Factor Structure and Construct Validity of a Hospital Survey on Patient Safety Culture Survey Using Exploratory Factor Analysis

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Factor Structure and Construct Validity of a Hospital Survey on Patient Safety
Culture Survey Using Exploratory Factor Analysis

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Factor structure and the construct validity of a Hospital Survey on Patient Safety Culture Survey using exploratory factor analysis

Abstract

Objective: The purpose is to explore the underlying factor structure of the Hospital Survey on Patient Safety Culture Survey (HSOPS®), to evaluate correlations between the factors, and to extend past work by further estimating its construct validity in a large sample.

Methods: A secondary data analysis using EFA and the AHRQ HSOPS® database (December 2017 to October 2020), from nurses who shared their perceptions about hospital cultures of safety in the reporting of adverse events. Data were collected from 191,977 hospital nurse respondents in 320 U.S. hospitals.

Results: EFA obtained six factors with an eigenvalue >1 from the items loading analysis. These six factors explained 51% of the total variance, and the Kaiser-Meyer-Olkin measure of sampling adequacy was 0.97. Of the 42 primary loadings, 32 were ≥0.50, 7 were ≥0.40 and 3 were ≥0.30. Factor 1, communication-lead/advice/speak out, had the most loadings with 12 items (r = 0.354 to 0.806). Factor 2, organizational culture, and culture of safety-environment, as well as Factor 5, patient safety, tied for the second most loadings (r = 0.605 to 0.849 and 0.349 to 0.662 respectively). Factor 6, communication-resilience, rebound, improvement, had the least number of loadings and the strongest correlations (r = 0.751 to 0.924). Factor 3, psychological safety-security, protection had a moderate to moderately strong positive correlation (r=0.468 to 0.551). Factor 4, psychological safety-support/trust, had a strong positive correlation with HSOPS® items (r = 0.500 to 0.849). All factors had moderate to very strong associations with each other (range 0.354-0.924). Construct
validity, estimated through pattern matching, determined the extent to which survey items corresponded to the theoretical framework offered in this study, was moderately high.

**Discussion:** EFA conducted identified six factors and associations between the factors from items in the HSOPS®. All factors were all at least moderately to moderately strongly correlated. Three factors were very strongly correlated with each other (factors 1, 2, and 4). Construct validity was moderately high. Two theoretical framework concepts, degree of deference to expertise, and extent of resilience, were missing from most of the factors. Implications for practice, theory, and future research are offered.
Background

Patient safety is a serious, worldwide healthcare concern and persistent problem. Despite widespread efforts to improve the quality of healthcare and eliminate patient harm while in healthcare, four of every 10 patients are harmed (Auraaen, Slawomirski, & Klazinga, 2018). The World Health Organization reports one out of a million people are harmed by plane travel compared to one in 300 harmed in healthcare (World Health Organization, 2019). Preventing harm continues to be a challenge for many healthcare organizations as they strive to reduce adverse events and mitigate risk to patients. Adverse events are the third leading cause of deaths in hospitals today, behind heart disease and cancer (Sternberg, 2016). Health care organizations continue to struggle with reaching zero harm despite the challenge to reduce harm to patients since the Institute of Medicine’s (IOM) release of the groundbreaking report To Err Is Human in 1999 (Kohn et al., 1999). Adverse events are underreported by nurses. Currently, the patient safety culture survey, used to assess perceptions of safety, may be missing factors that may contribute to barriers to reporting errors. With the goal of minimizing risk, many healthcare organizations attempt to improve patient safety and reduce harm through the use of five key principles grounded in the High-Reliability Organization (HRO) theory (Weick & Sutcliffe, 2015). The purpose of this dissertation study using exploratory factor analysis, will be exploring the underlying factor structure of the Hospital Survey of Patient Safety (HSOPS®), to evaluate correlations between the factors, and to extend past work by further estimating its construct validity in a large sample.

Studying the factor structure and construct validity of the HSOPS® through exploratory factor analysis has advantages clinically. Examining psychological safety,
and feedback communications as factors in HRO principles and safety culture factors may directly address the HRO principles of deference to expertise and commitment to resilience that are important clinically, yet underexplored. The proposed research may reveal that these factors are hidden in the background of clinical health care communication and might be playing a major role in the persistent problem of underreporting adverse events and errors. Additionally, another proposed theoretical framework underlying the factors found in this EFA and CV study may support the need for a future supplemental survey to assess the factors found in this study. This study has the potential to advance nursing theory, patient safety, and extent previous research, while offering suggestions for future research studies. Current discussions by nurses, and within the medical community, underscore the relevance and timeliness of this problem. Nurse’s perceptions of factors important to patient safety and voluntary reporting of errors is especially on the minds of many nurses, considering the recent guilty verdict of a former nurse in the death of a woman accidentally given the wrong medication (American Nurses Association, 2022). The importance of identifying, assessing, and evaluating the factors that support patient safety cultures, and error reporting by nurses is needed especially now, given the concern expressed by nurses about reporting errors and the fear of being blamed.

The Agency for Healthcare Research and Quality (AHRQ) Hospital Survey of Patient Safety (HSOPS®), developed in 2004, has been the benchmark for assessing patient safety culture in health care organizations for many years (Department of Health and Human Service, 2020). The HSOPS® was developed as a grant project and until recently, has not been revised since 2004. The Version 2.0 of the HSOPS® was recently
released. The newest version has the same sections and reduces the total questions with several edits to the reporting events sections. This survey is currently offered as an alternative to the original HSOPS®, but in June of 2022, it will be the only survey available. The AHRQ HSOPS® was designed to assess staff views on patient safety culture in hospital settings. Originally developed by researcher at AHRQ and pilot tested in 2004 in 21 hospitals across six states in the U.S. The purpose of the HSOPS® instrument was to assess cultures of safety in healthcare organizations, identify any problem areas, and detect problems to improve patient safety. Meanwhile, healthcare has borrowed strategies from other industries to try to improve safety and reduce errors. The High-Reliability Organization (HRO) theory borrowed from the aeronautics and automobile industry provides five guiding principles that aim at improving safety and reducing errors. By implementing HRO theory via training into healthcare settings, executive leaders intended to educate healthcare teams on HRO principles and Just Culture, thus improving awareness of the principles and engaging participation on behaviors that result in improved patient safety culture. In the VA healthcare system, the largest integrated health care organization in the country with 155 hospitals (U.S. Department of Veteran Affairs, 2019), HRO training is a priority and is being taught since March 2019 using a phased approach throughout the VHA. Training courses are currently in progress at several VHA hospitals, with a plan to roll the training out to all VA hospitals within the next few years (U.S. Department of Veterans Affairs, 2019).

High-reliability theory involves optimizing people, structures, and processes to support safety. HRO principles include: (a) preoccupation with failure: investigate small error that are considered potential symptoms of more serious ones to come; (b) reluctance
to simplify: obtain more diversified opinions and explanations to why these errors occur; (c) sensitivity to operations: pay attention to what is happening on the front line; (d) commitment to resilience: ability to spot errors, contain them, and bounce back from these events; (e) deference to expertise: deferring to the most experienced team or person.

In acute care settings, HROs establish safety standards to improve patient care by following HRO theory and guiding principles. HRO principles provide a safety net for trust and honest communication, promoting an environment where people feel free to speak up and mistakes are used as learning opportunities rather than punishment, and can lead to improvement from feedback following event reporting (Sculli, 2020).

Effective communication skills are important for all health care providers. Effective communication is essential for safe quality of care (The Joint Commission Center for Transforming Healthcare, 2015). Studies have clearly shown that poor or missing communication between providers and patients can lead to patient harm or even death (Burgener, 2020). The Joint Commission reports that as much as 80% of adverse events in hospitals occur because of communication problems, and handoffs (The Joint Commission, 2019). One major gap in the literature identified during a synthesis of the evidence is a paucity of literature on health communication and patient safety. These reviews offer some evidence-based strategies to improve communication, from staff to staff and supervisor to staff to create an environment for effective health communication for interdisciplinary health care teams. Limited evidence exists about the important role effective, clear channels of communication have in patient safety, and the ability to reduce errors caused by miscommunication.

**Study Aims**
The collection of studies in this proposal includes an integrative review, a systematic review, and a methods study using exploratory factor analysis (EFA) and construct validity (CV). All three of the studies contribute new knowledge that helps fill gaps in the literature identified during the literature search on the research topic.

Understanding what factors affect patient safety, and specifically those factors that are associated with environments that promote and support cultures of safety and error reporting are essential to improving patient safety and reducing patient harm.

Specifically, by exploring factors and offering a new theoretical framework, informed by eight theories identified in the literature, beyond, merely HRO theory alone, missing links for nurses to feel safe and supported in reporting errors are offered. Furthermore, findings from this dissertation explore unanswered questions that may hold the solutions to improving patient safety through voluntary reporting of adverse events. The study aims of the manuscripts describe practical application of adverse event reporting and communication. The aim of the first study, Adverse Event Reporting Priorities: An Integrative Review, is to synthesize adverse event reporting (AER) priorities in acute care hospitals from quantitative, qualitative, and mixed-methods research articles.

Assumptions underlying this review are that 1) clinically, healthcare managers and quality managers want to understand how to improve compliance with adverse event reporting 2) unraveling the complexity of suboptimal adverse event reporting is possible, and through use of a theory improved methodologies and measures, and a systems approach, healthcare providers can create new solutions; and 3) if an event happens, the safety thing to do is report it.
The aim of the second study, a systematic review is to examine evidence related to communication in health care organizations to ensure patient safety, much of which focuses on patient safety cultures, HRO principles, and other health communication trainings or programs in acute care settings, especially involving nurses. As healthcare has become increasingly complex, patients present to hospitals with multiples health conditions that can predispose patients to poor outcomes. Patients do not expect to receive harm in health care systems, however health care associated harm, arising from, or associated with actions taken during the provision of health care, rather than associated with an underlying disease or injury, in an increasingly costly concern, both to patients and to health care organizations.

Adverse events, injuries to the patients that happen as a result of medical management and not due to the patients’ disease progression (Xie et al., 2017), are harmful events usually attributed to both human and process errors. Communication in healthcare is a key factor in errors and the literature finds small studies regarding training to reduce errors and support HRO ideals (Brilli et al., 2013, Gilmartin et al., 2020, Sculli et al., 2020, Shabot et al., 2013, Yates et al., 2005).

The third study is a secondary data analysis study. Exploratory factor analysis findings, as planned in the proposed research study are important in examining the factors that influence nurse’s reporting adverse events. Nurses are patient advocates who spend the most time with patients, and as such, as poised to identify and communicate potential and real harm that can reach patients. By understanding the barriers that may contribute to reporting adverse events, and failure to report adverse events, we can explore key reasons that can help improve patient safety and help
healthcare teams achieve zero harm through transparent, honest examination of such factors, including those relation to environment of psychological safety, feedback, and support for reporting errors. The exploratory factor analysis study aim is exploring these key elements will help to achieve the following: 1) to examine whether the proposed HRO subscales (psychological safety, feedback communication) can be measured using HSOPS® data collected from acute care nurses; 2) to evaluate if each item from HSOPS® strongly measures the subscales for acute care nurses; and 3) to determine the association between the subscales. The hypotheses for this study are: HA1: The proposed subscales (psychological safety, feedback communication) can be measured by using the HSOPS® survey for acute care nurses. HA2: There are significant correlations among the proposed subscales for the acute care nurse population.

Methods

Each of the three studies required a comprehensive literature review to identify relevant research studies addressing the AER, communication, theories, including HRO and other theories, and patient safety cultures in health care systems. In the first study a comprehensive literature review was conducted to identify relevant research studies addressing AER in the integrative review. The literature search included research studies, from nursing, medicine, and communication research databases, as well as reviews, and reports from AHRQ and The Joint Commission. The literature search included publications from January 1999 through the beginning of May 2021. A PRISMA diagram shows over 4400 peer reviewed article records were obtained. Inclusion and exclusion criteria resulted in 29 articles retained for final inclusion (n=21 quantitative studies, n=4 qualitative, and n=4 mixed-methods studies). Articles were
assessed using Johns Hopkins criteria, COREQ standards, and two authors reviewed the
articles for relevance and rigor. During the data evaluation stage, a decision to provide a
table featuring the multiple measurement instruments and scales identified in the research
articles provides further evidence of the difficulty of comparing adverse event studies due
to the lack of widely-used standard scales and solid research study design.

The systematic review focused on communication in hospital settings to
improve patient safety also included a complete and thorough search of the literature. The
Communication and Mass Media database, along with nursing, medicine, were reviewed.
Literature related to communication in hospital settings to improve patient safety was
systematically reviewed. Articles from January 1, 1998, to June 3, 2021, were searched.
Additionally, hand searching of reference lists and a reference librarian assisted in
locating additional relevant articles. The final number of included articles in the sample
was 18. Ten articles were from health communication journals, and the eight remaining
studies were found in other, non-health communication journals. Despite the search span
of greater than two decades, less than half of the studies, only three, were completed
within the past five years. PICO (population, intervention, comparison, and outcome)
format is a widely accepted strategy for framing research questions (Dang & Dearholt,
2019). The PICO question for this review was: How does communication affect patient
safety within high-reliability organizations? The PRISMA diagram details the search
process and the number of articles retained for inclusion in this review. Data extraction
and synthesis was conducted through independent review by two of the authors followed
by a comparison of results for inclusion criteria for concurrence. Concurrence was
achieved in 90% of the initial reviews and differences resolved following the rubric. The
level of evidence and strength of evidence was assessed using the Johns Hopkins evidence rating tools for each of the articles screened for in-depth review (Virginia Commonwealth University, 2020). The literature review also included a search for the presence of theoretical frameworks either used or mentioned in the studies. Eleven of the 18 articles reviewed used theories in the study. Of note, the most frequently mentioned theory was HRO theory, yet the theories that referenced communication theory were limited, and several noted social science and behavioral theories.

