic review of existing print and electronic publications that are legally and publicly available. There were no living human subjects or human biological materials involved. In the studies that were used, participants are not identified individually. They are anonymous. Their responses were amalgamated and the data was reported as such. The reports were directed at healthcare work settings and not at any specific cultural group although in some reported results, researchers questioned the influence of culture on participant responses and survey questionnaire outcomes. No grants or sponsorships were received to perform this research study. As such, this thesis falls within the exemptions from ethical review (Canadian

Institutes of Health Research, Natural Sciences and Engineering Research Council of Canada, and Social Sciences and Humanities Research Council of Canada, 2014, p.15). Therefore, Research Ethics Board approval is not required.

Chapter Summary

In this chapter I have discussed the methodology used in this thesis. I have described the choice of narrative review and outlined the method of data collection using a literature search. I have included a description of the inclusion and exclusion criteria and the results. A listing of the included articles and their relevant features has been provided in Appendices A, B, and C. The use of the QualSyst instrument for quality assessment of the included studies has been described. I have provided details of the choice of narrative review to analyze the data extracted from the studies. Ethical considerations were discussed and it was stated that this thesis falls within the exemptions from ethical review.

Chapter Four: Findings

Introduction

The purpose of this thesis was to examine reports of nurses' perceptions of supervisory leadership in relation to patient safety culture within and across different contexts of care, to determine whether there were discernible similarities, differences or trends across different studies and whether they can be related to any specific factor, including which survey questionnaire was used, differences in geographic location, and differences across institutions or nursing practice settings. The thesis is based on the results of a systematic literature search, which are set out in this chapter. The results are organized to first provide a general description of the studies that were included, including the type and quality of study, the survey questionnaire used and the geographic location of the study. Next, the results pertaining to each survey questionnaire are organized by geographic region and the results are discussed. This is followed by a summary of the results pertaining to nurses' perceptions of supervisory leadership as reported in the studies, and a conclusion.

Description of the Included Studies

Thirty-five studies were included in this thesis. The studies that met the inclusion criteria are summarized in Appendices A, B, and C, which show the HSOPSC studies, SAQ studies, and studies that used other instruments. Twenty-four studies used the HSOPSC questionnaire, six studies used the SAQ, and five used other instruments. Of these latter five, two used the SCS, one used the SRS, one used the HSOPSC in combination with the RN4CAST, and one study was qualitative. The tables shown in Appendices A to C were useful for exploring "relationships in the data," and assessing whether conclusions could be drawn from the data relative to nurses' perceptions of supervisory leadership for safety (Popay et al., 2006, p.12).

The included studies were evaluated for quality using the QualSyst instruments for evaluating quality. A summary of the QualSyst scores for quality of the included articles is found at Appendix H. As a rule, the included studies indicated a high degree of quality. The quality scores are summarized in Appendix H. From the 35 studies that were included, 30 received a quality score of 100% based on the QualSyst instrument for evaluating quality, two studies received a score of 95%, one study received a score of 91%, one received a score of 85% and one received a score of 80%. The lowest score of 80% was given to the study of Nie et al. (2013) based on the manner in which the results were presented. Although a range of quality scores was awarded to the studies, all of the studies were included irrespective of the QualSyst score.

Geographically, the study populations were widely dispersed, with some concentration of studies in the Middle East and in Europe. The Middle Eastern countries of Egypt, Iran, Jordan, Saudi Arabia, and Turkey accounted for 13 of the included studies. The European countries of Albania, Croatia, Cyprus, Finland, Italy, Norway, and Sweden accounted for a further 13 studies. Four studies emanated from Asia, specifically China and South Korea. Three studies were conducted in the United States and one study was conducted in Brazil. One multinational study with participants in Turkey, Japan, and the United States, was also included.

Hospitals were the practice setting for twenty-four of the included studies. As described, multiple units within hospitals were surveyed. Only Ahmed et al. (2011) reported results for nurses working in different practice areas within the hospital. ICUs were the subject of five studies. Dialysis and nephrology were surveyed in three studies. Nursing homes, emergency and the operating room were each the subject of one study.

Participants provided information concerning their characteristics in all of the studies that were reviewed and it was reported. However, it was not often used in the analysis of data.

Practice areas were described with inconsistent levels of detail. Only Khater et al. (2015) reported a multivariate regression analysis to determine the influence of years of experience, practice area, age, weekly hours worked, and worksite on participants' responses.

Data Collection Instruments

Two self-administered patient safety culture survey questionnaires predominate in the studies included in this thesis. The HSOPSC appeared twenty-four times in the included studies and the SAQ was used in six studies. Their wide use may be explained by their availability online free of charge. Two studies used the SCS, one study used the RN4CAST, one study used the SRS created by the authors to survey patient safety culture in nursing homes, and one study used semi-structured interviews. All of these studies address nurses' perceptions of leadership for safety in the context of patient safety culture. The included studies were placed in three groups based on the primary survey questionnaire used, whether HSOPSC, SAQ, or another instrument. They are shown in Appendices A, B, and C.

Study Data: Hospital Survey on Patient Safety Culture

Twenty-four studies using the HSOPSC were included in this thesis. The studies are organized below according to the geographic region in which the study was conducted. The regions are the Middle East, the Far East, Europe and the United States.

Middle Eastern studies

The HSOPSC studies in this thesis included 10 articles from Middle Eastern countries. Aboul-Fotouh et al. (2012) conducted a study of patient safety culture by using the HSOPSC in medical, surgical, ICU, and paramedical departments in a university hospital in Egypt. The participant group included nurses and other healthcare professionals. The study shows that demographic and workplace information was collected from all participants. A result of 42.4%

positive responses (PPR), indicating the percentage of respondents who answered with a positive score of 4 or 5 on the Likert scale, or 1 or 2 on those questions that are reverse coded, was given for nurses' perceptions of supervisor/manager expectations and actions promoting safety**.** However, this result is not broken down by profession for individual practice areas. One of the major findings of this study was that the hospital had a strong "learning culture" (p.375) and the authors related this to disclosure of errors in the healthcare setting and corresponding opportunity for knowledge creation. The authors expressed the limitation that this was a study limited to one hospital with unique properties of a university setting.

Ahmed et al. (2011) studied patient safety culture at medical and pediatric university hospitals in Egypt with the objective of developing an improvement plan. Two specific research questions were "Are there any differences between nurses working in critical care units and nurses working in general wards regarding their perceptions of patient safety culture?" and "Are there any differences between staff nurses and head nurses regarding their perceptions of patient safety culture?" (p.55). PPR for supervisor/manager expectations and actions promoting safety was 28.9% for critical care nurses and 24.3% for general ward nurses. The authors suggest that greater supervision is required in critical care, which this may account for the difference in perception between the two staff nurse groups. PPR scores based on the responses by head nurses were generally higher relative to those based on responses by staff nurses for patient safety culture dimensions. In the case of supervisor/manager expectations and actions promoting safety, head nurses had a PPR of 32.1%. The authors recommended supporting head nurses to "establish non-punitive environment as well as a Teamwork spirit" (p.62).

Al-Awa et al. (2012) conducted a study to evaluate patient safety culture after a university hospital in Saudi Arabia participated in a Canadian accreditation process. Survey

information was collected from 605 nurses and data were reported for each of the HSOPSC questions addressing the dimension of supervisor/manager expectations and actions promoting patient safety. The PPR for this dimension was 51%, and for the individual questions 58% for B1, 61% for B2, B3 52% for B3, and 33% for B4 (see questions in Table 1, Chapter 2). These scores indicate the number of nurses who gave a positive score of 4 or 5 (1 or 2 for the reverse coded questions) for the questions addressing supervisor/manager expectations and actions promoting patient safety. The authors state that hospital accreditation had a "positive impact" on perception of patient safety culture (p.150). The influence of the presence of eight different cultural backgrounds in the workplace is noted as an influence. The authors suggest that although there are few Saudi Arabian nurses in the study group, "they might have a considerable effect on the outcome of the study as they are deeply rooted in the local society and, consequently, might have exerted dominant cultural effects" (p.148).

Al-Mandhari et al. (2014) conducted a study of healthcare workers at five government hospitals in Oman using the HSOPSC. The HSOPSC was selected for the study based on "culture free credentials" shown in prior use in Arabic speaking settings (p.269). The study population included 237 nurses. Study results were compared to the United States, Lebanon, and Taiwan because they were "socio-culturally different" from Oman (p.265). Although this study does not provide a dimension score for nurses, the authors state that there were no significant differences among professions (p.266). Based on this statement and as nurses were 237 of the total of 390 participants, the study was included. The study result of 60% PPR for supervisor/manager expectations and actions promoting patient safety was accepted for inclusion. The authors note that paternalistic Omani management style and differences in cultural backgrounds may influence participants' perceptions of patient safety culture (p.268).

Ammouri et al. (2014) used the HSOPSC to investigate patient safety culture in four government hospitals in Oman. The study population was 414 nurses and the PPR result for supervisor/manager expectations and actions promoting patient safety was 60%. The authors noted that a higher score in this dimension was related to nurses assigning a higher overall score to their perception of patient safety (p.4).

Bahrami et al. (2014) conducted a study of 340 nurses using the HSOPSC to assess patient safety culture at two educational hospitals in Iran. The nurses were employed in various units and the results are recorded as mean scores and are given according to unit. These scores are shown in Table 5. The authors note that based on this study, the perception of patient safety culture in Iran is low. They recognize that this is a baseline study limited to one point in time. As a result, the effect of any efforts to improve patient safety culture is not assessed. The authors encourage longitudinal studies to evaluate changes in patient safety culture.

Table 5

Mean Scores for Supervisor/Manager Expectations and Actions Promoting Safety

Hospital unit	Mean score* and standard deviation (SD)
Internal	2.77 (SD = 0.78)
Surgery	2.38 (SD = 0.72)
Obstetrics and gynecology	3.09 (SD = 0.65)
Pediatrics	2.3 (SD = 0.63)
Mental health	2.0 (SD = 0.72)
Intensive care	2.5 (SD = 0.50)
Emergency	2.81 (SD = 0.56)
Laboratory	3.0 (SD = 0.25)

Radiology	3.75 (SD = 0.00)
Other	2.3 (SD = 0.68)

(Bahrami et al, 2014, p. 6)

Note: * The mean score is based on the 5 point Likert scale and a score of 4 or 5 is considered positive.

The authors also reported the PPR for four hospital sites used in their study. In this study, the scores achieved for this dimension ranged from 36.12% to 42.17% for three hospitals in 2012, and 70% for a hospital in 2008 (Bahrami et al., 2014, p.4). According to the AHRQ, the benchmark score indicating a positive safety culture for this dimension is 75%, which would indicate that 75% of participants responded with a 4 or 5 on the Likert scale (1 or 2 for reverse coded items) (p.4).

Gunes et al. (2016) conducted a study of 554 nurses working in three public hospitals and one university hospital in Turkey. The units were indicated as medical, surgical, ICU, and emergency. The PPR for supervisor/manager expectations and actions promoting safety was reported in the ICU as 59.8%, in 'general' as 45.2%, and in surgical as 40.9%. No score was reported for emergency and general was assumed to be the authors' use of an alternate term for medical. The authors acknowledge two limitations. The first is that the study population was limited to nurses and is not generalizable to other healthcare professions and the second is that recently graduated nurses with fewer than six months experience were excluded based on their limited experience. In general, this study shows that there is a low positive perception of this dimension and patient safety culture in general.

Khater et al. (2015) conducted a study in Jordan of 658 nurses employed in 21 government, private, and university hospitals to assess nurses' perceptions of patient safety

culture and factors influencing it. The score for supervisor/manager expectations and actions promoting patient safety was 57.95%. For the individual questions on the HSOPSC that address this dimension, the scores were 52.10% for B1, 54.60% for B2, 51.40% for B3, and 73.70% for B4. It was not stated whether questions B3 and B4 were reverse scored as required and this affects the reliability of the results for this dimension. Of note, the authors performed a multivariate regression analysis to examine the influence of participant characteristics on the dependent variable of nurses' perceptions of patient safety culture. The characteristics included years of experience, practice area, age, weekly hours worked, and whether the participant worked in a government hospital or university hospital. All of these factors were stated to influence participants' responses although the authors did not state any finding specific to the dimension of interest, namely supervisory leadership (p.86). The authors express the opinion that nurses must exert leadership at the bedside, unit, and hospital management levels and that a blame free environment is conducive to a positive patient safety culture.

Saleh et al. (2015) conducted a study in Jordan involving 242 nurses in 5 hospitals and using the HSOPSC. For supervisor/manager expectations and actions promoting patient safety a PPR of 43.3% was reported. Results were also given for the HSOPSC questions: 44.20% for B1, 41.3% for B2, 45% for B3, and 42.60% for B4. The result for this dimension was shown to be related to overall patient safety perception. The authors note that a blame free, non-punitive work environment removes barriers to error prevention and improves patient safety.

Ugurluoglu et al. (2012) conducted a study of healthcare professionals at a hospital in Turkey using the HSOPSC. Nurses constituted 39 of the total of 108 participants. Nurses' perceptions of supervisor/manager expectations and actions promoting patient safety was 60.9% PPR. Individual HSOPSC question data was not given and although participant characteristics

were gathered, they were not related to responses other than noting, with respect to the dimension of interest, that nurses responded more positively than doctors did (p.466). The authors state that this study is limited in its application as it surveyed only one hospital.

Yilmaz and Goris (2015) conducted a study of 316 nurses in Turkey using the HSOPSC. They compared the responses of two groups of nurses working at intensive care units at two hospitals, nurses who had received in-service patient safety training in hand-offs and transitions as well as frequency of events reported, and those who had not received this training (p.599). A Mann-Whitney test was used to analyze the data between the trained and untrained groups and revealed that trained nurses performed higher than untrained nurses on those dimensions for which training had been given (pp. 59-600). The authors argue for increased patient safety training and more frequent assessments of patient safety culture. This study provides an assessment of the impact of an intervention on perceptions of patient safety culture.

Far Eastern studies

Feng et al. (2011) conducted a study at a university hospital in China using the HSOPSC. The participants were 228 staff nurses and 20 nurse managers. They also used a survey questionnaire to assess perceptions of managers' commitment to safety and they collected demographic information from participants. The Managers' Commitment to Safety scale is a 10 point scale and the mean score and standard deviation (SD) given by staff nurses was 8.32 (SD = 1.26). The mean of the nurse managers' scores was 8.85 (SD = 0.69). Concerning the HSOPSC dimension of supervisor/manager expectations and actions promoting patient safety, a score was not given, but the authors stated that "safety commitment from management was closely related to the culture of patient safety and was a significant predictor of patient safety culture" (p.254).