The third study utilized structural equation modeling, using exploratory factor analysis (EFA) to explore the factor structure and construct validity (CV) between the factors from the HSOPS® items and underlying theoretical framework concepts. A secondary data analysis was conducted using de-identified data from the AHRQ HSOPS® database to determine how each factor explained the items and how each factor correlated with the other. Standardized factor loadings were used to examine the reliability of the proposed factors. The 44 questions in the HSOPS® survey assess patient safety culture, organizational culture, quality of the culture of safety. While the 44 survey items assess safety culture items reliably, we wanted to see if there was evidence of the concepts related to constructs from a proposed theoretical framework in the HSOPS® survey, including psychological safety, feedback communication. These concepts are key to several HRO principles that may provide insight into gaps in patient safety (deference to expertise and extent of resilience). Descriptive statistics were included as background information of the data. Regarding measures, we ran an EFA using all of the items in the survey to see what emerged. All items which have the potential to fall into each factor were included in the EFA analysis. This data helps to clarify if there are single factors or
overlapping factors contributing to the factors and how perceptions affect reporting response. For the analysis plan, the data will be subset to only include acute care nurses. Acute care nurses were identified based on a staff position (nursing), and unit/work area (excluding support services). Using the items-based responses and keeping the Likert scale to examine the hypotheses by using the covariance metrics. Standardized factor loadings were used to examine the proposed factors. Eigenvalues were used, factor matrix/structure matrix, to examine factor loadings to each item. Additionally, the factor correlation matrix told us about the correlation between factors, the subscales in our study.

**Connections**

Developing a culture of safety is a central aim of many health care organization goals to improve patient safety and quality of care (Weaver et al., 2013). Organizations with a positive safety culture are characterized by communication founded on mutual trust, by shared perceptions of the importance of safety and by confidence in the efficacy of preventive measures (Sorra et al., 2016). A comprehensive exploration of adverse event reporting, priorities, and barriers, supports the importance of effective communication in environments where psychological safety and feedback communication may be associated with patient safety culture and adverse event reporting by health care members, especially acute care nurses who as patient advocates are uniquely poised to assess, report, and help eliminate adverse events from reaching patients.

These three manuscripts have implications for improving adverse event reporting and bring to the forefront the underlying factors that play a major role in the persistent
problem of underreporting adverse events. The evidence strongly supports the idea that perceptions of fear and blaming and retaliation, the lack of feedback, and comfort level of challenging someone more powerful present the greatest barriers to AER. The reviews describe gaps in the literature regarding the four priorities identified in the integrative review: understanding and reducing barriers, improving perceptions of AER within healthcare hierarchies, improving organizational culture, and improving outcomes measurement. Based on the EFA and CV study, a new theoretical framework is offered. Additionally, the factors identified in the EFA may provide subscales to be explored in a future research study using a proposed supplemental survey, targeting the specific factors identified in this study. The finds from these reviews may help clinicians and researchers to reduce adverse events and develop future research questions. Advancing nursing science and theory contribute to new knowledge and understanding of critical factors that affect voluntary reporting of errors by nurses. The implications for nurse researchers, nurse educators, nursing leaders, communication specialists, and patient safety managers are offered. Targeted communication strategies, supplemental surveys, new theory with constructs previously not widely researched, have the potential to advance patient safety, and sustain improvements that result in measurable patient safety outcomes in the future.
Chapter 2: Adverse Event Reporting Priorities: An Integrative Review

The integrative review, *Adverse Event Reporting Priorities: An Integrative Review* (Falcone et al., 2021), was accepted for publication in the Journal of Patient Safety, September 2021. Four key priorities were identified through the synthesis of the evidence during this integrative review. The review has universal significance; it provides important information about dynamic and complex issues associated with adverse event reporting, barriers to reporting, organizational culture, and measurement instruments used to assess patient safety, cultures, and errors within the acute care hospital setting. A review of the literature shows there are many measurement instruments to assess and evaluate patient safety cultures, however there is a lack of quantitative research supporting one ideal instrument that could help explain why health care providers underreport adverse events.

A limitation of this integrative review is that it does not provide an exhaustive list of measurement instruments. The strengths of this integrative review are that it adds a recent synthesis of studies to the literature. It delineates next steps including the need for multicorrelational work with statistical modeling as well as more interventional studies, and it provides findings that are highly clinically relevant to patient safety in the acute care setting. This is the first manuscript accepted for publication by the Journal of Patient Safety. This journal required MLM formatting for publication.
Adverse Event Reporting Priorities: An Integrative Review

Abstract

OBJECTIVES: Adverse events remain the third leading cause of death in hospitals today, after heart disease and cancer. Yet, adverse events remain underreported. The purpose of this integrative review is to synthesize adverse event reporting priorities in acute care hospitals from quantitative, qualitative, and mixed-methods research articles.

METHODS: A comprehensive review of articles was conducted using nursing, medicine, and communication databases between January 1, 1999, and May 3, 2021. Literature was described using standard reporting criteria.

RESULTS: Twenty-nine studies met the eligibility criteria. Four key priorities emerged: understanding and reducing barriers, improving perceptions of adverse event reporting within health care hierarchies, improving organizational culture, and improving outcomes measurement.

CONCLUSIONS: A paucity of literature was found on adverse event reporting within acute care hospital settings. Perceptions of fear of blaming and retaliation, lack of feedback, and comfort level of challenging someone more powerful present the greatest barriers to adverse event reporting. Based on qualitative studies, obtaining trusting relationships and sustaining that trust especially in hierarchical health care systems is difficult to achieve. Given that patient safety training is a common strategy clinically to improve organizational culture, only four published articles examined its effectiveness. Further research in acute care hospitals is needed on all four key priorities. The findings of this review may ultimately be used by clinicians and researchers to reduce adverse events and develop future research questions.
Keywords: Patient safety, safety culture, organizational culture, measurement tools, survey research, nursing, adverse events, error reporting, high-reliability theory, and organizations, HROs, health care communication.

**INTRODUCTION**

Across the United States, there is an alarmingly high rate of adverse events in health care. Adverse events are injuries to patients that happen due to medical management and are not attributed to disease progression of the patient\(^1\). Recent reports indicate that 210,000 to 400,000 patients a year die in U.S. hospitals from adverse events, the third leading cause of death in hospitals\(^1\). Adverse events are often attributed to environmental and human factors and theoretically should be avoidable, with zero harm as a guiding principle\(^2,3\).

Reporting of adverse events is fundamental to reducing patient harm\(^4\). Disclosure occurs through voluntary reporting. Staff and managers are included in the adverse event reporting (AER) process, and managers oversee giving feedback to staff\(^5\). Adverse event reports are used to help health care organizations learn from errors and improve processes to reduce future harm\(^6\). However, evidence suggests that nurses and physicians underreport adverse events\(^7\). These events include missed care and errors. Engaging health care providers to report adverse events remains a challenging issue\(^8\).

The purpose of this integrative review is to synthesize AER priorities in acute care hospitals from quantitative, qualitative, and mixed-methods research articles. Assumptions underlying this review are that (1) clinically, health care managers and quality managers want to understand how to improve compliance with AER and create a trusting culture without fear of blame and retaliation; (2) unraveling the complexity of
suboptimal AER is possible and through use of theory, improved methodologies and measures, and a systems approach, health care providers might create new solutions; and (3) if an event happens, the safest thing to do is report it. Patient care systems and environments, although complex and not perfect, are a place to start when seeking solutions about AER.

**METHODS**

**Literature Search**

A comprehensive literature review was conducted to identify relevant research studies addressing AER. Quantitative, qualitative, and mixed-methods research studies, reviews, and reports from the Agency for Healthcare Research Quality (AHRQ) and The Joint Commission were retrieved. The Cumulative Index to Nursing and Allied Health Literature (CINAHL), Medline, PubMed, and Communication and Mass Media Complete databases were used. Search terms were patient safety, safety culture, organizational culture, measurement tools, survey research, nursing, adverse events, error reporting, High-Reliability Theory, High Reliability Organizations, and health care communication. High-Reliability Organizations (HROs) refer to acute care settings that use established safety standards to improve patient care. Reference lists of included articles were also reviewed. Inclusion criteria were peer-reviewed articles (1) on AER by nurses and physicians in the acute care setting as well as data from HROs (2) that included nurses and/or physicians with direct patient contact and the opportunity to report adverse events to their supervisors and (3) were published in English from January 1, 1999, to May 3, 2021. Opinion papers, editorials, and commentaries were excluded.
The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow chart\(^9\) is presented in Figure 1. Initially, 4433 records were obtained. After review, 29 articles were included. Types of studies were quantitative (n=21; Table 1), qualitative (n=4; Table 2), and mixed methods (n=4; Table 3).

**Data Evaluation Stage**

The rigor of quantitative research articles was assessed using Johns Hopkins criteria\(^10\). Qualitative research was evaluated using Consolidated Criteria for Reporting Qualitative Research (COREQ)\(^11\). Studies were included only if they met the quality standard. PRISMA guidelines\(^9\) were used. Two authors reviewed the included articles for relevance and rigor.

**Data Analysis Stage**

Data were extracted using a standard form if the study met the quality standard and was related in any way to AER by health care providers. There were no preconceived categories when sorting articles. Data were grouped, compared, and analyzed. Articles focused on perceptions about AER by health care providers and management and on hospital-level data. Four *key priorities* emerged: understanding and reducing barriers to AER, improving perceptions of AER within health care hierarchies, improving organizational culture, and improving outcomes measurement.

**Characteristics of the Included Articles**

Twenty-nine research articles met eligibility criteria (Tables 1, 2, and 3). The sample size in these research studies ranged from 9 to 50,513. Ages of the research participants ranged from 21 to 68 years; gender, ethnicity, and educational background were not consistently reported. Overall, nurses responded to surveys at a higher rate
R (90%) than physicians (50%). Ten of the studies included only employees who worked at hospitals greater than 6 months\textsuperscript{5,6,12-19}. Participants were nurses, physicians, and managers in hospitals in the United States (n=15) and international hospitals including China (n=3), Canada (n=2), Europe (n=4), and countries in the Middle East (n=5). Three studies were\textsuperscript{5,20,21} conducted at Veteran Health Administration (VHA) facilities. The ten measurement instruments used in the published articles selected are presented in Table 4.

**RESULTS**

**Understanding and Reducing Barriers to Adverse Event Reporting**

**Fear of blame and retaliation**

Reporting errors is fundamental to improving patient safety, but not all adverse events are reported\textsuperscript{7}. Understanding the barriers to AER is essential to uncover the persistent reasons why health care providers do not report adverse events. Fear of blame and retaliation are common reasons nurses and physicians do not report errors\textsuperscript{4,7,14-16,20,22-28}; one of these studies\textsuperscript{26} identified fear as a major barrier in reporting medication errors. In the quantitative literature, four factors accounted for 67.5\% of the variance in barriers to reporting medication errors: fear, cultural barriers, lack of knowledge/feedback, and practical barriers\textsuperscript{22}. In four of the qualitative studies reviewed\textsuperscript{23,29-31}, consistent themes were fear of repercussion, inappropriate attitudes, system barriers, and feedback about errors. Other barriers include workload, interruptions, and lack of knowledge\textsuperscript{31}. Also, an important barrier is providers not prioritizing problems as reportable if they are easily resolved\textsuperscript{31}.

**Communication**
Another major barrier to AER is communication\textsuperscript{7,32}. Some studies have shown that only about 23\% of adverse events related to communication are reported by staff nurses\textsuperscript{13}. Lack of feedback after reporting adverse events was a consistent barrier reported by nurses. When results of the reporting are not communicated, many healthcare workers reported a decreased intention to report events in the future\textsuperscript{24}. Lack of closed-loop communication is consistently identified as a persistent barrier to AER\textsuperscript{33}.

**Improving Perceptions of Adverse Event Reporting Within Health Care Hierarchies**

**The influence of hierarchies**

The literature reflects the importance of health care provider roles and levels of power within organizations that contribute to the lack of AER by healthcare providers, yet only seven studies\textsuperscript{7,20,25-27,29,34} was found. Reluctance to report adverse events has been attributed to nurses’ perceptions of hierarchy\textsuperscript{7,25,27}. Power levels implied by roles within health care organizations can impede the ability to report adverse events in some cases\textsuperscript{7,20,29}.

Psychological safety, defined as the comfort level of a staff member to challenge someone more powerful and know that there will be no retribution, is a consistent influencing factor of AER\textsuperscript{34}. The relationship between psychological safety and intentions to report adverse events was explored at a large teaching hospital in the U.S.\textsuperscript{25}. Overall, they found that both the perceived power distance and leader inclusiveness predicted psychological safety (p<.001) and, in turn, predicted intention to report adverse events (p<.05). Larger hospitals and VHA organizations, by their size, the number of personnel, and reporting channels, have hierarchal organizational structures that can be a barrier to both psychological safety and event reporting\textsuperscript{20}. In one study, perceived power
hierarchy was a significant barrier to medication error reporting\textsuperscript{26}. In another study, staff in environments perceived as higher in psychological safety were significantly more willing to report errors compared to staff who work in psychologically unsafe environments\textsuperscript{20}. Recognizing the importance of psychological safety is key to reducing this obstacle to patient safety.