Nie et al. (2013) conducted a study of 32 hospitals in 15 cities in China to assess the perception of patient safety culture and describe factors that influence it in Chinese healthcare. Nurses comprised 722 of 1160 participants. The study used 10 of the 12 HSOPSC dimensions. Results are reported as number of positive responses. For the dimension of supervisor/manager expectations and actions promoting patient safety, nurses' positive responses are reported by the authors in whole numbers and percentage conversions are provided here in parentheses: 540 (74.8%) for B1, 458 (63.4%) for B3, 559 (77.4%) for B4. Question B1 was incorrectly numbered in the study as B2. The study shows no data for HSOPSC question B2. No overall score for nurses for the dimension of supervisor/manager expectations and actions promoting patient safety is given. The study shows generally a positive attitude toward patient safety culture.

Wang et al. (2014) conducted a study in seven Chinese hospitals using the HSOPSC. The study focused on nurses' perceptions of patient safety culture and adverse events. From each hospital, they selected a medical unit, surgical unit, ICU unit, and emergency department. The PPR for the dimension of interest was 73.8%. The mean score was 3.81 (SD = 0.52). The authors expressed several limitations. They noted the sample bias and suggested that this study could not be generalized to the entire nurse population of the area. They also suggested "a possibility that unmeasured variables could confound" the survey questionnaire results (p.1121).

European studies

Brborovic et al. (2014) used the HSOPSC in a general hospital in Croatia. The participant group was 148 nurses and the study explored the relationship between nurse "presenteeism" and patient safety. Presenteeism reflected the influence of overtime, night shift hours and working while sick. The practice areas were surgery, pediatrics, obstetrics, psychiatry, anaesthesiology and ICU. The score for the dimension of supervisor/manager expectations and actions promoting

patient safety was shown on a bar graph. Although no numerical score was given, it appeared to be 55% PPR. The authors acknowledged that the HSOPSC may not be an effective tool to explore individual nurse presenteeism as it is intended to measure department or hospital patient safety culture (p.154).

Ballangrud et al. (2012) used the HSOPSC in 10 ICUs in six hospitals in Norway. In total 220 nurses responded and for the dimension of supervisor/manager expectations and actions promoting patient safety the PPR was 73.1%. Through regression analysis, it was found that this dimension and the HSOPSC dimension of feedback and communication about error were related to low participant scores for frequency of incident reporting. The authors discussed elements of supervisory leadership that may improve incident reporting and noted the need for further study. Concerning organizational culture, the authors noted that "(h)ospitals and type of units may represent different cultures with specific professions and disciplinary traditions" (p.347). The data from this study were utilized by Vifladt et al. (2016a) in a study of restructured ICUs. This study is discussed below.

Vifladt et al. (2016a) are authors of a longitudinal study of ICUs in Norway. The study uses the HSOPSC to measure changes in patient safety culture in six ICUs from 2008/2009 to 2012/2013. The 2008/2009 baseline data was previously published by Ballangrud, Hedelin, and Hall-Lord (2012). In 2008/2009, a total of 217 nurses responded to the survey questionnaire and in 2012/2013 145 nurses responded. By 2012/2013, three of the ICUs had been restructured by merging general and medical intensive care and three had not been restructured. Using the Likert scale, the mean scores for the restructured units were 3.92 (SD = 0.58) in 2008/2009 and 3.76 (SD = 0.50) in 2012/2013. The mean scores for ICUs that were not restructured were 3.71 (SD = 0.72) and 4.15 (SD = 0.65) over the same study period. The authors found that HSOPSC unit

level dimensions were "vulnerable to the restructuring" (p.63) and suggested that "increased stress and additional responsibilities for the manager during the restructuring" were influences on some of the reduced dimension scores (p.64). This is an important study because it uses the HSOPSC as an instrument to measure the impact on patient safety culture of an action like workplace restructuring.

Vifladt et al. (2016b) used the HSOPSC in a study of the relationship between patient safety culture and the results of the administration of a burnout scale. This study took place in the structured and non restructured units used in Vifladt et al. (2016a). However, it took place in 2012/2013 and it is not part of a longitudinal study. In total, 143 nurses participated and the mean score for the dimension of supervisor/manager expectations and actions promoting patient safety was 3.94 (SD = 0.6). The authors found that "positive safety culture was statistically significantly correlated with a low score for burnout and a strong sense of coherence" (p.29). There were no statistically significant differences in burnout and sense of coherence between restructured and non-restructured ICUs. The authors noted that small sample size as a limitation of the study (p.33).

Kvist et al. (2013) used the HSOPSC to establish baseline data for four Finnish hospitals in the context of Magnet accreditation, which, according to the authors, is "the highest international recognition of nursing excellence" (p.153). The mean score for the dimension of supervisor/manager expectations and actions promoting patient safety was 3.60 (SD = .80). This was considered a moderate score (p.160). This study reviews aspects of the Magnet model and focuses on the importance of developing and assessing transformational leadership in Finnish hospitals. The authors stated that the response rate was low and may have reflected an absence of awareness of patient safety culture and transformational leadership (p.162).

Mantynen et al. (2014) is a study in a Finnish university hospital and it is related to Kvist et al. (2013). It is a longitudinal study reflecting data from 2008/2009 and 2010/2011. For the HSOPSC dimension of supervisor/manager expectations and actions promoting patient safety, the mean score of the 234 nurses surveyed in 2008/2009 was 3.69 (SD = 0.73). In 2010/2011, the mean score of 512 nurses was 3.68 (SD = 0.74). Two interventions with respect to transformational leadership occurred prior to the second survey questionnaire. Training was offered to nurse leaders and a mechanism was established to support nurse leaders with research and evidence-based learning materials (Mantynen et al., 2014, p.2). The authors noted a limitation in the manner of selecting and implementing the interventions. The importance of this study is that it provides data over time and compares the results before and after interventions.

Turunen et al. (2013) surveyed 723 nurses and 109 nurse managers in four Finnish acute care hospitals using the HSOPSC. The study reports results for supervisor/manager expectations and actions promoting patient safety by question and does not provide an overall score for the dimension. For nurses the PPRs were 43% for B1, 69% for B2, 64% for B3, and 70% for B4. For nurse managers the PPRs were: 56% for B1, 84% for B2, 83% for B3, and 90% for B4. Authors note that "it is important to narrow the gap" between staff nurse and manager perceptions of patient safety culture (p.615).

Verbeek-van Noord et al. (2014) used the HSOPSC to study safety culture and compare physicians and nurses in 33 Dutch emergency departments. Nurse respondents totalled 480 and the result for supervisor/manager expectations and actions promoting patient safety was a mean score of 3.5 (SD = 0.68). There was little discussion of this dimension score. The study noted that patient safety culture scores differ among countries and recommended further research to inquire into these dissimilarities (p.68). The authors used a multivariate analysis to show that

other dimensions of the HSOPSC – teamwork within units, frequency of events reported, feedback and communication about errors, and learning from errors – are predictors of patient safety scores (p.68). Limitations are indicated as non-response bias, clustering, and the fact that this was a survey of one emergency department only.

United States studies

Davis et al. (2016) used a modified HSOPSC to investigate patient safety culture in 55 free standing hemodialysis units in eight states in the United States. The nursing participants totalled 134 nurses and 47 charge nurses. Participants were asked only questions B1 and B2 pertaining to the dimension of supervisor/manager expectations and actions promoting safety. The PPR for nurses was 75.0% for B1 and 78.0% for B2, and for charge nurses it was 83% for B1 and 85% for B2 (p.124). Among the limitations, the authors noted that the results were limited in their application to the areas where the hemodialysis units were located. They recommended the use of "safety culture assessments" to identify areas of concern for patient safety and recommended that the assessments should be used "for quality assurance and performance improvement" (p.126).

Ulrich and Kear (2014) used a modified HSOPSC and Medical Office Survey of Patient Safety Culture (AHRQ, 2016c) in a study of 929 nurses and 249 nurse managers working in hospital and outpatient nephrology in the United States. Two open-ended questions were also asked and this allowed participants to provide personal comments on patient safety in nephrology. In the presentation of results, the data are shown in graphs that do not distinguish responses of nurses from nurse managers. However, the authors note that staff nurses' ratings were uniformly lower than those of nurse managers. The limitation in the presentation of the data does not allow an evaluation of the authors' analysis. The authors suggest that nephrology nurses

need to engage in patient safety culture assessment in their individual practice settings. To that end, they have developed a short assessment tool (p.471).

Summary of HSOPSC studies

Based on the results of the literature search that was conducted, the HSOPSC appears to be the most commonly used patient safety culture survey instrument. The 24 studies that were included in this thesis were drawn from the Middle East, Far East, Europe, and the United States. The surveys were predominantly conducted in hospital settings and covered a wide variety of practice areas. The results for the dimension of interest were varied. The importance of supervisory leadership in achieving and maintaining a positive patient safety culture was an evident theme across the studies. A number of studies identified the culture or ethnicity and gender of the nurse respondents as influences on survey results. A blame free, non punitive response to error reporting was identified as an important component of patient safety culture. The studies identified the usefulness of the HSOPSC to measure the effects of change such as reorganization or educational initiatives on patient safety culture in the healthcare workplace.

SAQ Studies

The Safety Attitudes Questionnaire short form (SAQ) was used in six studies included in this thesis. The studies are organized below according to the geographic region in which the study was conducted. The regions are the Middle East, Europe, and Brazil.

Middle Eastern studies

Abdi et al. (2015) used the SAQ and semi-structured individual interviews to assess safety culture which was defined as patient safety and staff well-being (p.334). This study was conducted in an ICU in an Iranian hospital. A total of 18 nurses responded. In the SAQ, perception of management is divided into unit management and hospital management. This

breakdown is not reflected in the results of this study, which show only a mean score for the perception of management of 69.5% (SD = 12.2). This is less than the benchmark score of 75% that would indicate a positive patient safety culture with respect to the perception of management dimension. The semi-structured interviews that were also conducted with nurses supplemented these scores by illustrating aspects of perception of unit level management. For example, one nurse responded that nurses' adherence to procedures was never confirmed by supervisors. The nurse stated, "Without adequate supervision, you can not expect the nurses to follow all the rules and regulations" (p.340). The semi-structured interviews revealed differences in the perception of physicians and nurses. For example, in the area of teamwork, physicians believed they had a good working relationship with nurses. On the other hand, nurses perceived a good relationship with other nurses and less so with physicians and attending physicians. Another theme that emerged from the qualitative results is that when reporting errors, nurses preferred "to report the incidents informally to the head nurse" and some "were not willing to report errors committed by their colleagues" (p.340). These responses suggest that the perception of the hierarchy within the hospital is an influence on patient safety culture and unit level management plays a critical role. The closer that supervisors are to direct-care nurses, the greater their potential to contribute to a positive patient safety culture. The study demonstrates that supplementing a survey questionnaire with qualitative interviews may reveal responses that enhance the survey questionnaire results. This may provide a more complete picture of the state of patient safety culture.

Zakari (2011) administered a survey questionnaire to 203 nurses and 18 nurse managers in ambulatory care in a hospital in Saudi Arabia using the SAQ. A limitation of this study is that it does not provide a breakdown in the scores for nurses and nurse managers or hospital management and unit management (p.234). The score for the dimension of perception of

management was 20% PPR and a mean score of 63% (SD = 12.7). However, in a statistical analysis the author found significant differences in the responses of nurses and nurse managers. It was indicated that "perception of management dimension attitudes was higher among nurse managers than registered nurses" (p.234). One of the recommendations of this study is that "to improve safety culture, nurse leaders must include interventions aimed at breaking down barriers between managers and nursing staff" (p.235). Zakari acknowledged that the nurse employees in Saudi Arabia represent diverse cultural backgrounds and suggested further qualitative research to explore whether this is an influence on patient safety culture (p.236).

European studies

Gabrani et al. (2015) conducted a study in four regional hospitals in Albania using the SAQ. Nurses totalled 132 of the participants in the study. The authors did not distinguish hospital management and unit level management in the data and indicated 44.8% (SD = 13.1) was the mean score for perception of management among nurses. They noted that the survey questionnaire results were intended as a "baseline" for further investigation (p.8) and suggested that Albanian organizational culture may be an influence on patient safety culture (p.7).

Haerkens et al. (2016) conducted a study in teaching hospitals in the Netherlands to validate the Dutch version of the SAQ. The study provided baseline information prior to implementing Crew Resource Management training in select units (p.2-3). The responses of 623 nurses were received. The result was expressed as the mean score of all responses on the five point Likert scale rather than as a percentage. This result was given as 2.89 (SD = 0.6) for perception of management (p.5). The study did not distinguish unit and hospital level management. The study validated the translation and use of the Dutch language version of the

SAQ. A limitation on this study may be that the surveyed units were already enrolled to take Crew Resource Management training.

Nguyen et al. (2015) conducted a study in two Italian hospitals to validate the Italian language version of the SAQ. As a validation study, it provided baseline data on patient safety culture in those hospitals. The nurses participating in the study totalled 134 and the response for perception of management was 49.3% PPR (SD = 25.0). The authors noted a number of missing responses to questions dealing with perception of management at the hospital and unit level. They suggest that this may be due to a hierarchical organizational culture that contributed to a "code of silence" (p.6).

Brazilian study

Carvalho et al. (2015) administered a survey questionnaire to healthcare professionals working in the operating room of a hospital. They used the SAQ. This hospital was undergoing an accreditation review. Nurses totalled 13 of the respondents and their mean score for perception of management was 63.4% for unit management as compared with 46.9% for hospital management. The authors commented on a "detachment" from management (p.1047). They noted that 75% is the desired score according to international standards (p.1045).

Summary of SAQ studies

The six included studies used the SAQ in the Middle East, Europe, and Brazil. All of the surveys were conducted in hospital settings. The results were varied and their usefulness for the purpose of this thesis was limited in some cases by the manner of reporting the results. Four of the six surveys were conducted to provide baseline data concerning patient safety culture in the workplace and one involved an accreditation process. Two of these also involved validation of the SAQ in a language other than English. The small sample size of one study limited its

usefulness and one study reported results without differentiating the responses of nurses and nurse managers. Culture was identified as a factor in studies from the Middle East and it was suggested that further research was required to determine whether it was an influence on patient safety culture. Studies from Albania and Italy referred to workplace hierarchical culture as a factor.

Other Instruments

Five studies that were included in this thesis used instruments other than the HSOPSC or SAQ. The Safety Climate Survey (SCS) was used in two studies. One study developed and used a Survey on Resident Safety in Nursing Homes (SRS) (Singer, 2012). The RN4CAST was used in one study in conjunction with aspects of the HSOPSC. One study used a qualitative method. These studies are organized below according to the geographic region where the study was conducted, in this case the Middle East and Europe.

Middle Eastern study

Almutairi et al. (2013) conducted a study of 319 nurses working in a teaching hospital in Saudi Arabia using the Safety Climate Survey. The survey questionnaire was conducted in medical, surgical, and gynecological units. The SCS was a precursor to the more detailed SAQ (Di Benedetto et al, 2011, p.610). The important feature of the results of this study is the focus on cultural backgrounds and discussion of nationality as an influence on perceptions of patient safety culture. Noting that many participants did not reveal their ethnicity or nationality, the authors suggested that the participants "might be disempowered in this multicultural environment and might not be able to discuss the safety concerns or issues in their clinical practice" (Almutairi et al., 2013, p.192). For those who did reveal that information, there was a statistically significant difference among the nationalities (p.191). Deficiencies were found in the

perception of patient safety cultural generally and the authors stated that "education is the tool to enhance the sense of empowerment for the multicultural nursing workforce" (p.193).

European studies

Danielsson et al. (2014) conducted a qualitative study of nurses and nursing assistants working in a university hospital and a country hospital in Sweden. Focus groups and individual interviews were held and management emerged as a theme. The authors noted that the perception of management is commonly used in established patient safety culture survey questionnaires (p.7). Participants noted that the behaviour modeled by managers "might undermine the safety culture among staff" when it does not adhere to established protocols (p.7). Themes of responsibility and competence were also identified as important elements and they do not appear in the most common quantitative survey questionnaires. This study supports the benefit of qualitative data in the assessment of patient safety culture.

Smeds Alenius et al. (2013) also conducted a study in Sweden. The authors surveyed 9236 nurses using the RN4CAST and to a lesser extent, some parts of the HSOPSC. The RN4CAST is a tool that relates "workforce planning in nursing and patient safety" (Sermeus et al., 2011, Discussion, para.1). Two findings from the study are significant to this thesis. Firstly, the authors observe that participants whose work was most closely aligned with direct patient care gave higher patient safety culture scores (Smeds Alenius et al, 2013). Secondly, "visible and competent nursing leadership" is connected with nurses giving a higher rating to patient safety (Discussion, para.3).

Di Benedetto et al. (2011) conducted a survey of 201 nurses working in 33 private dialysis centres in Italy using the Safety Climate Survey and the Universal Hygiene Precautions

Questionnaire (p.605). The results show that participants rated their direct supervisors more highly than hospital management, noting "a lack in the responsiveness of senior leaders" (p.610).

United States study

Singer et al. (2012) developed and administered a survey questionnaire to assess nursing home patient safety culture in eight nursing homes (p.104). This is the only study of long term care that was included in this thesis. Of 432 respondents, only 27 were nurses, suggesting that nurses are a small percentage of the staff that is present in these nursing homes. The overall score for nurses' perception of management support was 66.7%. This was a preliminary study and the authors note that the study had not yet been validated. The authors note that the results may have been influenced by "a social desirability bias toward a positive response" (p.116).

Summary of studies using other instruments

Five included studies were conducted in Saudi Arabia, Europe, and the United States and used instruments other than the HSOPSC or SAQ. The settings included nursing homes and dialysis units as well as hospitals. One study was a qualitative study. Some of the studies used parts of other survey instruments or adapted them for use in a specific nursing context. Culture and nationality were cited as influences on perceptions of patient safety culture.

Analysis of Similarities and Differences across Studies and Contexts of Care

In this chapter, the included studies were analyzed from the perspective of the study instrument used, the geographic location, the area of nursing practice, the sample size, and data concerning nurses' perceptions of supervisory leadership for safety.

All of the studies provided baseline data. Baseline data indicates that there is no prior history of conducting patient safety culture survey questionnaires in the study setting. In some cases, for example Al Awa et al. (2012) the survey questionnaire was administered as part of an

accreditation process. Two studies produced longitudinal data, providing baseline data plus a subsequent evaluation after an intervening event. Ballangrud et al. (2012) provided baseline data on ICUs in Norway that was subsequently relied on when Vifladt et al. (2016a) evaluated the impact of restructuring versus not restructuring in the same ICU units surveyed by Ballangrud. This was an important measure of change and in this case showed that patient safety culture and the perceptions of supervisor/manager expectations and actions promoting patient safety were negatively affected by restructuring. In Norway, Kvist et al. (2013) and Mantynen et al. (2014) in studies of transformational leadership relative to Magnet hospitals evaluated the impact of providing training and support to nurse leaders. The value of the longitudinal studies was in measuring change over time.

The manner of reporting results for supervisory leadership for patient safety was varied. Using the example of the five ICUs that were the subject of included studies, Ballangrud et al. (2012) found a PPR on the HSOPSC of 73.10%. In a follow-up to this study, Vifladt et al. (2016a) reported mean scores on the HSOPSC of 3.71 to 4.15 on the Likert scale. This study followed an exercise in unit restructuring. In the study of Yilmaz and Goris (2015), the PPR for the HSOPSC was 40.8%. Abdi et al. found a mean score of 69.5% (SD = 12.2 on the SAQ. These studies use different assessment tools and report results differently, as mean scores and PPRs. The results appear to be divergent and cannot be explained on the basis of these two studies without significant investigation of the contexts in which the survey questionnaires were used together with additional data to allow the results to be analyzed and interpreted.

Many observations and limitations were expressed in the included studies. Diverse cultural backgrounds were suggested as an influence in a number of Middle Eastern and European studies irrespective of the survey instrument used. Al-Awa et al. (2012) noted the

presence of eight cultural backgrounds in the workplace. Zakari (2011) suggested qualitative research to investigate the impact of diversity on patient safety culture. Al-Mandari et al. (2014) suggested paternalistic management style in addition to cultural diversity may have influenced patient safety culture. Gabrani et al. (2015) noted that Albanian organizational culture may be a factor in perceptions of patient safety culture. Singer et al. (2012) noted that "a social desirability bias toward a positive response" may have been a factor influencing participants (p.116). Nguyen et al. (2015) suggested that a high incidence of missing responses concerning perception of management may indicate an unwillingness to address the subject. Almutairi et al. (2013) addressed the reluctance of participants to reveal their ethnicity or nationality as a factor. Nie et al. (2013) cautioned against using the HSOPSC "in a different cultural context" (Reliability and Validity, para. 1).

Several studies discussed supervisors' or managers' perceptions relative to frontline nurses' perceptions. In these cases, it was generally observed that the nurses' scores for perception of supervisory or managerial leadership were lower than the mean score given by their supervisors and managers for this dimension (Zakari, 2011; Turunen et al., 2013; Ulrich & Kear, 2014).

It was also demonstrated that qualitative assessment of patient safety culture offers perspectives that supplement the data typically emerging from survey questionnaire data. Using qualitative interviews, Danielssonet al. (2014) found themes such as competence and responsibility. Neither of these is assessed on the quantitative instruments used in studies that were reviewed in this thesis but could be explored qualitatively. Abdi et al. (2015) used the SAQ together with semi-structured interviews. This allowed the addition of narrative detail to the survey questionnaire responses that would not have been revealed otherwise. Ulrich and Kear

(2014) supplemented the HSOPSC with two open-ended questions that allowed nurses to expand their responses beyond the numeric Likert scale and provide examples from their personal experience in their practice area.

Chapter Summary

In this chapter, the included studies were analyzed from the perspective of the study instrument used, the geographic location, the area of nursing practice, the sample size, and data concerning nurses' perceptions of supervisory leadership for safety. The HSOPSC was used in twenty-four studies. One of the dimensions it measures is supervisor/manager expectations and actions promoting patient safety. The SAQ was used in six studies and one dimension it assesses is perception of management at the unit level. Three other instruments, the SCS, SRS, and RN4CAST, and one qualitative study were also found in the included studies. Geographically the studies were widely dispersed. The Middle East accounted for thirteen studies, Europe for thirteen studies, Asia for four studies, the United States for three studies, and Brazil for one study. Chapter 5 provides a discussion of these results and the conclusion of the thesis.

Chapter Five: Discussion and Conclusion

The impetus for this thesis originated from the results of a patient safety culture survey questionnaire that was administered by a Canadian health services agency throughout a number of healthcare sectors under its authority. The results uniformly showed low ratings for supervisory leadership for safety. This led to the question whether, from a more global perspective, patient safety survey questionnaires might reveal some consistency in their results. The purpose of this thesis was to examine reports of nurses' perceptions of supervisory leadership in relation to patient safety culture within and across different contexts of care to identify whether, within or among the instruments used, there were trends in the data based on geographic location, type of institution, and nursing practice setting. This chapter discusses the results.

Safety culture and safety climate have been viewed as intertwined. The responses to a patient safety culture survey questionnaire indicate the safety climate or "the visible feature of safety culture" (Ausserhofer et al., 2012, p.242). "Measuring and monitoring the PSC (patient safety climate) in healthcare organizations allows hospital and nurse leaders to detect vulnerabilities and to implement and evaluate improvement interventions to strengthen the PSC" (p.250).

A variety of different survey questionnaires was encountered in the literature but the HSOPSC and SAQ were predominant and there was a wide geographic distribution of studies. Most of the studies considered in this thesis provided data that was gathered from an institution, often a hospital and sometimes several hospitals in a region. Although the studies often provided details of the unit or practice setting from which participants were drawn, rarely did the analysis of results relate the participants' responses to their individual units or practice settings. The

absence of this detail limited the outcome of this thesis and the narrative review. Where it was originally anticipated that the literature search would yield studies that addressed distinct nursing practice settings, these studies were few. Where they were found to exist, some authors acknowledged that the nursing practice setting may have been an influence on the patient safety culture survey results. However, the number of studies that detailed responses from individual nursing practice settings was too few to generate any generalizable conclusion concerning nurses' perceptions of supervisory leadership for safety. Nonetheless, a review of the results yielded three important themes emerging from the results of survey questionnaires: benchmarks, culture, and interventions.

Benchmarks

The first emerging theme is that the results of a patient safety culture survey questionnaire provide a benchmark at a given point in time that relates to the given participant population. Because the results appear to be highly dependent on context, for example the culture, age, and education of the participants, they are not generalizable and are unlikely to be useful predictors for other populations. Still, the usefulness of the results can be enhanced. In dynamistic healthcare environments, longitudinal studies that repeat the survey questionnaire at intervals could provide illuminating data for further research. This is being undertaken in some instances. For example, in one study the stated objective was to obtain "baseline measurements for a longitudinal study" (Kvist et al., 2012, p.152). Most of the studies that were considered in this thesis administered a survey questionnaire once and provided limited discussion of factors that may have influenced the results. Approaching patient safety culture from a longitudinal aspect will provide the opportunity to assess the variables that may influence participant responses. For example, "capacity and capability" (Bevan, 2010, p.140) are powerful

determinants of culture and climate and are rarely static and changes to either of them may alter subsequent survey questionnaire results. Additional value may be added by repeating survey questionnaires over time to assess the influence of such changes in the workplace and its impact in a patient safety culture context (Visser, Krosnick, & Lavrakas, 2000, p.226).

Both the HSOPSC and the SAQ ask participants to provide information concerning their profession, work unit, and experience. Other than profession, this information about participants' characteristics inconsistently appears to have been related to their reported survey questionnaire results. Perhaps this is attributable to the sample size or concerns for participant anonymity. Nonetheless, it is arguably information which, where it is appropriate to report it, could be useful and particularly where longitudinal studies are undertaken as it could reveal explanations for changes within the participant group that may influence survey questionnaire outcomes.

It is important to recognize that patient safety culture survey questionnaires are not diagnostic although Li does describe them as "a diagnostic indicator on the state of safety in a hospital" (2012, p.60) but acknowledges that they do not measure "behaviour, values, and competencies" (p.64) or "causality" (p.66). Patient safety culture survey questionnaires do not explain strengths or weaknesses that are reported in the results. In order to create meaning, it is necessary to conduct further inquiry with the potential of then applying initiatives to support or enhance patient safety culture. This warrants significant investigation of the underpinnings of participants' reported perception. The survey questionnaire results must be confined to the population and setting that they address for "(w)ithout the right safety culture, initiatives to improve patient safety, such as blame-free incident reporting and root cause analysis, are far less likely to succeed" (Poley, van der Starre, van den Bos, van Dijk, & Tibboel, 2011, p.e310). As Hamdan states, effective intervention has "the need for a customized approach that builds on

existing strengths and targets areas of opportunities for improvement" (2013, p.886.e13). The existence of a positive patient safety culture is of paramount importance in a healthcare workplace where "complexity, intense stress, time sensitivity, multiple players, a requirement for teams functioning at a high level with precise and accurate information, and the high and often irreversible cost of error" are constants (Oriol, 2006, p.403).

Culture

The second theme of the findings of this thesis that warrants comment and has potential for further exploration is the impact of the cultural background of the participants in the survey questionnaires. A number of studies identified cultural backgrounds of the individual study participants and the "socio-cultural" geographic milieu of the workplace setting as factors (Al-Mandhari et al., 2014, p.265). Ballangrud et al. (2012) remarked on "cultural and organisational differences regarding patient safety" between Norway and the United States (p.348). Zakari (2011) referred to the large contingent of foreign nurses in Saudi Arabia and the "considerable effects" the diverse workforce might reflect in patient safety culture survey questionnaire results (p.233). Al-Mandhari et al. (2014) noted the "Oman is known to be characterized by 'directive and paternalistic' management styles" which could impact perceptions of patient safety culture (p.268). In a study of a hospital in Taiwan, Li observed that in "eastern Asia, the virtue of obedience is highly valued among nurses. Therefore, they tend to be silent and reluctant to express their safety concerns" (2013, p.65). As this thesis illustrates, culture of the participant population and study site cannot be overlooked as influential factors in the assessment of patient safety culture and perceptions of supervisory leadership for safety. To more fully understand the data, these contextual features need to be explored.

Interventions

The third theme that emerges is the use of baseline and longitudinal studies in assessing the effects of interventions. Carvalho et al. (2015) and Al-Awa et al. (2012) are examples of patient safety culture assessment in accreditation processes. Yilmaz and Goris (2015), a Turkish study, illustrates the impact of training and measures its effect in comparing the results of nurses who had been trained in aspects of patient safety culture with nurses who had not received training. Ballangrud et al. (2012) together with Vifladt et al. (2016a) provide a longitudinal study that analyzes the impact of unit restructuring on patient safety culture in Norwegian ICUs. Kvist et al. (2013) and Mantynen et al. (2014) combine to examine the impact over time of training given to nurse leaders and information for nurses on transformational leadership.