Deference to expertise is the ability to let the person with the most experience speak up and be heard despite traditional roles or hierarchy, promoting perceived team equality, trust, and respect\textsuperscript{35}. Team training focused on deference to expertise can mitigate hierarchical barriers to speaking up when adverse events are recognized\textsuperscript{6}. This underscores the importance of preventing adverse events rather than conducting root cause analysis after the fact. If prevention of adverse events is the goal, this priority must be addressed.

**Differences between nurse managers and staff nurses**

Perceptions of AER and barriers vary between levels of managers within organizations, frequently between nurse managers and direct care nurses. Perceptions of managers and nurses about the culture of trust and error reporting differ between nursing roles\textsuperscript{24}. Nurse managers believe that nurses report all adverse events, yet only about 14% of adverse events are reported\textsuperscript{36}. Compared to nurse managers, staff nurses perceived higher likelihood of being blamed for errors (p<.05). A much larger percentage of nurse managers (92.3%) versus only 67.5% of nurses reported that hospitals devote time, energy, and resources toward making patient safety improvements. When open communication with feedback from nurse managers was present, nurses’ intentions to
report events increased. Barriers to AER may go undetected if managers are not aware of perceived barriers that staff have in relation to reporting adverse events.

**Differences between nurses and physicians**

A few studies comparing barriers to AER between nurses and physicians showed that nurses report adverse events more than physicians. One study reported 96% of nurses versus 52% physicians completed incident reports (p<.01). Another study found 80.2% of nurses compared to 6.9% of physicians reported drug errors. Differences in experience levels between student nurses, senior nurses, resident physicians, and attending physicians showed the fear of being blamed and/or punished was highest for student nurses (Table 1).

**Improving Organizational Culture**

**Benefits**

A chief characteristic of organizational culture, as well as a benefit, is an intentional focus on psychologically safe environments. Organizational culture is a predictor of trust, and the environment of the healthcare organization enhances providers’ ability and willingness to report adverse events. Studies have shown that organizational cultures, focused on patient safety and accountability, have higher levels of safety climate.

**Patient safety culture**

One of the primary factors shown to influence AER is having a patient safety culture within the organization. Regarding missed care, 77.9% of nurses reported occasionally to always missing some aspect of nursing care. Higher hospital
management support for patient safety and frequency of event reporting has been associated with fewer medication errors (p<.05).  

Several factors explaining the relationship between nurse perceptions of patient safety culture and frequency of AER were reported in the literature. Among the factors were teamwork within the hospital, communication with each other, level of staffing, and feedback when the error happened. Patient safety culture was a positive contributing factor in AER, with nurses rating communication openness and feedback about the error most important (p<0.01). Managers typically rated patient safety culture more optimally than nurses and physicians.

**HRO and Just Culture**

HRO and Just Culture environments prioritize safety, supporting increased trust as well as promoting AER. HRO Theory provides five guiding principles: preoccupation with failure, reluctance to simplify, sensitivity to operations, commitment to resilience, and deference to expertise. Commitment to resilience is the ability to which a person or organization can spot errors, contain them, and rebound from these events. The benefits of HRO and Just Culture include reductions in mortality by 23% and preventable harm by 53% (p<0.001). Interviews from staff in exploring barriers to error reporting found HRO factors helped reduce patient safety risks.

There is no one-size-fits-all approach to implementing HRO and Just Culture in health care organizations. An important study described how a hospital system implemented HRO and Just Culture Theory. The AER rate was higher (91%) at the Truman VHA hospital that implemented HRO, and Just Culture compared to a group of all other VHA hospitals that did not (71%). Also, the total reported events were greater
at Truman VHA Hospital (n=80) compared to a group of all other VHA hospitals (n=14.3; p<.001). Compared to all VHA hospitals, Truman VA hospital experienced fewer potentially serious safety events and 30-day mortalities (Table 1).

A relationship exists between perceptions about reporting incidents and organizations with HRO and Just Culture principles. Fear of disciplinary action was lower for nurse managers (61.5%) than direct care nurses (83.6%; p<.01). When managers cultivate trust rather than blame, the trust nurses have in the patient safety process is improved. Frameworks for HRO provide processes to improve safety, yet missing factors may still exist that contribute to event reporting.

**Training**

Five studies reported training programs aimed at improving patient safety cultures through HRO and Just Culture training, focusing on avoiding individual blame and instead looking at the events and processes that led to the error, including how to fix it and mitigate risk. Training sessions varied widely, ranging from 2 to 8 hours and from 1 day to 6 months. HRO with simulation, Zero Hero, and Safety Cultural training programs were used in these five studies. However, details about the content of the interventions were often not given; thus, replication in the clinical setting is not straightforward.

According to the VHA, the largest integrated health care system in the country, training with an HRO and Just Culture and Clinical Team Training simulation is a key strategy, and its roll-out began at the Truman VHA hospital in the Midwest. Improvements in event reporting rates at Truman VHA were significantly better than at
all other VHA hospitals that had no training. The rollout of the training continues using a phased approach to all VHA hospitals.

Safety culture training was implemented in three studies. One type, Zero Hero training, focuses on the concept of eliminating preventable harm. Like HRO training, Zero Hero training demonstrated an increase in event reporting after training, yet there was no significant decrease in actual adverse events post-training. A third type was used in one study at five hospitals in China. This training implemented a hospital-designed intensive safety culture training. This study showed improvements in use of patient safety culture principles at 6 months (p<0.05) (Table 1).

**Improving Outcomes Measurement**

**Measurement of safety, culture, and workplace environment outcomes**

Ten measurement instruments—including information about the population studied, type, number of items and dimensions, dimension descriptions, and item examples—are presented in Table 4. These instruments are found in the research studies reviewed. Because AER is dynamic, one might expect a large variety of instruments. Safety, culture, and workplace environment surveys, including leader inclusiveness, psychological safety, and reporting intention, is presented in Table 4A. Error surveys are presented in Table 4B. Each of the instruments measures perceptions, attitudes, and provides insight into the importance of safety culture at individual and group levels. All the surveys contributed essential information that can help detect the presence or absence of safety cultures and areas for improvement within health care environments. Measurement instruments assessing a positive safety culture are characterized by
communications founded on mutual trust and shared perceptions of the importance of safety as well as by confidence in the efficacy of preventive measures\textsuperscript{43}.

Studies used various questionnaires to measure attitudes about safety culture. The most used survey in the VHA system is the All-Employee Survey (AES)\textsuperscript{6}. Otherwise, the AHRQ Hospital Survey on Patient Safety Culture (HSOPS\textsuperscript{®}, Version 1) is often used\textsuperscript{5,6,12-17,19} (Table 4). This 44-item survey measures 12 dimensions of patient safety culture: (1) teamwork across units, (2) staffing, (3) supervisor/manager expectations and actions promoting safety, (4) nonpunitive response to errors, (5) care handoffs and transitions, (6) feedback and communication about the error, (7) communication openness, (8) overall perceptions of patient safety, (9) management support for patient safety, (10) organizational learning and continuous improvement, (11) teamwork within units, and (12) frequency of events reported\textsuperscript{5}.

The Just Culture Assessment Tool (JCAT)\textsuperscript{33} targets the perceptions of health care providers regarding Just Culture, looking at some of the same items as the HSOPS\textsuperscript{®} such as feedback and communication, continuous improvement, and event reporting. The difference between Just Culture assessment surveys and other patient safety culture surveys is the presence or absence of a culture that supports Just Culture principles, where processes rather than people are often the root cause of the error.

**Measurement of error outcomes**

This integrative review also included surveys focused on error outcomes: missed care and medication error reporting (Table 4B). The Missed Nursing Care Survey (MISSCARE) captures nursing care missed across the continuum of care, how often the care aspect was overlooked, and why it was neglected. The survey asks nurse participants
to rate how often each care aspect was missed with response options including rarely, occasionally, frequently, and always. A second part explores 17 reasons for missed nursing care within the work area.

An adverse drug event is defined as an injury resulting from medical intervention related to a drug. One out of every three adverse events are due to a medication error. The Medication Error Reporting survey captures barriers to reporting medication errors (Table 4B).

**DISCUSSION**

The four key priorities identified in this review reflect areas in need of future research. Only studies of high quality were included, yet because no randomized controlled trials and only three high-level quasi-experimental studies were found, the overall level of evidence is low. More sophisticated methodological approaches would more adequately capture the complexity of outcomes in acute care settings. Because of the nature and number of outcomes involved in AER, future researchers might use, for example, multi-correlational designs and statistical modeling. More large-scale observational survey studies, qualitative approaches, and secondary analysis of large databases might help explore the risk factors associated with fear and communication issues that contribute to the underreporting of adverse events in the acute care setting. Additionally, it is important to note that studies included in this review may not be easily replicated in other settings. Moreover, not all study findings from other countries may be directly applicable in the United States.

No comparative effectiveness research articles were found in the literature, a finding that suggests we know little about which interventions to enhance AER are most
effective. Future research on interventions needs to include communication strategies and scenarios to improve communication skills among health care providers to enhance AER. Testing the effectiveness of interactive innovation strategies about communication skills as well as hierarchies and trust might be accomplished using simulated patients and scenarios. Examining health care providers’ incident reporting before and after interventions and comparing AER between nurses and physicians can shed light on attitudes toward event reporting over time, as was done in a longitudinal study in Italy over 6 years\textsuperscript{45}.

A wide variety of instruments applicable to the study of AER was found in the literature, reflecting the dynamic and complex nature of the problem of underreporting of AER in acute care hospital systems. Moreover, various instruments are used to measure multiple outcomes, making it challenging to compare outcomes across studies, given the various types of health care systems studied. Future research in large and diverse samples is warranted to compare research instruments to each other to determine which instruments demonstrate the strongest validity and which are the most applicable and usable clinically.

A limitation of this integrative review is that it does not provide an exhaustive list of measurement instruments. Little discussion was presented in this review on the new version of the Oro\textsuperscript{TM}\textsuperscript{46} and the HSOPS\textsuperscript{®}\textsuperscript{47} because no outcomes research in acute care settings was found in the literature. The strengths of this integrative review are that it (1) adds a recent synthesis of studies to the literature, (2) delineates next steps including the need for multi-correlational work with statistical modeling as well as more highly
controlled designs in intervention studies, and (3) provides findings that are highly clinically relevant to patient safety in the acute care setting.

CONCLUSIONS

A paucity of literature was found on AER within acute care hospital settings. Studies provided a sense of the structures (culture, climate, environment) and processes (communication, training) that contribute to the result: underreporting of adverse events in complex acute care hospital systems. The evidence strongly supports the idea that perceptions of fear of blaming and retaliation, the lack of feedback, and comfort level of challenging someone more powerful present the greatest barriers to adverse event reporting AER\textsuperscript{48}. Based on qualitative studies, obtaining trusting relationships and sustaining that trust, especially in a hierarchical health care system, is difficult to achieve. Given that patient safety trainings are a common strategy clinically, only four published articles\textsuperscript{6,12,18,42} examined the effectiveness of such trainings. This review describes gaps in the literature regarding all four priorities: understanding and reducing barriers, improving perceptions of adverse event reporting within health care hierarchies, improving organizational culture, and improving outcomes measurement. The findings of this review may ultimately be used by clinicians and researchers to reduce adverse events and develop future research questions.

Acknowledgements None
References


doi:10.1177/0193945919838990


Figure Legends

Figure 1.0 PRISMA Diagram

Figure 1.

**O** Records identified through databases searching CINHAL (EBSCO), Medline (OVID), Cochrane, PubMed & Communication and Mass Media Complete (n = 4427)

Record**s** identified through other sources Agency for Health Research Quality (AHRQ) & The Joint Commission (TJC) reports (n = 6)

Records excluded after title and abstract review (n = 4314)

Records after screened for inclusion criteria, peer reviewed, journal articles, English, and duplicates removed (n = 119)

Records excluded after methodology review (n = 90)

Total articles included (n = 29):
Quantitative (n = 21)
Qualitative (n = 4)
Mixed Methods (n = 4)
Table 1.

Quantitative studies

<table>
<thead>
<tr>
<th>Author (year)</th>
<th>Purpose</th>
<th>Design, Sample, and Method</th>
<th>Results</th>
</tr>
</thead>
</table>
| Al Lawati et al. (2019)<sup>13</sup> | Examine PSC in health care | -Descriptive  
- n=186 health care staff at 22 health care centers in Oman  
- HSOPS<sup>®</sup> | • 74% rated patient safety as very good or excellent  
• 84% reported organization learning for continuous improvement  
• 59% rated PSC as positive on all dimensions of survey  
• 46% reported errors occurring when transferring patients during handoffs  
• 40% reported AEs  
• 23% reported communication problems between the staff  
• 63% reported 0 events in past 12 months  
• 33% reported 1-5 events in past 12 months |
| Appelbaum et al. (2016)<sup>25</sup> | Explore relationship between psychological safety and intention to report AEs | -Descriptive, correlational  
- n=106 resident physicians at a large teaching hospital in U.S.  
- Cultural Perspective Questionnaire Version 4  
- Leadership inclusive scale | • Perceived power distance and leader inclusiveness both predicted psychological safety, (p <.01, R<sup>2</sup>=0.36) which in turn, predicted intention to report AEs (p<.05, R<sup>2</sup>=0.10) |
<table>
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<tr>
<th>Study</th>
<th>Methodology</th>
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<tr>
<td>Edmondson's psychological safety scale</td>
<td>Author-developed intention to report</td>
<td>- Edmondson's psychological safety scale</td>
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<tr>
<td>Bagenal et al. (2016)</td>
<td>Compare attitudes and knowledge of incident reporting and errors</td>
<td>- Descriptive, comparative</td>
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<tr>
<td></td>
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<td>- n=50 hospital nurses versus 50 physicians in England</td>
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<td>- Safety Attitudes Questionnaire</td>
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<tr>
<td>Bodur et al. (2009)</td>
<td>Compare PSC in primary healthcare units</td>
<td>- Descriptive, comparative</td>
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<tr>
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<td>- n=180 nurses and physicians at 12 healthcare centers in Turkey</td>
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<td>- HSOPS®</td>
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<td>Brilli et al. (2013)</td>
<td>Examine the effectiveness of a patient safety</td>
<td>- Quasi experimental, 1 group, pre and posttest</td>
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<td>- Serious safety event reduced post compared to pre training by 83.3%</td>
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<td>(p&lt;.001)</td>
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- 69% indicated incident reporting was beneficial
- 61% felt they would be blamed for errors
- Nurses compared to physicians:
  - 24% versus 66% felt lacked training on patient safety (p<.01)
  - 96% versus 52% filled out incident reports (p < .01)
  - 72% versus 38% confident with patient safety issues (p<.01)

- 59% reported positive response about overall perceptions of safety
- 18% reported non-punitive response to errors
- 12% reflects low percent positive ratings for frequency of events reported

- Nurses compared to physicians:
  - Lower communication openness (M=32 versus M=56, p<.05)
  - Lower feedback and communication about errors (M=35 versus M=65, p<.05)
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<tr>
<th>Research</th>
<th>Objective</th>
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<th>Findings</th>
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<tr>
<td>Chiang et al. (2006)</td>
<td>Describe nurses’ perceptions of reporting barriers to medication errors</td>
<td>Descriptive, correlational</td>
<td>Preventable harm decreased post compared to pre by 35.5% ($p&lt;0.001$)\nMortality decreased post compared to pre by 0.25% ($p&lt;0.001$) \nFear was a major perceived barrier \nWork environment factors (peer relations and quality management) and cultural factors (face-saving-concern and power hierarchy) accounted for 54.6% of the variance in barriers to medication error reporting</td>
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<tr>
<td>Gorini et al. (2012)</td>
<td>Investigate presence of blame and punishment culture in healthcare</td>
<td>Descriptive, comparative</td>
<td>Overall: \nFear of being blamed ($M=4.07$, $SD=0.62$, $p&lt;0.001$) greater than fear of being punished ($M=2.51$, $SD=0.88$, $p&lt;0.001$) \nNursing students compared to senior nurses, medical students, and physicians \nHighest fear of being punished ($M=2.91$, $SD=0.73$ versus $M=2.59$, $SD=0.84$; $M=1.81$, $SD=0.73$; and $M=1.70$, $SD=0.57$, all $p&lt;.05$).</td>
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<td>Hartmann et al. (2009)</td>
<td>Examine the relationship of organizational</td>
<td>Correlational</td>
<td>Higher levels of group and entrepreneurial culture associated with higher levels of safety climate ($p &lt; .001$),</td>
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<tr>
<td>Author(s)</td>
<td>Methodology</td>
<td>Study Population</td>
<td>Findings</td>
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<td>Hessels et al. (2019)</td>
<td>Descriptive, correlational</td>
<td>n=4652 respondents across 30 hospitals in the U.S.</td>
<td>Patient Safety Climate in Healthcare Organizations survey whereas higher levels of hierarchical culture were predictive of lower levels of safety climate (p &lt; .001)</td>
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<tr>
<td>Kakemam et al. (2021)</td>
<td>Descriptive, correlational</td>
<td>n=2295 nurses at 32 hospitals in Iran</td>
<td>Descriptive, correlational n=311 nurses at 5 hospitals across 29 units in the U.S.</td>
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<tr>
<td>Levinson (2012)</td>
<td>Descriptive, report summary</td>
<td>n=189 surveyed hospitals</td>
<td>Incident reporting systems provide incomplete information about how often events occur. Approximately 14% of adverse events are reported because of staff misperceptions about what constitutes patient harm.</td>
</tr>
<tr>
<td>McFarland et al. (2018)</td>
<td>Quasi-experimental, 1 group pre and posttest</td>
<td>Reported number of AEs, severity level of AEs, and number of near misses were not significantly reduced after as compared to before the training (p=ns)</td>
<td>Examine the reporting of errors and the impact of training program</td>
</tr>
</tbody>
</table>
Paradiso et al. (2019)\textsuperscript{24} Examine a relationship between trust, Just Culture, and error reporting

- Descriptive, comparative
- n=185 nurses versus nurse managers at a large hospital in the U.S.
- Just Culture Assessment Tool survey

- Direct care nurses compared to nurse managers (all p<.05):
  - 76.1% versus 52% reported staff members usually blamed
  - 83.6% versus 61.5% reported staff members fear disciplinary action
  - 66.4% versus 92.3% reported staff can easily approach supervisors with concerns
  - 60.4% versus 91.7% each employee is given a fair and objective follow up process
  - 65.1% versus 95.7% reported trust that the hospital will handle events fairly
  - 60.7% versus 88.5% reported trust supervisors to do the right thing
  - 59% versus 89.3% reported supervisors respect suggestions from staff members
  - 63.2% versus 92% reported there are improvements because of event reporting
  - 67.5% versus 92.3% reported hospital devotes time/energy/resources toward making patient safety improvements
  - 77% versus 100% reported hospitals sees events as opportunity for improvement

- n=102 neuro Intensive care nurses at a large hospital in the U.S.
- High reliability training intervention
- Electronic error reporting system, baseline and 6 months

- Fall frequency not different after as compared to before training (p=ns)
Rutledge et al. (2018)²

Describe medication error barriers

- Descriptive, comparative
- n=359 nurses at a community hospital in the U.S.
- Medication Error Reporting barriers questionnaire

- Overall:
  - 48.2% reported extra time documenting med error as a barrier
  - 35.9% reported forms long and time-consuming as a barrier
  - 34.3% reported fear of lawsuit as a barrier
  - 32.8% reported fear of being blamed as a barrier
  - 29% reported fear of disciplinary action as a barrier
  - 26.7% reported fear of losing respect of coworkers as a barrier
  - 18.9% reported lack of a culture of reporting errors as a barrier
  - 18.6% reported lack of feedback after reporting as a barrier
  - 12.2% reported a belief that reporting medication errors have little contribution to improving the quality of care
  - 67.5% of variance in medication error reporting from four factors: fear, cultural barriers, lack of knowledge/feedback, and practical barriers

- Advance practice nurses, versus nursing leaders versus direct care nurses versus supervisor:
  - Lack of knowledge/feedback higher in advance practice nurses than nurse leaders (M=2.46, SD=.88 versus M=1.72, SD=.71, p<.003)
  - No differences in fear, cultural barriers, and practical/utility barriers (p=ns)
<table>
<thead>
<tr>
<th>Study</th>
<th>Methodology</th>
<th>Findings</th>
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| Scherer et al. (2008) | Compare perceptions of hospital culture to patient safety | - HSOPS®<sup>®</sup> Overall:  
  40.9% reported an AE in past 12 months  
  49.4% reported 0 events completed in past 12 months  
- Nurses compared to physicians:  
  Higher supervisor/manager expectations and actions promoting safety (M=11.72, SD=1.56 versus M=10.77, SD=4.64, p<.05)  
  Higher feedback and communication about error (M=10.24, SD=2.37 versus M=9.97, SD=2.74, p<.05) |
| Sculli et al. (2020)  | Examine a High Reliability Hospital framework | - HSOPS® and AES, at baseline and 3 years  
- Truman VHA versus all VHA hospitals:  
  Truman had more optimal responses regarding identifying and assessing risks to patient safety, fear of punishment, safety training provided, self-shame in front of peers, feel free to speak up, mistakes lead to positive changes, provide feedback about changes following event reporting, discuss ways to prevent errors from occurring again, senior leadership set an example for compliance with safe patient care policy and practice to support patient safety (p<.001)  
- Truman versus all VHA hospitals (per 10,000 uniques)  
  Total reported events 80 versus 14.3 (p<.001)  
  Reported non-serious, low harm safety events 141.1 versus 22.7 (p<.001)  
  Reported potential serious safety events reduced by 62.1 versus 8.8 (p<.001)  
  Reported serious safety events 1 versus .4 (p=ns)  
- Truman versus top (90<sup>th</sup> percentile) of all VHA hospitals  
  30-day mortality rate lower |
<table>
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<tr>
<th>Source</th>
<th>Methodology</th>
<th>Sample Description</th>
<th>Findings</th>
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<tr>
<td>Sorra et al. (2010)</td>
<td>Methodological, factor analysis</td>
<td>n=50,513 staff responses at 331 in the U.S. hospitals in 2,267 units in the U.S.</td>
<td>Evidence supports multilevel nature of the 12 dimensions and 42 items of HSOPS®&lt;sup&gt;®&lt;/sup&gt;</td>
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<td>- HSOPS®</td>
<td>Reliability range, Cronbach's alpha=.62-.85, average .77</td>
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<tr>
<td>Tricarico et al. (2017)</td>
<td>Descriptive, comparative, retrospective</td>
<td>n=3200 hospital staff at hospital in Italy</td>
<td>Overall:</td>
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<td>- 3 electronic databases examining incident reports over 6 years, between Jan. 2010 and Dec. 2015</td>
<td>- Reporting rate increased from 0.29 to 0.67 (p=0.04) per full time equivalent</td>
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<td>- Modified World Health Organization International Classification of Patient Safety</td>
<td>- Reporting mild AE, moderate AE, or severe AE more likely than reporting near misses (OR=1.54, p&lt;.001, OR=1.99, p&lt;.001, OR=1.78, p&lt;.018)</td>
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<td></td>
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<td>- Nurses compared to physicians:</td>
<td>- Nurses compared to physicians:</td>
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<td>- The likelihood of self-reporting AEs greater for nurses (OR=1.51, p&lt;.001)</td>
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<tr>
<td>Vogus et al. (2007)</td>
<td>Correlational</td>
<td>n=1033 nurses and 78 nurse managers in 10 acute care hospitals in the U.S.</td>
<td>Trust in manager positively related to safety organizing (r=.33, p=.01)</td>
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<td>- Safety Organizing Scale</td>
<td>High levels in trust in manager coupled with high levels of safety organizing results in approximately 1 fewer reported medication error per unit than those with lower levels of trust (p&lt;.001)</td>
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<tr>
<td>Study</td>
<td>Objective</td>
<td>Methodology</td>
<td>Findings</td>
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<tr>
<td>Wang et al. (2014)¹⁵</td>
<td>Describe the relationship between nurses' perception of PSC and frequency of AE</td>
<td>Descriptive, correlational - n=463 nurses at 7 hospitals in China - HSOPS®</td>
<td>• Higher hospital management support for patient safety and frequency of event reporting associated with lower medication error (p&lt;.05)</td>
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<td></td>
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<td>• Higher organizational learning/continuous improvement and feedback and communication about errors and frequency of event reporting associated with fewer pressure ulcers (p&lt;.05)</td>
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<td>• Higher organizational learning/continuous improvement and communication openness associated with lower physical restraints (p&lt;.05)</td>
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<td></td>
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<td>• PSC factors unrelated to patient falls (p=ns)</td>
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<td>Xie et al. (2017)¹²</td>
<td>Examine the effectiveness of a training on nurse managers' perceptions of patient safety</td>
<td>Quasi-experimental, 1 group pre and posttest - n=83 nurse managers at 5 hospitals in China - Safety Cultural Training Program training random assignment to nurse managers implemented - HSOPS® baseline and 6 months</td>
<td>• Attitude about work safety climate improved after (M=4.09, SD=.38) compared to before (M=3.52, SD=.42) the training, (p&lt;.001)</td>
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Note. PSC=Patient Safety Culture; HSOPS®=Hospital Survey of Patient Safety; AE=Adverse Events; HRO=High-Reliability Organization
<table>
<thead>
<tr>
<th>Author (year)</th>
<th>Purpose</th>
<th>Design and Sample</th>
<th>Results</th>
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</thead>
</table>
| Carlfjord et al. (2018) | Explore experiences of incident reporting from heads of health care departments and quality coordinators | - Individual interviews and focus groups  
- n=9 nurses and midwives at 3 hospitals in Sweden | • Themes: Incident reporting is here to stay includes perceived advantages (of incident reporting being discussed on a regular basis), observed changes over time (improved attitudes), and value of the incident reporting system  
• Remaining challenges in incident reporting include the need for action, encouraged learning, continuous culture improvement, incident reporting system development, and proper use of incident reporting |
| Padgett et al. (2017) | Explore components of HRO theory useful in reducing risks to patient safety | - Case study using semi-structured interviews and observations using triangulation  
- n=14 nursing and respiratory staff at a subacute nursing facility in the U.S. | • Themes: Transitioning to HRO contributes to reduced safety incidents and costs, improves staff perceptions of the organization, and leaders should empower staff to improve decision-making |
| Polisena et al. (2015) | Explore factors influencing reporting | - Semi-structured phone interviews using triangulation  
- n=16 healthcare workers at two hospitals in Canada | • Themes: Knowledge, professional experience, incident reporting by error severity, attitudes, and feedback from errors reported |
Soydemir et al. (2017)\textsuperscript{23} & Determine barriers to error reporting according to nurses and physicians & - Descriptive, in-depth interviews  
- n=23 nurses and physicians in Turkey & • Themes: Fear, attitude of administration, system barriers, and employee's perception of error  