There is no single intervention that will enhance perception of supervisory leadership for safety in every healthcare. Hamdan noted in assessing the results of a patient safety culture survey questionnaire of neonatal intensive care units (NICU) that "most of the NICUs have opportunities to improve domains of patient safety culture and that these opportunities differ by NICU" (2013, p.886.e9). The culture, strengths, and weaknesses of the workplace will play a large part in determining a useful intervention.

A number of studies suggest interventions that may enhance patient safety culture. Kvist et al. (2012) and Halligan et al. (2014) state that nurse leaders should be visible in the workplace. Kvist et al. (2012) add that nurse leaders "should pay attention to giving direct feedback about work generally and patient safety issues particularly" (p.162). Ammouri et al. (2014) suggest mentorship among senior and junior nurses with particular attention to patient safety culture. Parker's study (as cited by Kuosmanen, Tiihonen, Repo-Tiihonen, Eronen, & Turunen, 2013, 214) indicated that "(s)taff should be engaged in discussions about their responses to raise

awareness of patient safety and provide opportunities to share concerns." Kuosmanen et al. also suggest that continuing education is an important component of patient safety culture, but cautions that "cultural differences between professional groups should be taken into account when constructing (patient safety) educational plans" (2013, p.215). Regarding educational interventions, Taher et al. noted that improving patient safety culture "requires not only education and awareness but also being able to carry the personnel with you in the safety attitude and implementation" (2014, p.101). Marsteller encourages "frank discussions among team members and leaders about fear of punishment, stigma or retaliation for raising concerns. In the absence of conversations about hazards, errors will eventually reach the patient" (2015, p.2188).

The attributes of a nurse leader are strongly linked to patient safety culture and the qualities of effective leadership must be developed and applied to support patient safety culture. "A leader guides, directs, and fosters goal attainment, thus motivating followers to reach their full potential" (Merrill, 2015, p.319). Merrill strongly advocates for transformational leaders who "are proactive and convince followers to strive for high performance" (p.319). Mantynen et al. suggest that the need for transformational nurse leadership is "urgent" (2014, Conclusions, para. 1). To "promote patient safety" a transformational leader looks to "increasing employee involvement in decision making, developing a culture of trust, and looking at error as an opportunity to improve processes rather than reprimand employees" (Merrill, 2015, p.323). Improving the skills of a nurse leader is a logical component in strengthening nurses' perceptions of supervisory leadership as "(n)urse leaders have the ability to cause change and are therefore in unique positions to help create an environment ... where safety is valued" (Wagner, Capezuti, & Rice, 2009, p.190).

More concrete tools were suggested in several studies. Aviation "shares many characteristics with medicine, particularly in terms of the goal of risk reduction and the importance of teamwork and interpersonal skills" (Zeltser & Nash, 2010, p.13). Several studies in the literature suggest borrowing from aviation to use Crew Resource Management in a healthcare context to enhance patient safety culture (Oriol, 2006; Poley et al., 2011; Zeltser & Nash, 2010). The foundation for CRM was described by Nance (2004) in the following passage:

> The new definition of what it takes to lead has been forged in the fires of airline disasters and the extensive renaissance in teamwork and communication methods that resulted from those accident investigations. No longer are dangerously impossible claims of human infallibility acceptable. No longer is autocratic, noncommunicative leadership tolerable. No longer are health care participants given the false luxury of silence, or the challenge of using excessive diplomacy as a license to remain silent.
>
> From the smallest clinic to the largest hospital, this massive change in the way we view teamwork, communication, leadership, and human fallibility is the basic formula needed to change the structure of health care's approach to the very real patient safety issues before it. The vast majority of human errors that metastasize into patient injury or death, whether involving medication errors or otherwise, can be prevented by attacking and improving bad systems, not assuming the presence of bad people. (p.203)

Kemper et al. (2014) explain that Crew Resource Management "is based on the premise that human error is avoidable, but can never be eradicated (Background, para.4). As described by Hatlestadt (in Oriol, 2006) the basic concept of Crew Resource Management involves the acknowledgement of human fallibility and "the training of all personnel to develop basic skills for understanding the extent and nature of actual and potential errors, for altering the precursors

to the error, and for identification of interventions that can prevent or mitigate error" (p.404). Consistent with the Crew Resource Management approach, Kear and Ulrich acknowledge that "patient safety and patient safety culture rely on an interprofessional team approach and transparency" (2015, p.121). Haerkens et al. (2016) is an example of a study that provides baseline data that will be used to assess the effects of Crew Resource Management training.

Implications and Recommendations

At the conclusion, it is important to return to the question posed by this thesis, which was to examine reports of nurses' perceptions of supervisory leadership in relation to patient safety culture within and across different contexts of care to identify whether, within or among the instruments used, there were trends in the data based on geographic location, type of institution, and nursing practice setting.

Generalizable information cannot be drawn from the data generated by the studies included in this thesis. The different survey questionnaires and methods, and the manner of presenting the data both placed limitations on the use of the data. Nonetheless, there were three salient themes that emerged. Firstly, the survey questionnaires are useful tools to establish benchmarks for the participant population. Secondly, the concept of culture, including the cultural backgrounds of participants, the organizational culture of the workplace, and the cultural milieu of the geographic setting, are influences on the perceptions of patient safety culture and they are necessary avenues of further inquiry. Thirdly, there are useful studies in the literature that propose and in some cases assess the use or deployment of interventions and their impact on patient safety culture. A strong example comes from the study conducted by Vifladt et al. (2014), which showed a decline in patient safety culture after restructuring work units. In the context of interventions, it is also a finding of this thesis that the assessment of patient safety culture cannot

be a single or isolated event. Baseline data must be given meaning and to give it meaning, the patient safety culture assessment must be repeated at intervals and examined in the context of the workplace at the time of each assessment. There is also benefit in combining assessment methods, for example the HSOPSC or SAQ together with qualitative interviews. The addition of a personal narrative adds value.

Conclusion

The result of this thesis shows that trends cannot presently be found in patient safety culture results, it may be that this is attributable to the fact that safety culture is an emerging field. With time, the volume of reported patient safety culture data, more standardized reporting of results, and more detailed analysis of information such as the demographic data of the participants, may allow synthesis of the results and the identification of patient safety culture.

References

Aarons, G. A., Farahnak, L. R., Ehrhart, M. G., & Sklar, M. (2014). Aligning leadership across systems and organizations to develop strategic climate to for evidence-based practice implementation. *Annual Review of Public Health*,*35*, 255–274. doi: 10.1146/annurev-publhealth-032013-182447

Abdi, Z., Delgoshaei, B., Ravaghi, H., Abbasi, M., & Heyrani, A. (2015). The culture of patient safety in an Iranian intensive care unit. *Journal of Nursing Management, 23*, 333-345. doi: 10.1111/jonm.12135

Aboul-Fotouh, A.M., Ismail, N.A., Ez Elarab, H.S., & Wassif, G.O. (2012). Assessment of patient safety culture among health-care providers at a teaching hospital in Cairo, Egypt. *Eastern Mediterranean Health Journal, 18*(4), 372-377.

Agency for Healthcare Research and Quality. (2016a). *Hospital survey on patient safety culture.* Retrieved from http://www.ahrq.gov/professionals/quality-patient-safety/patientsafetyculture/hospital/index.html

Agency for Healthcare Research and Quality. (2016b). *Hospital survey on patient safety culture: User's guide.* Retrieved from https://www.ahrq.gov/professionals/quality-patient-safety/patientsafetyculture/hospital/index.html

Agency for Healthcare Research and Quality. (2016c). *Medical office survey on patient safety culture.* Retrieved from https://www.ahrq.gov/professionals/quality-patient-safety/patientsafetyculture/medical-office/index.html

Ahmed, G.A., Adam, S.M., & Abd Al-Moniem, I.I. (2011). Patient safety: Assessing nurses' perception and developing an improvement plan. *Life Science Journal, 8*(2), 53-64.

Al-Awa, B., Al Mazrooa, A., Rayes, O., El Hati, T., Devreux, I., Al-Noury, K., Habib, H., & El-

Deek, B.S. (2012). Benchmarking the post-accreditation patient safety culture at King Abdulaziz University Hospital. *Annals of Saudi Medicine. 32*(2), 143-150. doi: 10.5144/0256-4947.2012.143

Al-Mandhari, A., Al-Zakwani, I., Al-Kindi, M., Tawilah, J., Dorvlo, A., & Al-Adawi, S. (2014). Patient safety culture assessment in Oman. *Oman Medical Journal 29*(4), 264-270. doi: 10.5001/omj.2014.70

Almutairi, A.F., Gardner, G., & McCarthy, A. (2013). Perceptions of clinical safety climate of the multicultural nursing workforce in Saudi Arabia: A cross-sectional survey. *Collegian, 20*, 187-194. http://dx.doi.org/10.1016/j.colegn.2012.08.002

Ammouri, A.A., Tailakh, A.K., Muliira, J.K., Geethakrishnan, R., Al Kindi, S.N. (2014). Patient safety culture among nurses. *International Nursing Review, 62*(1), 102-110. doi: 10.1111/inr.12159

Ausserhofer, D., Schubert, M., Desmedt, M., Blegen, M., De Geest, S., & Schwendimann, R. (2013). The association of patient safety climate and nurse-related organizational factors with selected patient outcomes: A cross-sectional survey. *International Journal of Nursing Studies, 50*(2), 240-252. doi: b10.1016/j.ijnurstu.2012.04.007

Bahrami, M.A., Chalak, M., Montazeralfaraj, R., & Tafti, A.D. (2014). Iranian nurses' perception of patient safety culture. *Iran Red Crescent Medical Journal 16*(4). doi: 10.5812/ircmj.11894

Ballangrud, R., Hedelin, B., & Hall-Lord, M.L. (2012). Nurses' perceptions of patient safety climate in intensive care units: A cross-sectional study. *Intensive and Critical Care Nursing 28,* 344-354. doi:10.1016/j.iccn.2012.01.001

Bevan, H. (2010). How can we build skills to transform the healthcare system? *Journal of Research in Nursing, 15*, 139-148. doi:10.1177/1744987109357812

Brborovic, H., Brborovic, O., Brumen, V., Pavlekovic, G., & Mustajbegovic, J. (2014). Are nurse presenteeism and patient safety culture associated: A cross-sectional study. *Archives of Industrial Hygiene and Toxicology, 65*, 149-156.

doi:10.1016/j.iccn.2012.01.001

Canadian Institutes of Health Research, Natural Sciences and Engineering Research Council of Canada, and Social Sciences and Humanities Research Council of Canada. (2014, December). *Tri-Council policy statement: Ethical conduct for research involving humans.* Retrieved from http://www.pre.ethics.gc.ca/eng/policy-politique/initiatives/tcps2-eptc2/Default/

Canadian Patient Safety Dictionary. (2003). Retrieved from http://www.royalcollege.ca/portal/page/portal/rc/common/documents/publications/patient_safety_dictionary_e.pdf

Canadian Patient Safety Institute. (2009). *The safety competencies.* Ottawa, ON. Retrieved from http://www.patientsafetyinstitute.ca/English/toolsResources/safetyCompetencies/Documents/Safety%20Competencies.pdf

Carvalho, P.A., Gottems, L.B., Pires, M.R., & de Oliveira, M.L. (2015). Safety culture in the operating room of a public hospital in the perception of healthcare professionals. *Revista Latino-americana de Enfermagem, 23*(6), 1041-1048. doi: 10-1590/0104-1169.0669.2647

Castle, N., Wagner, L.M., Perera, S., Ferguson, J.C., & Handler, S.M. (2011). Comparing the safety culture of nursing homes and hospitals. *Journal of Applied Gerontology, 30*(1), 22-43. doi:10.1177/0733464809353603

Center for Healthcare Quality & Safety. (2016). *Safety attitudes and safety climate questionnaire.* Retrieved from https://med.uth.edu/chqs/surveys/safety-attitudes-and-safety-climate-questionnaire/

Clarke, S. (1999). Perceptions of organizational safety: Implications for the development of safety culture. *Journal of Organizational Behavior, 20*(2), 185-198.

Conchie, S.M., Moon, S., & Duncan, M. (2013). Supervisors' engagement in safety leadership: Factors that help and hinder. *Safety Science, 51,* 109-117. doi:10.1016/j.ssci.2012.05.020

Cooper, M.D. (2000). Towards a model of safety culture. *Safety Science, 36*, 111-136. doi: 10.1016/S0925-7535(00)00035-7

Danielsson, M., Nilsen, P., Ohm, A., Rutberg, H., Fock, J., & Carlfjord, S. (2014). Patient safety subcultures among registered nurses and nurse assistants in Swedish hospital care: A qualitative study. *BMC Nursing, 13*:39. doi:10.1186/s12912-014-0039-5

Davis, K.K., Harris, K.G., Mahishi, V., Bartholomew, E.G., & Kenward, K. (2016). Perceptions of culture of safety in hemodialysis centers. *Nephrology Nursing Journal, 43*(2), 119-126.

Di Benedetto, A., Pelliccia, F., Moretti, M., d'Orsi, W., Starace, F., Scatizzi, L....& Marcelli, D. (2011). What causes an improved safety climate among the staff of a dialysis unit? Report of an evaluation in a large network. *Journal of Nephrology, 24*(5), 604-612. doi: 10.5301/JN.2011.6306

Donaldson, L., & Philip, P. (2004). Patient safety – a global priority. *Bulletin of the World Health Organization, 82*(12), 892. Retrieved from http://www.who.int/bulletin/volumes/82/12/editorial11204html/en/

Feng, X., Acord, L., Cheng, Y., Zeng, J. & Song, J. (2011). The relationship between management safety commitment and patient safety culture. *International Nursing Review,* 58, 249–254. doi: 10.1111/j.1466-7657.2011.00891.x

Flin, R., Mearns, K., O'Connor, P., & Bryden, R. (2000). Measuring safety climate: Identifying the common features. *Safety Science, 34*(1-3), 177-192.