\textit{Note.} HRO = High-Reliability Organization
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<tr>
<th>Author (year)</th>
<th>Purpose</th>
<th>Design, Sample, and Method</th>
<th>Results</th>
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<tbody>
<tr>
<td>Armitage et al. (2010)⁷</td>
<td>Examine factors that contribute to error reporting</td>
<td>Retrospective chart audits, in-depth interviews - n=991 drug error reports from 1999-2003 in England - n=40 qualitative interviews from health care team in hospital - Incident reports randomly assigned and reviewed</td>
<td>Overall: • 22.4% reported communication as the highest rated factor contributory to AE reporting - Nurses compared to physicians (p value not reported): • 80.2% versus 6.9% report drug errors - Themes that are contributing factors to error reporting: High workload, communication deficits, interruptions and distractions, knowledge deficits, faulty cognitive processes, and inappropriate attitudes</td>
</tr>
<tr>
<td>Derickson et al. (2015)²⁰</td>
<td>Evaluate psychological safety and willingness to report errors</td>
<td>Quantitative survey, qualitative from semi-structured interviews - n=185,879 survey responses from all VHA hospitals in the U.S. - n=27,754 surveys from Hospital A and Hospital B - n=374 interviews about factors across 12 VHA hospitals - n=180 interviews about willingness to report from Hospital A and Hospital B - VHA All Employee Survey - Learning Organization Survey</td>
<td>Overall, in all VHA hospitals: • Perceived psychological safety was significant between all levels of supervisory role (none, informal team leader, first-line supervisor, manager, and executive) and higher with each higher supervisory level (p&lt;.001) - Overall interview responses across 12 hospitals: • 76% nothing would prevent their reporting AEs • 11% type or severity of error influenced their decision to report • 12% would not report errors at all • Of those that would not report, fear of retaliation most frequent deterrent • Of those that would report, common reasons were personal or professional ethics - Hospital A compared to Hospital B:</td>
</tr>
</tbody>
</table>
| Pattison et al. (2015) | Examine predictors managerial and organizational trust culture in healthcare organizations | -Quantitative within subjects using policy capturing research approach, qualitative from semi-structured interviews  
- n=29 participants using 32 scenarios in Canada  
- n=12 health care staff interviews  
- Safety Culture package developed by authors | - Overall:  
- Four of five predictors of manager-nurse trusting culture and for organizational trusting culture: 1) lack of knowing policy rather than discarding it; 2) explanation provided about how the error would be handled or not; 3) supervisor makes efforts to not blame the nurse; 4) the Executive Team plans to conduct a system review rather than holding accountable all individuals should legal action result (p<.05)  
- Awareness of a formal policy on error management did not predict the manager-nurse trusting culture ratings (p=ns)  
- R²=.40; 16% of the variance in both manager-nurse and organizational trusting cultures accounted for by the five predictors  
- Themes: Blame or punished by supervisor or organization and accountability in just and trusting culture |
|------------------------|---------------------------------|-------------------------------------------------|-------------------------------------------------|
| Wami et al. (2016)     | Examine PSC                     | -Quantitative, cross-sectional triangulated and qualitative interviews  
- n=596 healthcare staff at 4 hospitals in Ethiopia  
- n=10 interviews  
- HSOPS® | -Overall:  
- PSC judged as low at 46.7%  
- 71.3% reported organizational learning was a PSC dimension  
- 23.7% reported there was a non-punitive response to error  
- Predictors of PSC were good communication reporting an event and exchange of feedback about error (p<.05) |
-Themes: Safety culture was low, working hours, staffing levels, teamwork, communications, reporting and feedback were all contributory factors

Note. AE=Adverse event; PSC=Patient Safety Culture; HSOPS*=Hospital Survey of Patient Safety
Table 4.

Measurement instruments

<table>
<thead>
<tr>
<th>Survey Instrument and Population Studied</th>
<th>Type, Number of Items, and Dimensions</th>
<th>Dimension Descriptions</th>
<th>Item Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agency for Healthcare Research and Quality Hospital Survey on Patient Safety (HSOPS®)⁵,⁶,¹²,¹⁷,¹⁹</td>
<td>- 5-point Likert scale - 44 items - 12 dimensions (with 2 ended questions on perceptions of safety and frequency of events reported and also number of events reported and patient safety grade)</td>
<td>- Measures safety culture - Unit/department level: supervisor/manager expectations and actions promoting patient safety, organizational learning, teamwork within departments, communication openness, feedback, and communication</td>
<td>“My supervisor/manager seriously considers staff suggestions for improving patient safety” “Please give your work area/unit in this hospital an overall grade on patient safety” “Hospital units do not coordinate well with each other”</td>
</tr>
</tbody>
</table>
regarding errors, nonpunitive response to errors, and staffing

“We are given feedback about changes put into place based on event reports”

“In the past 12 months, how many event reports have you filled out and submitted”

| Cultural Perspectives Questionnaire version 4 (CPQ4) | 25
| Healthcare providers | 5-point Likert scale
| -16 items | -4 dimensions
| Measures culture perspectives using path analysis
| Power distance perceptions
| Leader inclusiveness
| Psychological safety
| Intent to report adverse events
| “My medical center has a hierarchy of authority”
| “Attendings in my department are open to hearing new ideas”
| “It is safe for me to take a risk in this department”
| “I would report a breach in confidentiality”

| Safety Attitudes Questionnaire (ICU version) | 27
| *there are 6 versions
| 5-point Likert scale
| -63 items
| -6 dimensions
| Measures perceived safety quality of collaboration between providers using
| “I have the support I need from other personnel to care for patients” |
based on the intended setting

<table>
<thead>
<tr>
<th>Healthcare providers</th>
<th>Work Environment Questionnaire (Chinese version)²⁶</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Teamwork climate</td>
<td>- 5-point Likert scale</td>
</tr>
<tr>
<td>- Job satisfaction</td>
<td>- 15 items</td>
</tr>
<tr>
<td>- Perception of</td>
<td>- 3 dimensions</td>
</tr>
<tr>
<td>management</td>
<td></td>
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<tr>
<td>- Safety climate</td>
<td></td>
</tr>
<tr>
<td>- Working conditions</td>
<td></td>
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<tr>
<td>- Stress recognition</td>
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</table>

“Morale in this ICU area is high”

“I am provided with adequate, timely information about events in the hospital that might affect my work”

“In this ICU, it is difficult to discuss errors”

“This hospital constructively deals with problem physicians and employees”

“I am less effective when I’m fatigued”

“Quality improvement processes: TQM and CQI are used to improve patient care on our unit”

“I feel comfortable asking nurses on this unit for assistance”
<table>
<thead>
<tr>
<th>Survey/Tool</th>
<th>Scale/Items</th>
<th>Dimensions</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate in Healthcare Organization (PSCHO)(^{37}) survey and the added Zammuto and Krakower surveys</td>
<td>-5-point Likert scale, -42 items, -4 dimensions</td>
<td>- Measures perceptions of safety climate and organizational culture, - Hospital contributions to safety climate</td>
<td>- “The staffing level here is sufficient to care adequately for patients”</td>
</tr>
<tr>
<td>Healthcare personnel</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Just Culture Assessment Tool (JCAT)(^{33})</td>
<td>-27 items, -6 dimensions</td>
<td>- Measures perceptions of Just Culture for a hospital setting</td>
<td>- “Senior management supports a climate that promotes patient safety”, - “My unit does a good job managing risks to ensure patient safety”, - “If people find out that I made a mistake, I will be disciplined”, - 4 scenarios that relate to group, entrepreneurial, hierarchical, and rational patterns of behavior and policies related to five key organizational characteristics</td>
</tr>
</tbody>
</table>
• Balancing a blame-free approach with accountability
  “Staff members are usually blamed when involved in an event”

• Feedback and communication
  “I feel comfortable entering report where others were involved”

• Openness of communication
  “The hospital sees events as opportunities for improvement”

• Quality of the event reporting process
  “The hospital devotes time/energy/resources toward making patient safety improvements”

• Continuous improvement
  “I trust that the hospital will handle events fairly”

• Trust
  “Staff will freely speak up if they see something that may negatively affect patient care”

Healthcare providers

All Employee Survey (AES) includes Patient Safety Culture Survey (PSCS) items

- 5-point Likert scale
- 20 items
- 1 dimension
- Measures perceptions of PSC
<table>
<thead>
<tr>
<th>Frontline staff at VHA facilities</th>
<th>Modified World Healthcare Organization Classification of Patient Safety&lt;sup&gt;45&lt;/sup&gt;</th>
<th>-4-point Likert scale</th>
<th>-Measures the providers’ attitudes toward reporting incidents that happened inside their own ward “Reporting of incidents involving any process related to the use of blood and blood components”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthcare personnel</td>
<td>• Adverse events reporting</td>
<td>Nurse/physician/other healthcare personnel</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Reporters’ profession</td>
<td></td>
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<tr>
<td>Safety Organizing Scale&lt;sup&gt;39&lt;/sup&gt;</td>
<td>-5-point Likert scale</td>
<td>-Measures self-reported behaviors enabling a safety culture</td>
<td></td>
</tr>
<tr>
<td>Healthcare providers</td>
<td>-9 items (6 items and 2 items for trust and 1 item for care pathways/standard protocols) -9 dimensions</td>
<td>• Preoccupation with failure</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>&quot;When giving report to an oncoming nurse, we usually discuss what to look out for&quot;</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>&quot;We discuss alternatives as to how to go about our normal work activities&quot;</td>
<td></td>
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</tbody>
</table>
• Reluctance to simplify interpretations sensitivity to operations

• Commitment to resilience

• Deference to expertise

• Personal commitment and belonging

• Trust in managers

"We have a good 'map' of each other’s talents and skills”

"We talk about mistakes and ways to learn from them"

"When a patient crisis occurs, we rapidly pool our collective expertise to attempt to resolve it"

“My manager has a reputation for fairness in dealing with RNs”

B. Error Surveys

| MISSCARE survey | -5-point Likert scale | -Measures how frequently |
| **Nurses** | -24 items -3 dimensions | elements of care are missed | “Vital signs assessed as ordered”  
• Assessments  
• Interventions  
• Treatments | “Turned patient every 2 hours”  
“Medications administered within 30 minutes before or after scheduled time” |
|-------------|-------------------------|-----------------------------|---------------------------------|
| **Medication Error Reporting (MER)** | -5-point Likert scale -20 items -4 dimensions | Measure barriers to medication error reporting | “Fear of being blamed”  
• Fear  
• Cultural barriers | “Lack of a culture of reporting medication errors” |
| **Healthcare providers** | -20 items -4 dimensions | Lack of knowledge/feedback | “Lack of knowledge of which medication errors should be reported”  
“Lack of readily available medication error reporting system or forms” |
Chapter 3: Communication in Hospital Settings to Improve Patient Safety: A Systematic Review

The second manuscript was submitted to the Health Communication journal on April 19, 2022. This systematic review has universal significance; it provides important information about dynamic and complex issues associated with communication among health care providers, and the impact of communication on patient safety, especially within the hospital setting. A review of the literature shows there are many strategies to create environments for effective communication among health care team members. Of the strategies in the literature, there is limited research on the important role of effective, clear channels of communication, based on theories. Of those theories found, there are few predicated on communication-related theories. Addressing this lack of research can help improve patient safety and reduce errors caused by ineffective communication. The findings of this review suggest implications for future research to examine effective communication and promote safety healthcare environments with evidence-based practices that endorse interpersonal communication in a supportive environment.

Limitations of this review may be specific to the inclusion of articles for this review. The inclusion criteria limited studies to the U.S., another limitation was the small number of quantitative studies that met inclusion criteria. Among the strengths of this review is that it identifies that few studies have examined acute hospital settings using social science or communication theory to examine how effective communication skills affect patient safety and environments where errors can be reported safely without fear of punishment.
Communication in Hospital Settings to Improve Patient Safety: 
A Systematic Review

Abstract

Communication in healthcare settings is critical to patient safety. For this systematic review, we synthesized the literature related to communication in hospital settings to improve patient safety. We searched eight databases from January 1, 1998, to February 3, 2022. We identified 18 articles describing studies that met inclusion criteria. This systematic review is necessary to fill a gap in the literature on health communication and patient safety by evaluating empirical evidence related to the impact of communication on patient safety. The purpose of the review is to synthesize the current research on communication in healthcare, as well as the theoretical frameworks underpinning the literature, and suggest implications for future research using communication-based theories to enhance communication in healthcare settings. This review will help to inform evidence-based interventions that support healthcare leaders, quality managers, and health communication specialists as they seek to provide safe, quality healthcare environments. Findings demonstrate the limited strength of research designs used in studies regarding the role of communication in optimizing patient safety. Additionally, few studies are predicated on communication-based theories, thus leaving missed opportunities for theory-based strategies to inform interpersonal healthcare team communication. Addressing this lack of research will help to improve patient safety and reduce errors related to ineffective communication.

Keywords: high-reliability theory, high-reliability organization, patient safety culture assessment, health communication, errors, adverse events, and nurses
Effective communication between healthcare providers and patients and their families is essential to safe, quality care (The Joint Commission Center for Transforming Healthcare, 2015). Patients do not expect to experience harm in healthcare settings, yet healthcare-associated harm, harm arising from or associated during the provision of healthcare rather than harm associated with an underlying disease or injury, is an increasingly costly concern to both patients and healthcare organizations. Studies have clearly shown that poor or missing communication between providers and patients can lead to patient harm or death (Burgener, 2020). The Joint Commission reports that as much as 80% of adverse events in hospitals are the result of communication problems and handoffs (The Joint Commission, 2019). These errors include medication errors, falls, treatment delays, missed care, wrong procedures, wrong-site surgeries, and wrong-patient surgeries (Maples & Colgan, 2018). Even though organizations have been challenged to reduce harm to patients since the Institute of Medicine released the groundbreaking report “To Err Is Human” in 1999, healthcare organizations struggle to reach the goal of zero harm (Kohn et al., 1999). Healthcare has become increasingly complex, and patients present to hospitals with multiple health issues, often chronic conditions that predispose them to poor outcomes.

Adverse events, defined as injuries to patients related to medical management and not attributed to the patients’ disease progression are harmful events usually attributed to both human and process errors (Xie et al., 2017). Communication in healthcare is a key factor in errors, and the use of research evidence by nurse leaders, can help mitigate the risk to patients and organizations. To date, much of the literature is limited to small studies and case studies regarding training to reduce errors and live up to organizational
ideals of high-reliability organizations (HROs; Brilli et al., 2013; Gilmartin et al., 2020; Sculli et al., 2020; Shabot et al., 2013; Yates et al., 2005). HRO principles are used as guiding standards for safe, quality care. High reliability organizations experience fewer than anticipated accidents or harmful events despite operating in highly complex, high-risk environments. There are five HRO principles: sensitivity to operations, preoccupation with failure, reluctance to simplify, commitment to resilience, and deference to expertise. Sensitivity to operations is being mindful of people, processes, and systems that impact patient care. Preoccupation with failure means catching errors and eliminating risks before they cause harm. Reluctance to simplify entails getting to the root causes of a problem rather than settling for simple explanations. Commitment to resilience means bouncing back from mistakes, getting back on track, and preventing mistakes and errors from happening again. Deference to expertise means relying on those with the most knowledge of the situation at hand, regardless of rank, hierarchy, position, or other factors. (Phillips et al., 2021).

This systematic review, following PRISMA reporting guidelines (Equator Network, 2022), examined evidence related to communication in healthcare organizations and patient safety cultures, HRO principles, and other health communication trainings/programs in acute care settings, especially involving nurses. The current review was necessary to answer the following question: How does communication affect patient safety in acute healthcare settings? The purpose of the review is to synthesize the current research on communication in healthcare, as well as the theoretical frameworks underpinning the literature, and to suggest implications for
future research using communication-based theories to enhance communication in healthcare settings.

**Patient Safety Culture**

Patient safety is the reduction in the risk of unnecessary harm associated with healthcare to an acceptable minimum (World Health Organization, 2013). Patient safety is also often referred to as a safety climate or safety culture (McCormack, 2013, p. 4). For this review, patient safety culture is defined as “the absence of preventable harm to a patient during the process of healthcare” (Sorra et al. (2016). Others, have similarly defined patient safety as being the freedom from accidental injury caused by medical care, also known as medical error (Mitchell, 2008). Organizations with a positive safety culture are characterized by communication founded on mutual trust, shared perceptions of the importance of safety, and effective preventive measures (Sorra et al., 2016; Weaver et al., 2013).

**High-Reliability Theory and Principles**

High-reliability theory involves optimizing people, structures, and processes to support safety. The five principles of high-reliability theory include: (a) preoccupation with failure: investigate small errors that are considered potential symptoms of more serious ones to come; (b) reluctance to simplify: obtain more diversified opinions and explanations as to why these errors occur; (c) sensitivity to operations: pay attention to what is happening on the front line; (d) commitment to resilience: have an ability to spot errors, contain them, and bounce back from these events; and (e) deference to expertise: defer to the most experienced team or person. HRO acute care settings use established safety standards to improve patient care by following HRO theory and guiding principles.
HRO principles provide a safety net for trust and honest communication, including the freedom to speak up and use mistakes to make positive changes by providing feedback following event reporting (Sculli, 2020). The theory underlying HROs is that creating a culture of “collective mindfulness”—in which workers look for and report small problems—can help systems address issues before they pose a risk to the organization or harm individuals (Weike & Sutcliffe, 2007). However, there are limited studies related to patient safety in the literature examining HRO frameworks. Eight studies identifying HRO implementation frameworks were found, in a recent evidence review (Veazie et al., 2022) outlining five implementation strategies for supporting HRO frameworks. In addition to HRO theory, communication theories and other communication-based theories are now emerging in the literature.

**Health Communication and Patient Safety**

As healthcare organizations develop patient safety agendas and aim to improve safety culture, various strategies aimed at improving communication have been implemented. Among those are strategies by The Joint Commission and the U.S. Agency for Healthcare Research and Quality (AHRQ) promoting the development of reporting systems to reduce adverse events and patient harm (The Joint Commission Center for Transforming Healthcare, 2015; AHRQ, 2016). Closing the loop, or using follow-up feedback communication, has been shown to be an effective method for increasing reporting as well as developing and maintaining a systematic method to communicate with hospital staff (Gandhi et al., 2005). Training on effective health communication strategies has been examined, but large studies are limited (Gilmartin et al., 2020; Noland & Carmack, 2015; Sculli et al., 2020; Woodhouse et al., 2016). The literature reviewed in
this systematic review explored the role of communication in healthcare organizations to ensure patient safety.

**Methods**

**Literature Search**

A comprehensive search for articles was conducted by the first author using nursing, medicine, and communication databases between January 1, 1998 and February 3, 2022. In late 1997, President Clinton convened an advisory group to guide him regarding the state of healthcare in America. Out of this advisory group came the famed “To Err Is Human” report from the Institute of Medicine in 1999 (Kohn et al., 1999), which outlined medical errors and their consequences and spawned efforts to improve safety in healthcare. Because of this, the search for this review dates back to 1998. Academic databases searched were Cumulative Index to Nursing and Allied Health Literature (CINAHL), Cochrane Database of Systematic Reviews, Communication and Mass Media Complete (EBSCOhost), Communication and Mass Media Complete (Gale), Medline, PsycInfo, Academic Search Premier, and PubMed. A reference librarian helped locate and further search for applicable articles using MeSH terms, truncated parts of words, and the following key words: high-reliability theory, high-reliability organization, patient safety culture assessment, health communication, errors, adverse events, and nurses. The literature search included examining the gray literature as well as The Joint Commission and the AHRQ for papers and briefs to further ensure representation from experts on communication, HROs, and HRO theory as additional resources (Yates et al., 2005; Woodhouse et al., 2016). Hand searching of journals was completed for all issues of *Journal of Health Communication* and *Health Communication*. Additionally, reference
lists of included studies were hand searched for additional, relevant articles. Articles were initially screened by title and abstract to exclude irrelevant studies. Two reviewers independently screened the remaining articles for inclusion.

The final sample included 18 articles. Ten articles were retrieved from health communication journals: five from *Journal of Health Communication* and five from *Health Communication*. The remaining eight studies were found in other, non–health communication journals. The study search spans over two decades, yet fewer than half the studies (k=3) were completed within the past 5 years.

**Inclusion and Exclusion Criteria**

Inclusion criteria were acute care hospital setting, adult patient population, English language, U.S. setting, and interventions aimed at medical professionals and/or trainees. We chose to limit this review to the United States to account for unique aspects of communication in healthcare within a single country. The exclusion criterion was studies that were not methodologically sound based on Cochrane criteria and those that examined patients’ perceptions of safety. The question for this review was: How does communication (issue) affect patient safety within acute healthcare settings (outcome)? The PRISMA diagram details the search process and the number of articles retained for inclusion in this review (Figure 1).

**Data Extraction and Synthesis**

The first author used prespecified criteria, to evaluate articles for inclusion, assess study quality, extract data, and grade strength of evidence with the second author checking. Consensus for inclusion was 90% and full consensus was reached after discussion between the two authors. Study quality was appraised using a validated tool,
the Johns Hopkins evidence rating instruments for all included studies (Virginia Commonwealth University, 2020; see Tables 1 and 2 for levels of quality). Articles were sorted by methodological type (quantitative, qualitative, and mixed methods). The analysis and summary of the included articles are presented in Table 1. Because of the heterogeneity of interventions and outcomes, we synthesized evidence qualitatively.

Results

Quality of Selected Appraised Studies

Eighteen studies met inclusion criteria. The overall strength of the evidence is low. Only three were Level 1 studies, experimental RCTs (Cunningham & Geller, 2011; Hartmann et al., 2009, Sculli et al., 2020). Half (k = 9) of the eighteen articles were Level II, quasi- or non-experimental studies (Boswell et al., 2004; Brilli et al., 2013; Gilmartin et al., 2020; Grube et al., 2010; Mayo & Duncan, 2004; McKinley & Perino, 2013; Stucky et al., 2020; White et al., 2005; Woodhouse et al., 2016). Two studies were Level III, qualitative studies (Carmack, 2010; Noland & Carmack, 2015). Three studies were Level IV, expert papers with evidence (Gandhi et al., 2005; Shabot et al., 2013; Yates et al., 2005), and one was Level V, expert opinion paper (Burgener, 2020). Additionally, only 11 of 18 studies contained theoretical frameworks. Communication theories were limited to three articles, but many articles explored communication behaviors and methods of communication without using specific communication or behavioral theoretical frameworks.

Outcomes

The evidence detailing the qualitative and quantitative findings is presented in Tables 1, 2, and 3. The qualitative studies identified three theories (narrative theory,
socialization theory, memorable messages theory) that are used in communication research. The quantitative table details eight themes and outcomes, which include (a) learning environments; (b) systematic feedback; (c) communication protocols (AIDET and SBAR); (d) organization behavior management; (e) identity and group theory (communication behavior within organizational context); (f) frameworks (competing values and HRO); (g) social network analysis; and (h) miscommunication. Positive outcomes across studies include increased patient safety culture evaluations and transition communication as well as decreased state reported medical event (SRME) and patient safety events (such as falls with injuries).

As part of this systematic review, we evaluated the presence of theoretical frameworks either used or mentioned within the studies. Of the 18 articles, 11 described or used theories. Of the eight unique theories used in included studies, three were from communication (narrative theory, socialization theory, memorable messages theory) and three were from other social sciences (socialization theory, identity theory and group identity theory, organizational behavior management theory). The most frequently occurring theory (k=5) was HRO theory (Brilli et al., 2013; Gilmartin et al., 2020; Sculli et al., 2020; Shabot et al., 2013; Woodhouse et al., 2016). Other theoretical frameworks included organizational behavioral management (OBM) theory (Cunningham & Gellar, 2011), identity theory and group identity theory (Grube et al., 2010), the competing values framework (Hartmann et al., 2009), narrative theory (Carmack, 2010), socialization and memorable messages theory (Noland & Carmack, 2015), and social network analysis (SNA) theory (Stucky, DeJong, & Kabo, 2020).
Interventions were typically education-based trainings. Most interventions (k=5) were HRO training or simulation (Brilli et al., 2013; Sculli et al., 2020; Shabot et al., 2013; Woodhouse et al., 2016; Yates et al., 2005). Others (k=4) were communication competency interventions focused on behavior and communication skills (Cunningham & Geller, 2011; Gandhi et al., 2005; McKinley & Perino, 2013; Stucky et al., 2020). Of the 18 articles, six studies assessed patient safety outcomes. The pre- and post-intervention outcomes evaluated in these studies included serious safety events (Gandhi et al., 2005), mortality rates (Brilli et al., 2013; Sculli et al., 2020), witnessed falls, procedural variances (Cunningham & Geller, 2011), hospital acquired infections (Shabot et al., 2013), and communication handoffs (Woodhouse et al., 2016). For all studies with outcomes, each one showed improvement from pre-implementation to post-implementation measures.

Eleven studies in this review were descriptive studies evaluating nurses’ perceptions (Boswell et al., 2004; Mayo & Duncan, 2004); communication skills (McKinley & Perino, 2013); communication protocols (Burgener 2020); effective communication strategies (Gandhi et al., 2005); organizational culture (Hartmann et al., 2009), and behaviors (Gilmartin et al., 2020); communication frameworks (Stucky et al, 2020); reporting response (Grube et al., 2010; McKinley & Perino, 2013); and qualitative evaluations of medical errors through storytelling (Carmack, 2010) and medical error messages, especially in hierarchical environments (Noland & Carmack, 2015). Higher levels of communication competence directly contributed to increased employee satisfaction (r=0.61, P<.01) and indirectly predicted error reporting among healthcare workers in a survey of 145 participants (McKinley & Perino, 2013). Exploring the
experiences of medical errors and communication about medical errors, for example
during narrative rituals such as morbidity and mortality conferences and other storying of
medical mistakes, provides a way to make sense and take action to prevent future
mistakes for physicians (Carmack, 2010). According to nursing students, communication
about medical errors can help interrupt errors and increase error reporting through open,
honest communication about the errors (Noland & Carmack, 2015). Given the
complexity of healthcare and the multiple channels of communication healthcare
providers navigate, focusing on strategies to improve communication and enhance patient
safety are crucial to mitigate medical errors and support healthcare team communication.

**Synthesis of Findings**

**Communication Senders and Receivers**

Two themes emerged from within and across methodological categories. First, the
complexity of interpersonal communication is described in several studies, focusing on
transitional communication between healthcare providers. Multiple studies have
identified communication as a core factor in creating and sustaining patient safety
cultures in healthcare organizations (Cunningham & Geller, 2011; Grube et al., 2010).
Understanding the interrelationships between communication skills and healthcare team
members’ attitudes and behaviors was found to be a significant factor contributing to job
satisfaction and tendency to report errors (McKinley & Perino, 2013). Results of a study
by Boswell et al. (2004) indicated that communication with physicians may be difficult
for new nurses. Nurses were more inclined to communicate with physicians who
expressed humor and empathy. McKinley et al. (2013) reported that physician use of
immediate, humorous, and/or empathic messages was linked to various forms of nurse
satisfaction, including physician communication, job satisfaction, and physician relationships (p. 159). Improving the communication competence of healthcare team members has implications for increased error reporting behavior (McKinley & Perino, 2013).