Flin, R., & Yule, S. (2004). Leadership for safety: Industrial experience. *Quality and safety in health care, 13* (Suppl II), ii45–ii51. doi:10.1136/qshc.2003.009555

Flin, R. (2007). Measuring safety culture in healthcare: A case for accurate diagnosis. *Safety Science, 45*(6), 653-667. doi:10:1016/j.ssci.2007.04.003

Frank, J.R., & Brien, S. (Eds.) on behalf of The Safety Competencies Steering Committee. (2009, August). *The safety competencies: Enhancing patient safety across the health professions (1st ed.).* Ottawa, ON: Canadian Patient Safety Institute. Retrieved from http://www.patientsafetyinstitute.ca/English/toolsResources/safetyCompetencies/Documents/Safety%20Competencies.pdf

Gabrani, A., Hoxha, A., Simaku, A., & Gabrani, J. (2015). Application of the Safety Attitudes Questionnaire (SAQ) in Albanian hospitals: A cross-sectional study. *BMJ Open, 5*. http://dx.doi.org/10.1136/bmjopen-2014-006528

Ginsburg, L.R, Tregunno, D., Fleming, M., Flemons, W., Gilin, D., & Norton, P. (2008, November). *Perceptions of patient safety culture in six Canadian healthcare organizations*. Edmonton, AB: Canadian Patient Safety Institute. Retrieved from http://www.patientsafetyinstitute.ca/English/research/cpsiResearchCompetitions/2005/Documents/Ginsburg/Ginsburg%20Full%20Report.pdf

Ginsburg, L.R., Tregunno, D., Norton, P., Mitchell, J.I., & Howley, H. (2014). 'Not another safety culture survey': Using the Canadian patient safety climate survey (Can-PSCS) to measure provider perceptions of PSC across health settings. *BMJ Quality & Safety, 23,* 162-170. doi: 10.1136/bmjqs-2013-002220

Glendon, A.I. and Stanton, N.A. (2000). Perspectives on safety culture. *Safety Science 34,* 193-214.

Guldenmund, F.W. (2000). The nature of safety culture: A review of theory and research. *Safety Science, 34*(1-3), 215-257. doi:10.1016/S0925-7535(00)00014-X

Guldenmund, F.W. (2007). The use of questionnaires in safety culture research – an evaluation. *Safety Science, 45*, 723-743. doi:10.1016/j.ssci.2007.04.006

Gunes, U.Y., Gurlek, O., & Sonmez, M. (2016). A survey of the patient safety culture of hospital nurses in Turkey. *Collegian, 23,* 225-232. http://dx.doi.org/10.1016/j.colegn.2015.02.005

Haerkens, M., van Leeuwen, W., Sexton, J.B., Pickkers, P., & van der Hoeven, J.G. (2016). Validation of the Dutch language version of the Safety Attitudes Questionnaire (SAQ-NL). *BMC Health Services Research, 16:385.* doi 10:1186/s12913-016-1648-3

Halligan, M. & Zecevic, A. (2011). Safety culture in healthcare: A review of concepts, dimensions, measures and progress. *BMJ Quality and Safety.* doi: 10.1136/bmjqs.2010.0400964

Halligan, M., Zecevic, A., Kothari, A., Salmoni, A., & Orchard, T. (2014). Understanding safety culture in long-term care: A case study. *Journal of Patient Safety, 10*(4), 192-201.

Hamdan, M. (2013). Measuring safety culture in Palestinian neonatal intensive care units using the Safety Attitudes Questionnaire. *Journal of Critical Care, 28*, 886.e7-886.e14. doi: 10.1016/j.jcrc.2013.006.002

Institute of Medicine. (2009). *Leadership commitments to improve value in health care: Finding common ground: Workshop summary*. Washington, DC: The National Academies Press. Retrieved from: http://www.ncbi.nlm.nih.gov/books/NBK52843/

Kear, T., & Ulrich, B. (2015). Patient safety and patient safety culture in nephrology nurse practice settings: Issues, solutions, and best practices. *Nephrology Nursing Journal, 42*(2), 113-122.,

Kemper, P., de Bruijne, M., van Dyck, C., & Wagner, C. (2011) Effectiveness of classroom based crew resource management training in the intensive care unit: Study design of a controlled trial. *BMC Health Services Research, 11*:304. doi:10.1186/1472-6963-11-304

Khater, W.A., Akhu-Zaheya, L.M., Al-Mahasneh, S.I., & Khater, R. (2015). Nurses' perceptions patient safety culture in Jordanian hospitals. *International Nursing Review. 62,* 82–91. doi: 10.1111/inr.12155

Kmet, L.M., Lee, R.C., & Cook, L.S. (2004). *Standard quality assessment criteria for evaluating primary research papers from a variety of fields.* Edmonton, AB: Alberta Heritage Foundation for Medical Research.

Kohn, L.T., Corrigan, J.M., & Donaldson, M.S., (Eds.) on behalf of the Committee on Quality of Health Care in America, Institute of Medicine. (2000). *To err is human: Building a safer health system.* Washington, DC: National Academy Press. Retrieved from http://www.nap.edu/

Kuosmanen, A., Tiihonen, J., Repo-Tiihonen, E., Eronen, M., & Turunen, H. (2013). Patient safety culture in two Finnish state-run forensic psychiatric hospitals. *Journal of Forensic Nursing*, *9*(4), 207-216. doi:10.1097/JFN.0b013e318281068c

Kvist, T., Mäntynen, R., Turunen, H., Partanen, P., Miettinen, M., Wolf, G. A., & Vehviläinen-

Julkunen, K. (2013). How magnetic are Finnish hospitals measured by transformational leadership and empirical quality outcomes? *Journal of Nursing Management, 21*(1), 152-164. doi: 10.1111/j.1365-2834.2012.01456.x

Li, A-T. (2013). Teamwork climate and patient safety attitudes: Associations among nurses and comparison with physicians in Taiwan. *Journal of Nursing Care Quality, 28*(1), 60-67. doi:10.1097/NCQ.0b013e318262ac45

Mantynen, R., Vehvilainen-Julkunen, K., Partanen, P., Turunen, H., Miettinen, M., & Kvist, T. (2014). Changes in transformational leadership and empirical quality outcomes in a Finnish hospital over a two-year period: A longitudinal study. *Nursing Research and Practice, 2014.* http://dx.doi.org/10.1155/2014/218069

Marsteller, J.A., Wen, M., Hsu, Y-J.., Bauer, L.C., Schwann, N.M., Young, C.J....& Martinez, E.A. (2015). Safety culture in cardiac surgical teams: Data from five programs and national surgical comparison. *The Annals of Thoracic Surgery, 100*, 2182-2189. doi:10.1016/j.athoracsur.2015.05.109

Mays, N., Pope, C., & Popay, J. (2005, July). Systematically reviewing qualitative and quantitative evidence to inform management and policy-making in the health field. *Journal of Health Services Research & Policy 10 Suppl*, 6-20. doi:10.1258/1355819054308576

Merrill, K. (2015). Leadership style and patient safety: Implications for nurse managers. *The Journal of Nursing Administration, 45*(6), 319-324. doi:10.1097/NNA0000000000000207

Nance J. (2004). Admitting imperfection: Revelations from the cockpit for the world of medicine. In: B. Youngberg & M. Hatlie (Eds.). *The Patient Safety Handbook* (1st ed., pp. 187-203). Boston, MA: Jones & Bartlett.

National Steering Committee on Patient Safety. (2002). *Building a safer system: A national integrated strategy for improving patient safety in Canadian health care.* Retrieved from: http://www.royalcollege.ca/portal/page/portal/rc/common/documents/advocacy/building_a_safer_system_e.pdf

Nguyen, G., Gambashidze, N., Ilyas, S.A., & Pascu, D. (2015). Validation of the Safety Attitudes Questionnaire (short form 2006) in Italian in hospitals in the northeast of Italy. *BMC Health Services Research,* 15:284. doi: 10.1186/s12913-015-0951-8

Nie, Y., Mao, X., Cui, H. He, S., Li, J., & Zhang, M. (2013). Hospital survey on patient safety culture in China. *BMC Health Services Research, 13*:228. doi:10.1186/1472-6963-13-228

Nieva, V.F., & Sorra, J. (2003). Safety culture assessment: A tool for improving patient safety in healthcare organizations. *Quality and Safety in Health Care, 12*(Suppl II), ii17-ii23. Retrieved from http://qualitysafety.bmj.com/content/12/suppl_2/ii17.full.pdf+html

Nuclear Energy Agency. (2002). *Chernobyl: Assessment of radiological and health impact 2002 update of Chernobyl: Ten Years On.* Retrieved from http://www.oecd-nea.org/rp/chernobyl/c01.html

Oliver, A., Cheyne, A., Tomás, J.M., & Cox, S. (2002). The effects of organizational and individual factors on occupational accidents. *Journal of Occupational and Organizational Psychology, 75*(4), 473-588.

Oriol, M. (2006). Crew resource management: Applications in healthcare organizations. *The Journal of Nursing Administration, 36*(9), 402-406.

Poley, M., van der Starre, C., van den Bos, A., van Dijk, M., & Tibboel, D. (2011). Patient safety culture in a Dutch pediatric surgical intensive care unit: An evaluation using the Safety Attitudes Questionnaire. *Pediatric Critical Care Medicine, 12*(6), e310-e316. doi:10.1097/PCC.0b013e318220afca

Popay, J., Roberts, H., Sowden, A., Petticrew, M., Arai, L., Rodgers, M., ... Duffy, S. (2006). *Guidance on the conduct of narrative synthesis in systematic reviews.* Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.178.3100&rep=rep1&type=pdf

Pope, C., Mays, N., & Popay, J. (2007). *Synthesizing qualitative and quantitative health evidence: A guide to methods.* Maidenhead, BRK, England: Open University Press.

Saleh, A.M., Darawad, M.W., & Al-Hussami, M. (2015). The perception of hospital safety culture and selected outcomes among nurses: An exploratory study. *Nursing and Health Sciences, 17,* 339-346. doi: 10.1111/nhs.12196

Sammer, C.E., Lykens, K., Singh, K.P., Mains, D.A. & Lackan, N.A. (2010). What is patient safety culture? A review of the literature. *Journal of Nursing Scholarship, 42*(2), 156-165. doi:10.111/j.1547-5069.2009.01330x

Sermeus, W., Aitken, L. Van den Heede, K., Rafferty, A., Griffiths, P., Moreno-Casbas, M....& RN4CAST consortium. (2011). Nurse forecasting in Europe (RN4CAST): Rationale, design and methodology. *BMC Nursing*, *10*:6. doi: 10.1186/1472-6955-10-6

Sexton, J., Helmreich, R., Neilands, T., Rowan, K., Vella, K., Boyden, J.... & Thomas, E. (2006). The Safety Attitudes Questionnaire: Psychometric properties, benchmarking data, and emerging research. *BMC Health Services Research, 6*: 44. doi: 10.1186/1472-6963-6-44

Singer, S., Kitch, B.T., Rao, S.R., Bonner, A., Gaudet, J., Bates, D.W....&Campbell, E.G. (2012). *Journal of Patient Safety, 8,* 104-124.

Singer, S., Kitch, B., Rao, S., Bonner, A., Gaudet, J., Bates, D....& Campbell, E. (2012). *Journal of Patient Safety, 8*(3), 104-124.

Smeds Alenius, L., Tishelman, C., Runesdotter, S., & Lindqvist, R. (2013). Staffing and resource adequacy strongly related to RNs' assessment of patient safety: A national study of RNs working in acute-care hospitals in Sweden. *BMJ Quality & Safety, 0*, 1-8. doi:10.1136/bmjqs-2012-001734

Smith, D., Zhao, I., Wang, L., & Ho, A. (2013). Dimensions and reliability of a hospital safety climate questionnaire in Chinese health-care practice. *International Journal of Nursing Practice, 19*, 156-162. doi: 10.1111/ijn.12046

Sorra, J.S. & Dyer, N. (2010). Multilevel psychometric properties of the AHRQ hospital survey on patient safety culture. *BMC Health Services Research, 10*:199. Doi: 10.1186/1472-6963-10-199

Sorra J, Gray L, Streagle S, Famolaro, M., Young, M., & Behm, J. (2016). *AHRQ hospital survey on patient safety culture: User's guide*. Rockville, MD: Agency for Healthcare Research and Quality. Retrieved from http://www.ahrq.gov/professionals/quality-patient-safety/patientsafetyculture/hospital/index.html

Taher, S., Hejaili, F., Karkar, A., Shaheen, F., Barahmien, M., Al Saran, K....& Al Sayyari, A. A. (2014). Safety climate in dialysis centers in Saudi Arabia: a multicenter study. *Journal of Patient Safety, 10*(2), 101-104. doi:10.1097/PTS.0000000000000111

The University of Manchester. (2006). *The Manchester patient safety framework.* Retrieved from http://www.nrls.npsa.nhs.uk/resources/?entryid45=59796

Turunen, H., Partanen, P., Kvist, T., Miettinen, M., & Vehvilainen-Julkunen, K. (2013). Patient safety culture in acute care: A web-based survey of nurse managers' and registered

nurses' views in four Finnish hospitals. *International Journal of Nursing Practice, 19*, 609-617. doi:10.1111/ijn.12112

Ugurluoglu, O., Ugurluoglu, E., Payziner, P.D., & Ozatkan, Y. (2012). Patient safety culture: Sample of a university hospital in Turkey. *Pakistan Journal of Medical Sciences, 28*(3), 463-467.

Ulrich, B. & Kear, T. (2014). Patient safety culture in nephrology nurse practice settings: Initial findings. *Nephrology Nursing Journal, 41*(5), 459-475.

Verbeek-van Noord, I., Wagner, C., Van Dyck, C., Twisk, J.W., & De Bruijne, M.C. (2014). Is culture associated with patient safety in the emergency department? A study of staff perspectives. *International Journal for Quality in Health Care, 26*(1), 64-70. doi 10.1093/intqhc/mzt087

Vifladt, A., Simonsen, B.O., Lydersen, S., & Farup, P.G. (2016a). Changes in patient safety culture after restructuring of intensive care units: Two cross-sectional studies. *Intensive and Critical Care Nursing 32*, 58-65. http://dx.doi.org/10.1016/j.iccn.2015.06.004

Vifladt, A., Simonsen, B.O., Lydersen, S., & Farup, P.G. (2016b). The association between patient safety culture and burnout and sense of coherence: A cross-sectional study in restructured and not restructured intensive care units. *Intensive and Critical Care Nursing*, *36*, 26-34. http://dx.doi.org/10.1016/j.iccn.2016.03.004

Visser, P. Krosnick, J., & Lavrakas, P. (2000). Survey research. In H. Reis & C. Judd (Eds.), *Handbook of research methods in social and personality psychology* (pp.223-252). New York, NY: Cambridge University Press.