Another communication concern may exist in large healthcare organizations, which have more hierarchy and complex levels of communication. Larger organizations may experience more layers and channels for the communication to pass through to reach bedside caregivers (Hartmann et al., 2009; Sculli et al., 2020). Hartmann et al. found higher levels of hierarchical culture were predictive of lower levels of safety climate ($P < .001$). Complex levels of communication also exist between interprofessional healthcare providers. McKinley and Perino (2013) examined communication skills and error reporting in healthcare workers and found that higher levels of communication competence directly contributed to increased employee satisfaction and indirectly predicted error reporting (both $P < .01$). However, in a study by Stucky et al. (2020), where the perceptions of healthcare providers in a military surgical setting were examined, the findings showed a significant positive correlation between social distances and communication effectiveness. Using SNA theory, effective communication between staff and social distances across networks (interaction frequency, close working relationship, socialization, advice seeking, advice giving) was positively correlated for both general and specific communication ($P < .05$; Stucky et al., 2020). In summary, there are potential issues with hierarchy; however, communication across social distances may still be improved and made more effective in such environments.
Interpersonal communication problems can also occur during patient care transitions. Handoff communication, which occurs when care of a patient is transferred from one area or provider to another, is frequently linked to adverse events (The Joint Commission Center for Transforming Healthcare, 2015). Interpersonal communication is a persistent area requiring clear messaging given the complex and high-risk healthcare setting. Examples of this include handoff communication following procedures and surgeries to staff who are receiving the postoperative patient. Communication of key information can help staff detect and recognize potential problems postoperatively, when complete and pertinent patient information is handed off to the receiving staff. An example of staff-to-staff communication is described using the SBAR (situation, background, assessment, and recommendation) and AIDET (acknowledge, introduce, duration, explain, thank) protocols. These communication tools can be used to enhance the consistency of efficient and effective communication within healthcare organizations and improve patient care (Burgener, 2020; Gandhi et al., 2005; Yates et al., 2005).

Another important communication channel is communication from supervisor to staff. Communication strategies that use OBM techniques, focused on scripting communication for supervisors and nurse managers, can improve responses to reported errors (Cunningham & Geller, 2011). These techniques include active communication, individual feedback, team goals, and group feedback versus the less ideal options of no follow-up intervention or passive, punitive communication. In a study by Sculli et al. (2020), having a patient safety culture resulted in better patient safety event reporting rates than at all other Veterans Health Administration facilities ($P < .001$ and $P < .001$, respectively). Brilli et al. (2013) found “significantly reduced serious safety events
following a comprehensive patient safety program, including training focused on 
communication between teams” (p. 1638). Miscommunication between healthcare team 
members was a contributing factor in adverse events resulting in obstetric and 
gynecological patient risk (White et al., 2005). Communication interventions play an 
important role in effective team behaviors and the prevention of safety events in 
hospitals. Use of effective communication training and protocols are key strategies to 
promote safety and satisfaction while decreasing potential medical errors (Burgener, 
2020; Gandhi et al., 2005; Yates et al., 2005).

Supportive Environments

The second theme is that the environment or context in which the communication 
occurs is important, such that it is often improved in organizations that function as 
learning environments. Such organizations support taking opportunities to learn from 
mistakes, promote continuous improvement, and provide training to improve 
interdepartmental collaboration and teamwork. A study that used HRO theory included 
training to improve team communication within hospital cultures, provided a learning 
environment using mistakes as an opportunity to learn (Gilmartin et al., 2020).
Communication approaches that provide opportunities for interpersonal interaction are 
likely to yield desired behavior change. These interpersonal communication strategies 
can take into consideration social, cultural, and behavioral factors that influence health 
outcomes, such as use of simulation training, mock events, and storytelling 
(Munodawafa, 2008).

In a study of 47 nurse managers, two of the most frequently occurring patient 
safety events (procedure/treatment variance and witnessed falls) improved significantly
following OBM training of managers. Procedure variance after OBM training improved from 25% to 48% with individual feedback and 14% to 39% with group feedback (Cunningham & Geller, 2011). Witnessed falls communication improved significantly with individual feedback (25% preintervention to 35% postintervention) and group feedback (0% preintervention to 35% postintervention; Cunningham & Geller, 2011). Enhancing communication to improve patient safety can be achieved with training of all healthcare staff, including nurses, physicians, residents, and student nurses (Boswell et al., 2004; Gandhi et al., 2005; Miller et al., 2017; Stucky et al., 2020).

HROs and organizations striving to become HROs often include some form of communication training in their strategic plan. More studies like those done by Gilmartin et al. (2020) can explore how reliability-enhancing work practices can support HROs to successfully reduce harm and create safer patient care environments. Learning environments can use structured knowledge transfer, such as checklists, and communication forums for learning and improvement to engage staff and mindfully organize healthcare teams that can deliver safer, higher-quality care (Gilmartin et al., 2020).

Interpersonal communication in a supportive environment is seen in organizations considered to be learning health systems (Gilmartin et al., 2020). Such organizations view mistakes as learning opportunities and seek to improve processes, including effective team communication skills to reduce harm to patients and improve care. Patient safety and strategies to improve communication channels between healthcare team members can significantly reduce patient harm and create environments where team members trust each other and support each other in achieving shared goals of care.
without harm (Baker et al., 2006; Burgener, 2020; Gandhi et al., 2005; Patterson, 2007; Sculli et al., 2020; Stucky et al., 2020).

Theory

The theories in the reviewed studies included SNA, HRO theory, OBM theory, identity theory, group identity theory, competing values framework, narrative theory, socialization theory, and memorable messages theory. Many articles did not provide any theoretical framework. Of the theories identified, very few were based in communication theory. Among the few communication-based theories, SNA has great potential for increasing understanding of the communicative behaviors that affect patient safety.

Social Network Analysis

SNA focuses on the interactions between people, organizations, and groups, investigating how they interact with others inside their network (Stucky et al., 2020). SNA provides insight into the social influences within teams and identifies cultural issues. SNA has been used as a strategic approach to team building and understanding its influence on the dynamics of an organization’s social networks. It characterizes network structures in terms of nodes (individual actors, people, or things within the network) and the ties, links, or interactions/relationships that connect them. This has implications for quantitative and qualitative research in that researchers can examine the observed and perceived contexts of relationships and interactions through communication.

Guiding Principles of SNA Applied to Healthcare Communication

There are three guiding principles of SNA in terms of relations and networks. First, relations, not attributes, are important to understand that the causation is located in the social structure, not the individual. For example, new nurses may be hesitant to
voluntarily report adverse events or errors when perceptions are that reprimand and disciplinary action may follow; as a result, social perceptions support a culture of perceived lack of psychological safety in reporting errors. Conversely, in environments where mistakes are a source for learning and making safety improvements, the social culture is perceived to be nonpunitive in nature and is embraced as a learning environment (Gandhi et al., 2005; Gilmartin et al., 2020). More studies are needed to determine to what extent applying this first principle of SNA when creating communication strategies might improve communication between healthcare team members.

The second guiding principle of SNA is that networks, not groups, are key to understanding and learning about social structures. For example, rather than looking at specific healthcare team roles for example nurses, physicians, SNA examines how the team communicates together by first examining the largest element, the network (hospital as an organization), and working down to the smallest elements (individual team members). Other strategies that have embraced this approach to improving team communication are addressed in Cunningham and Geller’s (2011) OBM intervention, which focused on a communication intervention following reported patient safety events. The communication strategies used behavior change techniques, including active communication, individual feedback, team goals, group feedback, and positive recognition. Training targeted to manager communication and closing the loop on feedback to groups and individuals improved reporting of the top errors associated with patient safety events (procedural variance and witnessed falls). Future studies in healthcare communication focusing on the second principle of SNA, networks, is
warranted to further understand social structures and how networks differ from specific roles.

The third principle of SNA is how relations operate within a relational context. Looking beyond the implications of the relations between individuals to the broader context—the group or team—is important to understand how SNA applies to communication among healthcare workers. Multiple studies in this review demonstrated the implications of moving healthcare towards zero harm through use of HRO theory principles and embracing a culture of safety (Brilli et al., 2013; Sculli et al., 2020; Shabot et al., 2013; Woodhouse et al., 2016). More studies using SNA theory that examine the effects of social networks may provide implications for organizations with aspirations of reducing harm and improving patient safety outcomes.

Discussion

This systematic review focused on how communication affects patient safety within acute healthcare settings. A majority of the 18 included studies were one-group or smaller sample studies, and some were quality improvement projects. Overall, most studies addressed the importance of improving effective communication; however, few provided specific communication strategies that could be applied in the acute care setting with many interdisciplinary healthcare providers.

Few studies have examined HROs using social science or communication theory to determine how effective communication skills influence patient safety and perceptions of trusting environments where errors can be reported without fear of punitive outcomes. Given the theoretical underpinning in some of the reviewed studies, further exploration of identity theory and group identity theory may also provide insight into the importance of
strategies for improved communication methods. Communication senders’ and receivers’
behavior in supportive environments can provide new knowledge about what steps
organizations need to take to provide patient care without harm.

Failures to convey critical information between healthcare providers is a
significant and persistent problem. Quantitative and qualitative studies using SNA theory
can provide insight into team communication, especially for organizations that have
implemented training such as HRO training to improve patient safety (Cunningham &
Geller, 2011; Stucky et al., 2020). Understanding the communication channels from
organizations as networks, down to the individual relationships between social groups
(healthcare teams), has implications for identifying communication strategies as well as
gaps in communication techniques that require further exploration. Examining the
communication process at an organizational level and between groups can provide data to
support effective interventions to improve these environments (Gilmartin et al., 2020). As
Noland and Carmack (2015) described when they explored the education practices and
communication about medical errors from nursing students (using socialization theory
and memorable messages theory), not everyone hears about errors; hierarchy matters, and
honest, open communications about medical errors is needed (Noland & Carmack, 2015,
p. 1237).

Additional studies focused on OBM may provide insight into effective
communication strategies that support environments where healthcare workers feel
psychologically safe to report medical errors. Many training programs have focused on
simulations of conversations between team members; however, thus far this unique
approach has focused only on managers and their communication to individuals and
teams. Techniques in OBM theory move communication beyond simply checking boxes to ensuring consistent, effective closed-loop communication, which has the potential to improve perceptions of safety in reporting. In turn, safety perceptions promote a culture that encourages voluntary error reporting and improved patient safety. New approaches to communication are needed to meet the desired goals of organizations to reduce and eliminate harm.

**Limitations**

Expanding the search beyond the United States may have increased the number of articles for inclusion, although limiting studies to the United States allowed a focus on a single country’s healthcare system. Risk of bias in included studies is also a potential limitation, which we did not explicitly evaluate in the current review.

**Future Research**

More RCTs comparing effective handoff communication tools are warranted to improve patient safety consistently across healthcare systems, as opposed to individual organizations developing and using self-created handoff checklists that have not been validated by systematic, scientific inquiry. Additional comparative studies with larger sample sizes of supervisors who have received OBM training and used the communication techniques can provide more quantitative data to show how the communication techniques can improve patient outcomes, such as reduced patient falls, decreased infections, decreased length of stays, and increased patient satisfaction. Additional studies exploring social, behavioral, and communication theories (e.g., SNA, narrative theory, socialization theory, and memorable messages theory) are needed to
further examine how communication among healthcare team members can improve patient safety and quality of care.