Wagner, L. M., Capezuti, E., & Rice, J. (2009). Nurses' perceptions of safety culture in long-term care settings. *Journal of Nursing Scholarship, 41*(2), 184-192. doi: 10.1111/j.1547-

5069.2009.01270.x

Wang, X., Liu, K., You, L., Xiang, J., Hu, H., Zhang, L.,..& Zhu, X. (2014). The relationship between patient safety culture and adverse events: A questionnaire survey. *International Journal of Nursing Studies, 51*, 1114-1122. http://dx.doi.org/10.1016j.ijnurstu.2013.12.007

Yilmaz, Z. & Goris S. (2015). Determination of the patient safety culture among nurses working at intensive care units. *Pakistan Journal of Medical Sciences, 31*(3), 597-601. http://dx.doi.org/10.12669/pjms.313.7059

Zakari, N.M. (2011). Attitude of academic ambulatory nurses toward patient safety culture in Saudi Arabia. *Life Science Journal, 8*(3), 230-237.

Zeltser, M. & Nash, D. (2010). Approaching the evidence basis for aviation-derived teamwork training in medicine. *American Journal for Medical Quality, 25*(1), 13-23. doi: 10.1177/1062860609345664

Zhang, H., Wiegmann, D.A., von Thaden, T.L., Sharma, G., & Mitchell, A.A. (2002). Safety culture: A concept in chaos? *Proceedings of the Human Factors and Ergonomics Society 46th Annual Meeting – 2002*, 46(15), 1404-1408. doi: 10.1177/154193120204601520

Appendices

Appendix A – Included Studies Using Hospital Survey on Patient Safety Culture

*PPR as used in Appendix A indicates percent positive responses as reported in the study. It is the percentage of respondents answering 4 or 5 on Likert scale. Unless otherwise indicated, the result is for the dimension of supervisor/manager expectations and actions promoting patient safety. Note that questions B3 and B4 are reverse scored for the dimension.

Citation: Aboul-Fotouh, A.M., Ismail, N.A., Ez Elarab, H.S., & Wassif, G.O. (2012). Assessment of patient safety culture among health-care providers at a teaching hospital in Cairo, Egypt. *Eastern Mediterranean Health Journal*, *18*(4), 372-377.

Study tool: HSOPSC; Arabic language translation

Geographic region: Egypt

Sample: 165 nurses (32.4% of respondents) of 510 physicians, nurses, pharmacists, technicians and labourers

Practice area: Hospital: medical, surgical, intensive care (ICU), paramedical and other units

Relevant findings: PPR for nurses 42.4%. PPR also presented in relation to background characteristics of participants age, gender, position, work area, and experience. Not analyzed by profession and characteristics.

Citation: Ahmed, G.A., Adam, S.M., & Abd Al-Moniem, I.I. (2011). Patient safety: Assessing nurses' perception and developing an improvement plan. *Life Science Journal*, *8*(2), 53-64.

Study tool: HSOPSC

Geographic region: Egypt

Sample: 148 nurses, 128 staff nurses and 20 head nurses.

Practice area: Medical and pediatric university hospitals.

Relevant findings: Staff nurses 27.5% PPR. By unit: critical care 28.9% PPR; general wards 24.3% PPR. Noted that staff nurses' perception of patient safety culture is less positive than head nurses' perception. Sample characteristics reported but not related to HSOPSC responses.

Citation: Al-Awa, B., Al Mazrooa, A., Rayes, O., El Hati, T., Devreux, I., Al-Noury, K., Habib, H., El-Deek, B.S. (2012). Benchmarking the post-accreditation patient safety culture at King Abdulaziz University Hospital. *Annals of Saudi Medicine. 32*(2), 143-150. doi: 10.5144/0256-4947.2012.143

Study tool: HSOPSC

Geographic region: Saudi Arabia

Sample: 605 nurses

Practice area: 22 units in a university hospital

Relevant findings: Longitudinal study pre and post accreditation showing overall improvement in responses to questions about supervisor/manager expectations. Results compared to international benchmarks. Respondents represented eight distinct cultural backgrounds.

Citation: Al-Mandhari, A., Al-Zakwani, I., Al-Kindi, M., Tawilah, J., Dorvlo, A., Al-Adawi, S. (2014). Patient safety culture assessment in Oman. *Oman Medical Journal 29*(4), 264-270. doi: 10.5001/omj.2014.70

Study tool: HSOPSC

Geographic region: Oman

Sample: 237 nurses of 398 healthcare professionals

Practice area: 5 secondary and tertiary care hospitals

Relevant findings: Authors note that mean scores not significantly different among professions surveyed. PPR for supervisor/manager expectations 60%. Some dimension results compared with USA, Taiwan, and Lebanon but supervisor/manager expectations not mentioned. Omani culture suggested as an influence.

Citation: Ammouri, A.A., Tailakh, A.K., Muliira, J.K., Geethakrishnan, R., Al Kindi, S.N. (2014). Patient safety culture among nurses. *International Nursing Review*, *62*(1), 102-110. doi: 10.1111/inr.12159

Study tool: HSOPSC

Geographic region: Oman

Sample: 414 nurses

Practice area: Hospital; surgery, medicine, ICU, obstetrics, pediatrics, other

Relevant findings: 60% PPR. Individual question responses were converted to PPR and reported as a percentage score: B1 80.9%, B2 81.6%, B3 50.7%, B4 26.6%. Study shows that B3 and B4 were reverse scored as required.

Citation: Bahrami, M.A., Chalak, M., Montazeralfaraj, R., Tafti, A.D. (2014). Iranian nurses' perception of patient safety culture. *Iran Red Crescent Medical Journal 16*(4). doi: 10.5812/ircmj.11894

Study tool: HSOPSC

Geographic region: Iran

Sample: 302 nurses

Practice area: Hospital: internal medicine , surgery, obstetrics and gynecology, neurology, pediatrics, ICU, emergency, other

Relevant findings: Supervisor/manager expectations reported as mean score on Likert scale: internal medicine: 2.77 (SD = 0.78); surgery 2.38 (SD = 0.72); obstetrics and gynecology 3.09 (SD = 0.65); pediatrics 2.3 (SD = 0.63); mental health 2 .0 (SD = 0.72); ICU 2.5 (SD = 0.5); ER 2.81 (SD = 0.56); laboratory 3.0 (SD = 0.25); radiology 3.75 (SD = 0.0). Participant characteristics reported but not related to HSOPSC responses.

Citation: Ballangrud, R., Hedelin, B., Hall-Lord, M.L. (2012). Nurses' perceptions of patient safety climate in intensive care units: A cross-sectional study. *Intensive and Critical Care Nursing 28*, 344-354. doi:10.1016/j.iccn.2012.01.001

Study tool: HSOPSC

Geographic region: Norway

Sample: 220 nurses

Practice area: 10 intensive care units in 6 hospitals

Relevant findings: 73.1% PPR. Not differentiated by unit or participant characteristics. Supervisor/manager expectations found to be a predictor for other patient safety culture dimensions. Suggests research required on organizational and participant factors as influences on patient safety culture.

Citation: Brborovic, H., Brborovic, O., Brumen, V., Pavlekovic, G., Mustajbegovic, J. (2014). Are nurse presenteeism and patient safety culture associated: A cross-sectional study. *Archives of Industrial Hygiene and Toxicology, 65*, 149-156. doi:10.1016/j.iccn.2012.01.001

Study tool: HSOPSC translated into Croatian

Geographic region: Croatia

Sample: 148 nurses

Practice area: General hospital

Relevant findings: Focus was to see whether "presenteeism" affected patient safety, i.e. overtime, night shifts, working while sick. Results reported on a bar graph and not stated as a number. Appear to be approximately 55% mean score for supervisor/manager expectations.

Citation: Davis, K.K., Harris, K.G., Mahishi, V., Bartholomew, E.G., & Kenward, K. (2016). Perceptions of culture of safety in hemodialysis centers. *Nephrology Nursing Journal*,*43*(2), 119-126.

Study tool: HSOPSC, modified to ask only questions B1 and B2

Geographic region: United States

Sample: 134 nurses, 47 charge nurses

Practice area: Hemodialysis centres

Relevant findings: Score for nurses for B1 75%, B2 78%. For charge nurses, scores were higher: B1 83%, B2 85%. Authors suggest caution in generalizing results due to multiple factors.

Citation: Feng, X., Acord, L., Cheng, Y., Zeng, J. and Song, J. (2011). The relationship between management safety commitment and patient safety culture. *International Nursing Review*, 58, 249–254. doi: 10.1111/j.1466-7657.2011.00891.x

Study tool: HSOPSC, translated into Chinese

Geographic region: China

Sample: 228 staff nurses, 20 nurse managers

Practice area: Hospital

Relevant findings: Staff nurses score for patient safety culture was not given but stated to be lower than score given by nurse managers. Participant characteristics given but not related to data from HSOPSC. Study affirms that management commitment is closely related to perception of patient safety culture.

Citation: Gunes, U.Y., Gurlek, O., Sonmez, M. (2016). A survey of the patient safety culture of hospital nurses in Turkey. *Collegian, 23*, 225-232. http://dx.doi.org/10.1016/j.colegn.2015.02.005

Study tool: HSOPSC, Turkish version

Geographic region: Turkey

Sample: 554 nurses

Practice area: 3 public hospitals, 1 university hospital

Relevant findings: Benchmark 74% PPR (AHRQ 2012) and in this study participants achieved 48% PPR. Study provides breakdown of PPR relative to participant characteristics. Not analyzed by profession and characteristics.

Citation: Khater, W.A., Akhu-Zaheya, L.M., Al-Mahasneh, S.I., & Khater, R. (2015). Nurses' perceptions patient safety culture in Jordanian hospitals. *International Nursing Review. 62,* 82–91. doi: 10.1111/inr.12155

Study tool: HSOPSC, Arabic version

Geographic region: Jordan

Sample: 658 nurses

Practice area: Hospitals

Relevant findings: PPR for supervisor/manager expectations 57.95%. Scores for individual questions: B1 57.95%, B1 52.1%, B2 54.6%, B3 51.4%, B4 73.7%. Authors performed multivariate regression analysis to examine influence of participant characteristics. Limitation suggested but not shown that participants may have provided responses to meet approval of others.

Citation: Kvist, T., Mäntynen, R., Turunen, H., Partanen, P., Miettinen, M., Wolf, G. A., & Vehviläinen-Julkunen, K. (2013). How magnetic are Finnish hospitals measured by transformational leadership and empirical quality outcomes? *Journal of Nursing Management, 21*(1), 152-164. doi: 10.1111/j.1365-2834.2012.01456.x

Study tool: HSOPSC, translated to Finnish

Geographic region: Finland

Sample: 925 nurses

Practice area: 4 hospitals

Relevant findings: HSOPSC used as part of measurement of Magnet hospital standards. Score indicated as "moderate" and below target level of "excellent." Transformational leadership discussed. Study discusses connection between nursing perception and transformational leadership component of Magnet model.

Citation: Mantynen, R., Vehvilainen-Julkunen, K., Partanen, P., Turunen, H., Miettinen, M., Kvist, T. (2014). Changes in transformational leadership and empirical quality outcomes in a Finnish hospital over a two-year period: A longitudinal study. *Nursing Research and Practice, 2014.* http://dx.doi.org/10.1155/2014/218069

Study tool: HSOPSC

Geographic region: Finland

Sample: 234 nurses in 2008, 512 nurses in 2011

Practice area: University hospital

Relevant findings: Longitudinal study. Interventions aimed at improving patient safety culture and other workplace between studies. Mean score in 2008 for supervisor/manager

expectations 3.69 (SD = 0.73), in 2011 3.68 (SD = 0.74). Importance of transformational leadership discussed.
Citation: Nie, Y., Mao, X., Cui, H. He, S., Li, J., Zhang, M. (2013). Hospital survey on patient safety culture in China. *BMC Health Services Research, 13*:228. doi:10.1186/1472-6963-13-228 **Study tool:** HSOPSC, translated into Chinese; modified re frequency of events reported and transitions **Geographic region:** China **Sample:** 722 **Practice area:** 32 hospitals in 15 cities **Relevant findings:** Scores for dimension: B1 76%, B3 76%, B4 78%. Question B2 omitted. Chinese cultural dimension noted by authors as an influence and question reliability of using HSOPSC scale in a Chinese context.
Citation: Saleh, A.M., Darawad, M.W., & Al-Hussami, M. (2015). The perception of hospital safety culture and selected outcomes among nurses: An exploratory study. *Nursing and Health Sciences, 17*, 339-346. doi: 10.1111/nhs.12196 **Study tool:** HSOPSC **Geographic region:** Jordan **Sample:** **Practice area:** **Relevant findings:** English version used as English is the language of teaching and the language of Jordanian hospitals. PPR for supervisor/manager expectations: B1 44.2%, B2

41.3%, B3 45%, B4 42.6%. Overall score 43.3% for this dimension. Describes participant characteristics but does not relate them to this result.

Citation: Turunen, H., Partanen, P., Kvist, T., Miettinen, M., Vehvilainen-Julkunen, K. (2013). Patient safety culture in acute care: A web-based survey of nurse managers' and registered nurses' views in four Finnish hospitals. *International Journal of Nursing Practice, 19*, 609-617. doi:10.1111/ijn.12112

Study tool: HSOPSC, translated into Finnish

Geographic region:

Sample: 723 nurses, 109 nurse managers

Practice area: 4 acute care hospitals

Relevant findings: Aim to explore differences between staff nurses and nurse managers. PPR for nurses B1 43%, B2 69%, B3 64%, B4 70%. For nurse managers PPR B1 56%, B2 84%, B3 83%, B4 90%. Authors state that patient safety culture should be regularly reassessed.

Citation: Ugurluoglu, O., Ugurluoglu, E., Payziner, P.D., & Ozatkan, Y. Patient safety culture: Sample of a university hospital in Turkey. *Pakistan Journal of Medical Sciences*, *28*(3), 463-467.

Study tool: HSOPSC, translated into Turkish

Geographic region: Turkey

Sample: 39 nurses

Practice area: Hospitals

Relevant findings: 60.9% PPR for nurses for supervisor/manager expectations. Other than by profession, participant characteristics not analyzed relative to result.

Citation: Ulrich, B., & Kear, T. (2014). Patient safety culture in nephrology nurse practice settings: Initial findings. *Nephrology Nursing Journal*, *41*(5), 459-475.

Study tool: HSOPSC, modified

Geographic region: United States

Sample: 929 nurses and 249 nurse managers

Practice area: Nephrology nurse practice settings.

Relevant findings: Nurse and nurse manager not readily distinguishable in presentation of all results and study does not describe whether there is a difference between nurses and nurse managers. 52.4% of the 929 nurses in this study were direct care nurses. Others performed in other functions.

Citation: Verbeek-van Noord, I., Wagner, C., Van Dyck, C., Twisk, J.W., De Bruijne, M.C. (2014). Is culture associated with patient safety in the emergency department? A study of staff perspectives. *International Journal for Quality in Health Care*, *26*(1), 64-70. doi: 10.1093/intqhc/mzt087

Study tool: HSOPSC, Dutch version

Geographic region: Netherlands

Sample: 480 nurses

Practice area: Emergency

Relevant findings: Likert scale score for supervisor/manager expectations 3.5 (SD = 0.68). Authors discuss clustering and non-response bias as limitations on their study.

Citation: Vifladt, A., Simonsen, B.O., Lydersen, S., Farup, P.G. (2016a). Changes in patient safety culture after restructuring of intensive care units: Two cross-sectional studies. *Intensive and Critical Care Nursing 32*, 58-65. http://dx.doi.org/10.1016/j.iccn.2015.06.004

Study tool: HSOPSC, Norwegian version

Geographic region: Norway

Sample: 217 nurses 2008/2009, 145 nurses 2012/2013

Practice area: ICUs in 6 hospitals

Relevant findings: Longitudinal study conducted in 2008/2009 and 2012/2013. Uses data from Ballangrud study, above. Comparison of 3 restructured ICUs where general and medical ICUs merged, and 3 non restructured ICUs. Study showed that restructured units had lower patient safety culture scores than non restructured units. In the dimension of supervisor/manager expectations, authors suggest this may be attributed to higher stress and greater workload for supervisor/manager during the exercise of restructuring.

Citation: Vifladt, A., Simonsen, B.O., Lydersen, S., Farup, P.G. (2016b). The association between patient safety culture and burnout and sense of coherence: A cross-sectional study in restructured and not restructured intensive care units. *Intensive and Critical Care Nursing, 36*, 26-34. http://dx.doi.org/10.1016/j.iccn.2016.03.004

Study tool: HSOPSC, Norwegian version

Geographic region: Norway

Sample: 142 nurses

Practice area: ICU

Relevant findings: Compares HSOPSC to burnout assessment results. Refers to Ballangrud study. Positive score for HSOPSC relates to a low score for Bergen Burnout Indicator.

Citation: Wang, X., Liu, K., You, L., Xiang, J., Hu, H., Zhang, L.,..&Zhu, X. (2014). The relationship between patient safety culture and adverse events: A questionnaire survey. *International Journal of Nursing Studies, 51*, 1114-1122. http://dx.doi.org/10.1016j.ijnurstu.2013.12.007

Study tool: HSOPSC

Geographic region: China

Sample: 463 nurses

Practice area: Inpatient and emergency at 7 hospitals

Relevant findings: PPR 73.8%, Likert scale score 3.81 (SD = 0.52). Authors state that participant evaluation of patient safety culture was related to reporting of adverse events. Sample bias was suggested and participants were not considered representative of the nurse population in the city from which they were recruited. Study does not discuss the supervisor/manager expectation dimension in the analysis and conclusion.

Citation: Yilmaz, Z, & Goris S. (2015). Determination of the patient safety culture among nurses working at intensive care units. *Pakistan Journal of Medical Sciences, 31*(3), 597-601. http://dx.doi.org/10.12669/pjms.313.7059

Study tool: HSOPSC, translated into Turkish

Geographic region: Turkey

Sample: 316 nurses

Practice area: ICU in 2 hospitals

Relevant findings: 40.8% PPR. Noted that 220 participants had received patient safety training in handoffs and transitions as well as frequency of event reporting. This was found to have a positive influence on patient safety culture scores.

Appendix B – Included Studies Using Safety Attitudes Questionnaire

Citation: Abdi, Z., Delgoshaei, B., Ravaghi, H., Abbasi, M., & Heyrani, A. (2015). The culture of patient safety in an Iranian intensive care unit. *Journal of Nursing Management, 23*, 333-345. doi: 10.1111/jonm.12135

Study tool: SAQ-ICU version, translated into Farsi; qualitative interviews

Geographic region: Iran

Sample: 18 nurses

Practice area: ICU

Relevant findings: Perception of unit level management on SAQ indicated as mean score 69.5% (SD = 12.2). Two themes emerged in qualitative interviews: approval of management decisions and management support of staff. Authors note steps that can be taken by nurse leaders to foster patient safety culture.

Citation: Carvalho, P.A., Gottems, L.B., Pires, M.R., & de Oliveira, M.L. (2015). Safety culture in the operating room of a public hospital in the perception of healthcare professionals. *Revista Latino-americana de Enfermagem, 23*(6), 1041-1048. doi: 10-1590/0104-1169.0669.2647

Study tool: SAQ, translated into Portuguese

Geographic region: Brazil

Sample: 13 nurses

Practice area: Operating room

Relevant findings: Mean score for nurses' perception of unit management 63.4%. Cronbach's α for this domain is 0.63. This is a baseline study of operating room safety culture. Includes discussion of internally recommended standard of 75% and indicates score below 60%

suggests need for intervention. Dimension scores ranged from 34.4% to 74.8% for all dimensions of SAQ.
Citation: Gabrani, A., Hoxha, A., Simaku, A., & Gabrani, J. (2015). Application of the Safety Attitudes Questionnaire (SAQ) in Albanian hospitals: A cross-sectional study. *BMJ Open, 5*. http://dx.doi.org/10.1136/bmjopen-2014-006528 **Study tool:** SAQ, translated into Albanian **Geographic region:** Albania **Sample:** 132 nurses **Practice area:** 4 regional hospitals **Relevant findings:** Study does not distinguish unit level from hospital management results. Perception of management mean score 44.8% (SD = 13.1). Notes that there was no significant difference in findings of perception of physicians and nurses. States that study serves as a starting point for further research.
Citation: Haerkens, M., van Leeuwen, W., Sexton, J.B., Pickkers, P., & van der Hoeven, J.G. (2016). Validation of the Dutch language version of the Safety Attitudes Questionnaire (SAQ-NL). *BMC Health Services Research, 16:385.* doi 10:1186/s12913-016-1648-3 **Study tool:** SAQ, Dutch version **Geographic region:** Netherlands **Sample:** 623 nurses **Practice area:** 17 departments in 9 hospitals **Relevant findings:** Mean score for perception of management 2.89%. Study does not distinguish unit level from hospital level management. Purpose of this study was to provide a

baseline evaluation before the use of Crew Resource Management (CRM) as a patient safety culture intervention.

Citation: Nguyen, G., Gambashidze, N., Ilyas, S.A., & Pascu, D. (2015). Validation of the safety attitudes questionnaire (short form 2006) in Italian in hospitals in the northeast of Italy. *BMC Health Services Research,* 15:284. doi: 10.1186/s12913-015-0951-8

Study tool: SAQ, translated into Italian

Geographic region: Italy

Sample: 134 nurses

Practice area:

Relevant findings: Perception of unit management mean score 49.3% (SD = 25). Assesses Italian form of SAQ and its suitability for use.

Citation: Zakari, N.M. (2011). Attitude of academic ambulatory nurses toward patient safety culture in Saudi Arabia. *Life Science Journal, 8*(3), 230-237.

Study tool: SAQ

Geographic region: Saudi Arabia

Sample: 203 nurses

Practice area: 4 departments in one hospital; outpatient care

Relevant findings: Mean score 63% (SD = 12.7).

Appendix C – Included Studies Using a Method Other than HSOPSC or SAQ

Citation: Almutairi, A.F., Gardner, G., & McCarthy, A. (2013). Perceptions of clinical safety climate of the multicultural nursing workforce in Saudi Arabia: A cross-sectional survey. *Collegian, 20,* 187-194. http://dx.doi.org/10.1016/j.colegn.2012.08.002

Study tool: Safety Climate Survey

Geographic region: Saudi Arabia

Sample: 319 nurses

Practice area: Hospital; medical, surgical, pediatric, gynecology, medical rehabilitation

Relevant findings: 21 question survey developed at Centre for Healthcare Quality and Safety just as SAQ was. 2 questions considered relevant to supervisory leadership for safety: (1) The physician and nurse leaders in my areas listen to me and care about my concerns (3.68 (SD = 1.100)); (2) Management/leadership does not knowingly compromise safety concerns for productivity (3.53 (SD = 1.193)). Diverse cultural backgrounds of respondents, South-East Asian (30.7%), European (3.4%), South African (5.3%), Middle Eastern (4.7%).

Citation: Danielsson, M., Nilsen, P., Ohm, A., Rutberg, H., Fock, J., & Carlfjord, S. (2014). Patient safety subcultures among registered nurses and nurse assistants in Swedish hospital care: A qualitative study. *BMC Nursing, 13*:39. doi:10.1186/s12912-014-0039-5

Study tool: Semi-structured interviews

Geographic region: Sweden

Sample: 28 nurses

Practice area: Medical and surgical wards in 2 hospitals

Relevant findings: Leadership engagement and support discussed as important to patient safety. Failure of management to adhere to rules is problematic. This study confirms that perception of supervisory leadership for safety is an important element of patient safety culture.

Citation: Di Benedetto, A., Pelliccia, F., Moretti, M., d'Orsi, W., Starace, F., Scatizzi, L....&Marcelli, D. (2011). What causes an improved safety climate among the staff of a dialysis unit? Report of an evaluation in a large network. *Journal of Nephrology, 24*(5), 604-612. doi: 10.5301/JN.2011.6306

Study tool: Safety Climate Survey

Geographic region: Italy

Sample: 201 nurses

Practice area: Free standing dialysis units

Relevant findings: 2 questions considered relevant to supervisory leadership for safety: (1) The physician and nurse leaders in my areas listen to me and care about my concerns (bar graph suggests 82%); (2) Management/leadership does not knowingly compromise safety concerns for productivity (bar graph suggests 84%). This study confirms that the closer the

supervisor is to the delivery of patient care, the higher the perception of supervisory commitment to patient safety.
Citation: Smeds Alenius, L., Tishelman, C., Runesdotter, S., & Lindqvist, R. (2013). Staffing and resource adequacy strongly related to RNs' assessment of patient safety: A national study of RNs working in acute-care hospitals in Sweden. *BMJ Quality & Safety, 0*, 1-8. doi:10.1136/bmjqs-2012-001734 **Study tool:** RN4CAST and some items from HSOPSC **Geographic region:** Sweden **Sample:** 9236 nurses **Practice area:** Acute care hospitals **Relevant findings:** RNs providing direct patient care gave higher overall patient safety rating than supervisors. Visibility of leadership seen as influential factor in perception of patient safety. RN4CAST is part of a larger European Union survey on nurse retention, recruitment, and patient safety. This article is important as it gives insight into the RN4CAST and relates it to the HSOPSC.

Citation: Singer, S., Kitch, B., Rao, S., Bonner, A., Gaudet, J., Bates, D....& Campbell, E. (2012). *Journal of Patient Safety*, *8*(3), 104-124.

Study tool: Survey on Resident Safety in Nursing Homes

Geographic region: United States

Sample: 27 nurses

Practice area: Nursing homes

Relevant findings: Registered nurses are a small portion of the staff delivering direct care in this study. This study provides information on supervisory leadership for safety in nursing home setting. Findings reported as percent positively agree. 3 questions: (1) Management in my unit (my managers and supervisors) listens to CNAs (33.3%); (2) Management in my unit (my managers and supervisors) listens to staff ideas and suggestions about resident safety (55.6%); (3) Management in my unit (my managers and supervisors) does not knowingly compromise the safety of patients (66.7%).

Appendix D – QualSyst Manual for Evaluating Quality of Quantitative Studies

This Appendix is reproduced from Appendix "A" of Kmet, Lee, and Cook (2004, pp.14-19).

Definitions and instructions for quality assessment scoring

How to calculate the summary score

- **Total sum** = (number of "yes" * 2) + (number of "partials" * 1)
- **Total possible sum** = 28 – (number of "N/A" *2)
- **Summary score**: total sum / total possible sum

Quality assessment

1. Question or objective sufficiently described?

   Yes: Is easily identified in the introductory section (or first paragraph of methods section). Specifies (where applicable, depending on study design) all of the following: purpose, subjects/target population, and the specific intervention(s)/association(s)/descriptive parameter(s) under investigation. A study purpose that only becomes apparent after studying other parts of the paper is not considered sufficiently described.

   Partial: Vaguely/incompletely reported (e.g. "describe the effect of" or "examine the role of" or "assess opinion on many issues" or "explore the general attitudes" …); or some information has to be gathered from parts of the paper other than the introduction/background/objective section.

   No: Question or objective is not reported, or is incomprehensible.

   N/A: Should not be checked for this question.

2. Design evident and appropriate to answer study question?

   (If the study question is not given, infer from the conclusions).

Yes: Design is easily identified and is appropriate to address the study question/objective.

Partial: Design and/or study question not clearly identified, but gross inappropriateness is not evident; or design is easily identified but only partially addresses the study question.

No: Design used does not answer study question (e.g., a comparison group is required to answer the study question, but none was used); or design cannot be identified.

N/A: Should not be checked for this question.

3. Method of subject selection (and comparison group selection, if applicable) or source of information/input variables (e.g., for decision analysis) is described and appropriate.

Yes: Described and appropriate. Selection strategy designed (i.e., consider sampling frame and strategy) to obtain an unbiased sample of the relevant target population or the entire target population of interest (e.g., consecutive patients for clinical trials, population-based random sample for case-control studies or surveys). Where applicable, inclusion/exclusion criteria are described and defined (e.g., "cancer" – ICD code or equivalent should be provided). Studies of volunteers: methods and setting of recruitment reported. Surveys: sampling frame/strategy clearly described and appropriate.

No: No information provided. Or obviously inappropriate selection procedures (e.g., inappropriate comparison group if intervention in women is compared to intervention in men). Or presence of selection bias which likely seriously distorted the results (e.g., obvious selection on "exposure" in a case-control study).

N/A: Descriptive case series/reports.

4. Subject (and comparison group, if applicable) characteristics or input variables/information (e.g., for decision analyses) sufficiently described?

Yes: Sufficient relevant baseline/demographic information clearly characterizing the participants is provided (or reference to previously published baseline data is provided). Where applicable, reproducible criteria used to describe/categorize the participants are clearly defined (e.g., ever-smokers, depression scores, systolic blood pressure >140). If "healthy volunteers" are used, age and sex must be reported (at minimum). Decision analyses: baseline estimates for input variables are clearly specified.

Partial: Poorly defined criteria (e.g. "hypertension", "healthy volunteers", "smoking"). Or incomplete relevant baseline/demographic information (e.g., information on likely confounders not reported). Decision analyses: incomplete reporting of baseline estimates for input variables.

No: No baseline/demographic information provided. Decision analyses: baseline estimates of input variables not given.

N/A: Should not be checked for this question.

5. If random allocation to treatment group was possible, is it described?

Yes: True randomization done – requires a description of the method used (e.g., use of random numbers).

Partial: Randomization is mentioned, but method is not (i.e. it may have been possible that randomization was not true).

No: Random allocation not mentioned although it would have been feasible and appropriate (and was possibly done).

N/A: Observational analytical studies. Uncontrolled experimental studies. Surveys. Descriptive case series/reports. Decision analyses.

6. If interventional and blinding of investigators to intervention was possible, is it reported?

Yes: Blinding reported.

Partial: Blinding reported but it is not clear who was blinded.

No: Blinding would have been possible (and was possibly done) but is not reported.

N/A: Observational analytic studies. Uncontrolled experimental studies. Surveys. Descriptive case series/reports. Decision analyses.

7. If interventional and blinding of subjects to intervention was possible is it reported?

Yes: Blinding reported.

Partial: Blinding reported but it is not clear who was blinded.

No: Blinding would have been possible (and was possibly done) but is not reported.

N/A: Observational analytic studies. Uncontrolled experimental studies. Surveys. Descriptive case series/reports. Decision analyses.

8. Outcome and (if applicable) exposure measure(s) well defined and robust to measurement/misclassification bias? Means of assessment reported?

Yes: Defined (or reference to complete definitions is provided) and measured according to reproducible, "objective" criteria (e.g., death, test completion – yes/no, clinical scores). Little or minimal potential for measurement/misclassification errors. *Surveys:* clear description (or reference to clear description) of questionnaire/interview content and response options. *Decision analyses:* sources of uncertainty are defined for all input variables.

Partial: Definition of measures leaves room for subjectivity, or not sure (i.e. not reported in detail, but probably acceptable). Or precise definition(s) are missing, but no evidence or problems in the paper that would lead one to assume major problems. Or instrument/mode of assessment(s) not reported. Or misclassification errors may have

occurred, but they did not likely seriously distort the results (e.g., slight difficulty with recall of long-ago events; exposure is measured only at baseline in a long cohort study). *Surveys:* description of questionnaire/interview content incomplete; response options unclear. *Decision analyses*: sources of uncertainty are defined only for some input variables.

No: Measures not defined, or are inconsistent throughout the paper. Or measures employ only ill-defined, subjective assessments, e.g. "anxiety" or "pain." Or obvious misclassification errors/measurement bias likely seriously distorted the results (e.g., a prospective cohort relies on self-reported outcomes among the "unexposed" but requires clinical assessment of the "exposed"). *Surveys:* no description of questionnaire/interview content or response options. *Decision analyses:* sources of uncertainty are not defined for input variables.

N/A: Descriptive case series/reports.

9. Sample size appropriate?

Yes: Seems reasonable with respect to outcome under study and the study. When statistically significant results are achieved for major outcomes, appropriate sample size can usually be assumed, unless large standard errors (SE > ½ effect size) and/or problems with multiple testing are evident. *Decision analyses:* size of modeled cohort/number of iterations specified and justified.

Partial: Insufficient data to assess sample size (e.g., sample size seems "small" and there is no mention of power/sample size/effect size of interest and/or variance estimates aren't provided). Or some statistically significant results with standard errors > ½ effect size (i.e., imprecise results). Or some statistically significant results in the absence of variance

estimates. *Decision analyses:* incomplete description or justification of size of modeled cohort/number of iterations.

No: Obviously inadequate (e.g., statistically non-significant results and standard errors > ½ effect size; or standard deviations > _ of effect size; or statistically non-significant results with no variance estimates and obviously inadequate sample size. *Decision analyses:* size of modeled cohort/number of iterations not specified.

N/A: Most surveys (except surveys comparing responses between groups or change over time). Descriptive case series/reports.

10. Analysis described and appropriate?

Yes: Analytical methods are described (e.g. "chi square"/"t-tests"/"Kaplan-Meier with log rank tests", etc.) and appropriate.

Partial: Analytical methods are not reported and have to be guessed at, but are probably appropriate. Or minor flaws or some tests appropriate, some not (e.g., parametric tests used, but unsure whether appropriate; control group exists but is not used for statistical analysis). Or multiple testing problems not addressed.

No: Analysis methods not described and cannot be determined. Or obviously inappropriate analysis methods (e.g. chi-square tests for continuous data, SE given where normality is highly unlikely, etc.). Or a study with a descriptive goal/objective is over-analyzed.

N/A: Descriptive case series/reports.

11. Some estimate of variance (e.g., confidence intervals, standard errors) is reported for the main results/outcomes (i.e., those directly addressing the study question/objective upon which the conclusions are based)?

Yes: Appropriate variances estimate(s) is/are provided (e.g., range, distribution, confidence intervals, etc.). *Decision analyses:* sensitivity analysis includes all variables in the model.

Partial: Undefined "+/-" expressions. Or no specific data given, but insufficient power acknowledged as a problem. Or variance estimates not provided for all main results/outcomes. Or inappropriate variance estimates (e.g., a study examining change over time provides a variance around the parameter of interest at "time 1" or "time 2", but does not provide an estimate of the variance around the difference). *Decision analyses:* sensitivity analysis is limited, including only some variables in the model.

No: No information regarding uncertainty of the estimates. *Decision analyses:* No sensitivity analysis.

N/A: Descriptive case series/reports. Descriptive surveys collecting information using open-ended questions.

12. Controlled for confounding?

Yes: Randomized study, with comparability of baseline characteristics reported (or non-comparability controlled for in the analysis). Or appropriate control at the design or analysis stage (e.g., matching, subgroup analysis, multivariate models, etc.). *Decision analyses:* dependencies between variables fully accounted for (eg., joint variables are considered).

Partial: Incomplete control of confounding. Or control of confounding reportedly done but not completely described. Or randomized study without report of comparability of baseline characteristics. Or confounding not considered, but not likely to have seriously

distorted the results. *Decision analyses:* incomplete consideration of dependencies between variables.

No: Confounding not considered, and may have seriously distorted the results. *Decision analyses:* dependencies between variables not considered.

N/A: Cross-sectional surveys of a single group (i.e., surveys examining change over time or surveys comparing different groups should address the potential for confounding). Descriptive studies. Studies explicitly stating the analysis is strictly descriptive/exploratory in nature.

13. Results reported in sufficient detail?

Yes: Results include major outcomes and all mentioned secondary outcomes.

Partial: Quantitative results reported only for some outcomes. Or difficult to assess as study question/objective not fully described (and is not made clear in the methods section), but results seem appropriate.

No: Quantitative results are reported for a subsample only, or "n" changes continually across the denominator (e.g., reported proportions do not account for the entire study sample, but are reported only for those with complete data—i.e., the category of "unknown" is not used where needed). Or results for some major or mentioned secondary outcomes are only qualitatively reported when quantitative reporting would have been possible (e.g., results include vague comments such as "more likely" without quantitative report of actual numbers).

N/A: Should not be checked for this question.

14. Do the results support the conclusions?

Yes: All the conclusions are supported by the data (even if analysis was inappropriate). Conclusions are based on all results relevant to the study question, negative as well as positive ones (e.g., they aren't based on the sole significant finding while ignoring the negative results). Part of the conclusions may expand beyond the results, if made in addition to rather than instead of those strictly supported by data, and if including indicators of their interpretative nature (e.g., "suggesting," "possibly").

Partial: Some of the major conclusions are supported by the data, some are not. Or speculative interpretations are not indicated as such. Or low (or unreported) response rates call into question the validity of generalizing the results to the target population of interest (i.e., the population defined by the sampling frame/strategy).

No: None or a very small minority of the major conclusions are supported by the data. Or negative findings clearly due to low power are reported as definitive evidence against the alternate hypothesis. Or conclusions are missing. Or extremely low response rates invalidate generalizing the results to the target population of interest (i.e., the population defined by the sampling frame/strategy).

N/A: Should not be checked for this question.

Appendix E – QualSyst Manual for Evaluating Quality of Qualitative Studies

This Appendix is reproduced from Appendix "B" of Kmet, Lee, and Cook (2004, pp.20-22).

Definitions and instructions for quality assessment scoring

How to calculate the summary score

- **Total sum** = (number of "yes" * 2) + (number of "partials" * 1)
- **Total possible sum** = 20
- **Summary score**: total sum / total possible sum

Quality assessment

1. Question or objective sufficiently described?

   Yes: Research question or objective is clear by the end of the research process (if not at the outset).

   Partial: Research question or objective is vaguely/incompletely reported.

   No: Question or objective is not reported, or is incomprehensible.

2. Design evident and appropriate to answer study question?

   (If the study question is not given, infer appropriateness from results/conclusions).

   Yes: Design is easily identified and is appropriate to address the study question.

   Partial: Design is not clearly identified, but gross inappropriateness is not evident; or design is easily identified but a different method would have been more appropriate.

   No: Design used is not appropriate to the study question (e.g., a causal hypothesis is tested using qualitative methods); or design cannot be identified.

3. Context for study is clear?

   Yes: The context/setting is adequately described, permitting the reader to relate the findings to other settings.

Partial: The context/setting is partially described.

No: The context/setting is not described.

4. Connection to a theoretical framework/wider body of knowledge?

   Yes: The theoretical framework/wider body of knowledge informing the study and the methods used is sufficiently described and justified.

   Partial: The theoretical framework/wider body of knowledge is not well described or justified; link to the study methods is not clear.

   No: Theoretical framework/wider body of knowledge is not discussed.

5. Sampling strategy described, relevant and justified?

   Yes: The sampling strategy is clearly described and justified. The sample includes the full range of relevant, possible cases/settings (i.e., more than simple convenience sampling), permitting conceptual (rather than statistical) generalizations.

   Partial: The sampling strategy is not completely described, or is not fully justified. Or the sample does not include the full range of relevant, possible cases/settings (i.e., includes a convenience sample only).

   No: Sampling strategy is not described.

6. Data collection methods clearly described and systematic?

   Yes: The data collection procedures are systematic, and clearly described, permitting an "audit trail" such that the procedures could be replicated.

   Partial: Data collection procedures are not clearly described; difficult to determine if systematic or replicable.

   No: Data collection procedures are not described.

7. Data analysis clearly described, complete and systematic?

Yes: Systematic analytic methods are clearly described, permitting an "audit trail" such that the procedures could be replicated. The iteration between the data and the explanations for the data (i.e., the theory) is clear – it is apparent how early, simple classifications evolved into more sophisticated coding structures which then evolved into clearly defined concepts/explanations for the data). Sufficient data is provided to allow the reader to judge whether the interpretation offered is adequately supported by the data.

Partial: Analytic methods are not fully described. Or the iterative link between data and theory is not clear.

No: The analytic methods are not described. Or it is not apparent that a link to theory informs the analysis.

8. Use of verification procedure(s) to establish credibility of the study?

   Yes: One or more verification procedures were used to help establish credibility/trustworthiness of the study (e.g., prolonged engagement in the field, triangulation, peer review or debriefing, negative case analysis, member checks, external audits/inter-rater reliability, "batch" analysis).

   No: Verification procedure(s) not evident.

9. Conclusions supported by the results?

   Yes: Sufficient original evidence supports the conclusions. A link to theory informs any claims of generalizability.

   Partial: The conclusions are only partly supported by the data. Or claims of generalizability are not supported.

   No: The conclusions are not supported by the data. Or conclusions are absent.

10. Reflexivity of the account?

Yes: The researcher explicitly assessed the likely impact of their own personal characteristics (such as age, sex and professional status) and the methods used on the data obtained.

Partial: Possible sources of influence on the data obtained were mentioned, but the likely impact of the influence or influences was not discussed.

No: There is no evidence of reflexivity in the study report.

Appendix F – QualSyst Checklist for Evaluating Quality of Quantitative Studies

This checklist is drawn from Kmet, Lee, and Cook (2004, p.4).

	Criteria	YES (2)	PARTIAL (1)	NO (0)	N/A
1	Question/objective sufficiently described?				
2	Study design evident and appropriate?				
3	Method of subject/comparison group selection or source of information/input variables described and appropriate?				
4	Subject (and comparison group, if applicable) characteristics sufficiently described?				
5	If interventional and random allocation was possible, was it described?				
6	If interventional and blinding of investigators was possible, was it reported?				
7	If interventional and blinding of subjects was possible, was it reported?				
8	Outcome and (if applicable) exposure measure(s) well defined and robust to measurement/misclassification bias? Means of assessment reported?				
9	Sample size appropriate?				
10	Analytic methods described/justified and appropriate?				
11	Some estimate of variance is reported for the main results?				
12	Controlled for confounding?				
13	Results reported in sufficient detail?				
14	Conclusions supported by results?				

Appendix G – QualSyst Checklist for Evaluating Quality of Qualitative Studies

This checklist is drawn from Kmet, Lee, and Cook (2004, p.5).

	Criteria	YES (2)	PARTIAL (1)	NO (0)
1	Question/objective sufficiently described?			
2	Study design evident and appropriate?			
3	Context for the study clear?			
4	Connection to a theoretical framework/wider body of knowledge?			
5	Sampling strategy described, relevant and justified?			
6	Data collection methods clearly described and systematic?			
7	Data analysis clearly described and systematic?			
8	Use of verification procedure(s) to establish credibility?			
9	Conclusions supported by the results?			
10	Reflexivity of the account?			

Appendix H – Summary of QualSyst Quality Scores for Included Articles

Quantitative studies

Lead author	QualSyst score	Percentage score
Abdi	17/20	85%
Aboul-Fotouh	20/20	100%
Ahmed	20/20	100%
Al-Awa	20/20	100%
Al-Mandari	20/20	100%
Almutairi	20/20	100%
Ammouri	20/20	100%
Bahrami	20/20	100%
Ballangrud	20/20	100%
Brborovic	20/20	100%
Carvalho	20/20	100%
Davis	20/20	100%
Di Benedetto	20/20	100%
Feng	20/20	100%
Gabrani	19/20	95%
Gunes	20/20	100%
Haerkens	20/20	100%
Khater	20/20	100%
Kvist	20/20	100%
Mantynen	22/22	100%
Nguyen	20/20	100%
Nie	16/20	80%
Saleh	20/20	100%
Singer	20/20	100%
Smeds-Alenius	20/22	91%
Turunen	19/20	95%
Turunen	20/20	100%
Ulrich	20/20	100%
Verbeek-van Noord	20/20	100%
Vifladt (2016a)	22/22	100%
Vifladt (2016b)	22/22	100%
Wang	22/22	100%
Yilmaz	20/20	100%
Zakari	20/20	100%

Qualitative studies

QualSyst score for included quantitative studies n = 34	
Percentage score	Number of studies
100	29
95	2
91	1
85	1
78	1

Lead author	QualSyst score	Percentage score
Danielsson	20/20	100%

QualSyst score for included qualitative studies n = 1	
Percentage score	Number of studies
100	1