**Conclusion**

This systematic review found that communication training improves patient safety outcomes, although the literature is limited in scope and could be enhanced by an increased research focus on how to strengthen communication networks in acute care settings. Studies examining communication in hospital settings to improve patient safety often utilize HRO theory, yet some use no theory at all. Use of theories from communication and social sciences are warranted. More research is needed to examine effective communication to promote safe healthcare environments and disseminate evidence-based practices that support clear, effective interpersonal communication in a supportive environment.
References


https://www.centerfortransforminghealthcare.org/improvement-topics/safety-culture


https://guides.library.vcu.edu/ld.php?content_id=16422487


https://doi.org/10.1097/01.AOG.0000158864.09443.77


Records identified through database searches CINAHL, Cochrane Database of Systematic Reviews, Communication and Mass Media Complete, Medline, PsycInfo, Academic Search Premier & PubMed (n = 14,646)

Additional records identified through other sources Agency for Health Research Quality (AHRQ) & The Joint Commission (TJC) reports Reference lists review (n=12)

Records excluded after title and abstract review, if not peer reviewed journal articles, journal articles that were not relevant to the topic, or in English, or if duplicate records (n=14,602)

Full text retained for further review (n=56)

Records excluded due to not meeting inclusion criteria (n=38)
Not primary study (23)
Not US (11)
Not Acute Care (2)
Instrument Validation study (2)

Total articles included (n=18)
### Table 1. Quantitative studies

<table>
<thead>
<tr>
<th>Author (year)</th>
<th>Quality of Evidence</th>
<th>Theoretical Framework</th>
<th>Purpose</th>
<th>Design, Sample, Method</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boswell et al. (2004)</td>
<td>Level IIIB</td>
<td>None</td>
<td>Examine perceptions of nursing practice and professional goals</td>
<td>Descriptive -n=67 new graduate nurses (44 BSN, 12 ADN, 2 RN-BSN, 9 LPN) within 0-12 months of hire -Author-developed survey instrument</td>
<td>• Important values: Comprehensive orientation, continuing education, and mentoring • Orientation preference: most indicated six months preferred time for orientation; 12 months for specialty areas • 60% rated continuing education as very important • 68% endorsed future goals of obtaining an advanced degree • 69% did not feel the preceptor was most supportive and encouraging influence (high number, unexpected finding)</td>
</tr>
<tr>
<td>Brilli et al. (2013)</td>
<td>Level IIA</td>
<td>HRO Theory</td>
<td>Examine the effectiveness of a patient safety</td>
<td>Quasi-experimental-Clinical and non-clinical</td>
<td>• Safety metrics in hospitals with improvement in safety culture (all p&lt;.001):</td>
</tr>
<tr>
<td>Source</td>
<td>Level</td>
<td>Requirement</td>
<td>Description</td>
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<tr>
<td>Burgener (2020)</td>
<td>Level VB</td>
<td>None</td>
<td>Discuss different communication protocols to improve effective healthcare communication.</td>
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</tbody>
</table>
|                   |       |             | • 66% reported poor communication as a major factor in health care errors.  
• Two effective communication protocols:  
  • SBAR (situation-background-assessment-recommendation), a successful framework improving nurse to physician and nurse to nurse communication and decreases report and rounding time;  
  Simulation training |

Training Intervention:  
- Hospital staff data 2010-2012  
  - n=530 events in 2010  
  - n=342 events in 2012  
- High-reliability initiative training implemented  
- Survey  
- Baseline and six months data following training  

- Serious safety event reduced after the training by 83%  
- Preventable harm decreased after the training by 35.5%  
- Mortality decreased after the training by .25%
focusing on interprofessional communication improves perceptions of medical and nursing students

- AIDET (acknowledge-introduce-duration-explain-thank), a framework tool to improve healthcare providers’ communication with patients and families; Improves communication and patient satisfaction, promotes safety, and decreases patient anxiety

**Cunningham & Geller (2011)**

Organizational Behavior Management Theory

Examine how organizational behavior management intervention affects medical errors

- Quasi-experimental
- Single hospital
- n=47 nurse managers
- n=1231 safety event reports reviewed and coded
- OBM training implemented (Training on communication

**Procedure/treatment variance comparing pre and post training (all p<.001):**
- Procedural treatment variance decreased (47% versus 32%)
- Individual feedback increased (25% versus 48%)
- Active communication using group feedback
following reported patient safety events using behavior-change techniques including active communication, individual feedback, team goal, group feedback versus no follow-up intervention, passive and punitive communication.

- Patient safety events and impact scores
- Baseline for 17 months and three months following training

<table>
<thead>
<tr>
<th>Gandhi et al. (2005)</th>
<th>Level IVA</th>
<th>None</th>
<th>Describe a systematic method for feedback</th>
<th>Single hospital report of systems</th>
<th>91% of staff perceived leadership took concerns from walking rounds</th>
<th>increased (14% versus 39%)</th>
</tr>
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<tr>
<td></td>
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<td></td>
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<td>Follow-up group feedback increased (0% versus 35%)</td>
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</table>
communicating to staff to close the loop on patient safety issues

- Hospital database of safety report and follow up progress data
  - n=74 staff

89% reported following standard process of collecting data, completing action items, and communicating results

Gilmartin et al. (2020)  Level IIA  HRO Theory

Examine factors supportive of learning and high reliability

- Descriptive, correlational
  - n=294 cardiac cath lab staff from 68 VHA
- Learning organization survey and REWP survey

- Findings from the Learning organization surveys:
  - The highest-scoring factor = learning environments
  - Second highest factor = leadership that reinforces learning
  - Third factor = concrete learning processes and practices

- Findings from the REWP survey:
  - The highest scoring factor = affective commitment
  - Second highest factor = mindful organizing
  - Third factor = organizational citizenship
Grube et al. (2010) Level IIIA Identity Theory and Group Identity Theory Explore communication behavior within organizational context 

- Descriptive, comparative 
- n=336 nurse practitioners 
- n=193 observed unsafe practices 
- n=143 did not observe unsafe practices 
- Survey

• Respectful interactions 
• The learning environment and REWP strengths across cath labs include: 
  • Presence of training programs 
  • Openness to new ideas, 
  • Respectful interaction, and 
  • Affective commitment 
• The learning environment and REWP gaps include a lack of structured knowledge transfer (example checklists) and low use of forums for learning and improvement 

• The probability of reporting unsafe practices increases as the frequency of unsafe practices increases; moderated by nurse role identity and supervisory support for reporting (p<.001) 
• The probability of reporting unsafe practices increased when nurses had a strong role identity and
Hartmann et al. (2009)  Level IIA  Competing Values Framework
Examine the relationship of organizational culture and patient safety climate
-Correlational
-n=4652 respondents across 29 VHA hospitals
-Patient Safety Climate in Healthcare Organizations survey

- Higher levels of group and entrepreneurial culture associated with higher levels of safety climate, whereas higher levels of hierarchical culture were predictive of lower levels of safety climate (all p<.001)

Mayo & Duncan (2004)  Level IIA  None
Examine perceptions of medication errors
-Descriptive, correlational
-n=983 nurses from 16 acute care hospitals
-Survey

- Differences in perceptions about the causes and reporting of medication errors
  - Causes: Illegible physician handwriting and nurse distraction or exhaustion (highest reported)
  - 45.6% believe all drug errors are reported

- The highest probability for reporting occurred when both organization and nurse role identities were low (p<.05) (an unexpected finding)
<table>
<thead>
<tr>
<th>Study</th>
<th>Level</th>
<th>Theory</th>
<th>Methodology</th>
<th>Sample Size</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>McKinley &amp; Perino (2013)</td>
<td>IIA</td>
<td>None</td>
<td>Descriptive, correlational</td>
<td>n=145 healthcare workers</td>
<td>Fear and peer reactions are reasons for not reporting. Type of unit (r=0.21; p=.01) and years of RN practice (r=.015; p&lt;.001), although significant, do not explain much about nurses’ perceptions of medication error reporting.</td>
</tr>
<tr>
<td>Sculli et al. (2020)</td>
<td>IA</td>
<td>HRO Theory</td>
<td>Descriptive, comparative</td>
<td>n=1 VHA hospital, n=155 VHA hospitals</td>
<td>Higher levels of communication competence directly contributed to increased employee satisfaction (r=0.61, P &lt; 0.01), and indirectly predicted error reporting (r=0.43, P &lt; 0.01). Truman VHA versus all VHA hospitals (per 10,000 unique encounters) comparison of pre- and post-training (all p&lt;.001): Total reported events 80 versus 14.3</td>
</tr>
</tbody>
</table>
training, Just Culture training, and Clinical Team Training simulation implemented - Surveys - Baseline and three years following training

- Reported non-serious, low harm safety events 141.1 versus 22.7
- Reported potential serious safety events reduced by 62.1 versus 8.8
- Reported serious safety events 1 versus .4 (p=ns)

• Truman versus top (90th percentile) of all VHA
• 30-day mortality rate lower

Shabot et al. (2013) Level IVA HRO Theory Describe a High-Reliability journey of a large hospital system - Descriptive, comparative - n=9 hospitals in large healthcare system journey to high reliability - Baseline and quarterly data following HRO journey

• Three main factors applied from HRO principles: 1) organizational strategy aligned with transparent reporting processes; 2) robust process improvement with high-reliability interventions; 3) cultural establishment, sustainment, and evolution to eliminate patient harm
• Results of robust process improvement and evidence-based practice changes comparing pre-and post-training:
<table>
<thead>
<tr>
<th>Stucky et al. (2020)</th>
<th>Level IIB</th>
<th>Social Network Analysis (SNA)</th>
<th>Compare perceptions of hospital culture to patient safety.</th>
</tr>
</thead>
</table>

- Hospital associated infections decreased (central line-associated bloodstream infections from 9 to 0; ventilator-associated pneumonia from 6 to 0)
- Ultrasound-guided central line insertion as best practice preventing iatrogenic pneumothorax (a consistent practice used at nine hospitals from 0% versus 89.66%)
- Hand-hygiene compliance increased (hand-hygiene rate, 44% versus 92%)

- Findings show a significant positive correlation between differences in communication effectiveness and social distances across all five networks (interaction frequency, close working relationship, socialization, advice-seeking, advice-giving) for both general
and specific communication (p<.05)

White et al. (2005) Level IIA None Examine factors that may have contributed to or caused unanticipated adverse events and patterns -Retrospective analysis -n=90 obstetrics and gynecology related risk files between 1995 and 2001 •Case categories included inpatient obstetrics cases (50%); gynecologic surgery (38%), ambulatory patients (12%) -Case reviews •78% identified contributing factors; most had more than one factor •22% unable to identify avoidable factors •Diagnostic, therapeutic, and communication issues most common factors identified: •31% had adverse events associated with communication problems (patient dissatisfaction, caregiver miscommunication, between patient and caregiver miscommunication) •31% had clinical performance issues (treatment and surgery care) •18% has diagnostic issues (misdiagnosis,
<table>
<thead>
<tr>
<th>Study</th>
<th>Level</th>
<th>Theory</th>
<th>Description</th>
<th>Findings</th>
</tr>
</thead>
</table>
| Woodhouse et al. (2016) | IIA   | HRO      | Describe safety program effect on the quality of care and safety culture of large multisite systems | - Outcome comparisons for pre- and post-training:  
  - Evaluation of patient safety culture improved (62.2% versus 82.3%, p<.001)  
  - SMREs decreased (6 versus 3) between 2009-2016 (p<.0028)  
  - Average days between SRMEs increased (174 versus 541 days, p<.0075)  
  - Handoffs and transitions improved by 8%, above the national average of 45% (45% versus 53%) |
| Yates et al. (2005)    | IVA   | None     | Describe the High-Reliability journey of large hospital systems           | - Result of quality and safety improvement comparing pre- and post-training:  
  - Patient falls with injury decreased by 38.9% (0.73 versus 0.44) |
Systemwide safety culture training - Baseline and 3 years following training.

Legend: Patient Safety (PS); Social Network Analysis (SNA); State Reported Medical Event (SMRE); Level I (experimental study, RCTs); Level II (quasi-experimental study); Level III (non-experimental study, qualitative); Level IV (expert with evidence, clinical guidelines); Level V (literature review, subject matter expert opinion); Grade (quality): A(high), B (good), and C (low) (Virginia Commonwealth University, 2020). HRO=High-Reliability Organization; REWP=Reliability Enhancing Work Practices.
<table>
<thead>
<tr>
<th>Author</th>
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<th>Theoretical Framework</th>
<th>Purpose</th>
<th>Design, Sample, and Level of Evidence</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carmack (2010)</td>
<td>Level IIIA</td>
<td>Narrative Theory</td>
<td>Explore experiences of medical errors</td>
<td>-In-depth interviews</td>
<td>• Themes: The idea of bearing witness to medical mistakes emerged as a central way to narratively make sense of medical mistakes, listening to mistake narratives, inevitable disruption of “Good” Medicine</td>
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<td></td>
<td>-n=30 physicians at VHA hospital</td>
<td>• Storying medical mistakes for health care practitioners and health communication scholars</td>
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<td></td>
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<td></td>
<td></td>
<td>• Narrative rituals like morbidity and mortality conferences are designed for physicians to attend to, represent, and take action to prevent future mistakes</td>
</tr>
<tr>
<td>Noland &amp; Carmack (2015)</td>
<td>Level IIIA</td>
<td>Socialization Theory and Memorable Messages Theory</td>
<td>Explore education practices and communication about medical errors</td>
<td>-In-depth interviews</td>
<td>• Themes: Not everyone hears about errors, hierarchy matters, passive communication is the best way to interrupt or report an error; the need for honest,</td>
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<td></td>
<td></td>
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<td>-n=68 nursing students</td>
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</table>

open communication about medical errors

Legend: Level I (experimental study, RCTs); Level II (quasi-experimental study); Level III (non-experimental study, qualitative); Level IV (expert with evidence, clinical guidelines); Level V (literature review, subject matter expert opinion); Grade (quality): A (high), B (good), and C (low) (Virginia Commonwealth University, 2020).
Chapter 4: Factor structure and construct validity of a Hospital Survey on Patient Safety Culture Survey using exploratory factor analysis

The third manuscript was submitted to the International Journal of Nursing Studies in April, 2022. We conducted a secondary data analysis using exploratory factor analysis to analyze data from the AHRQ, SOPS database, using de-identified data to determine how each factor explained the items and how each factor correlated with the other. The purpose of the study was to explore the factor structure of the HOSPS® and evaluate correlations between the factors. Additionally, we aimed to extend past work by further estimating its construct validity in a large sample. Identifying the factors and their associations with each other was important in determining whether the factors and proposed theoretical framework concepts could be used to measure data from nurses that assessed concepts, not currently assessed in the HOSPS®, but necessary for perceptions of patient safety and reporting of errors. Additionally, we wanted to determine the association between the factors and the proposed theoretical framework. The 44 questions in the HSOPS® survey assess patient safety culture, organizational culture, quality of culture of safety. While the 44 survey items assess safety culture items reliably, we were interested in finding out if there was evidence of the concepts that relate to theoretical framework, derived from eight theories, not merely HRO theory, in the HSOPS® survey. We were especially interested in the factors with themes of psychological safety, feedback communication. These concepts are key to theories within the theoretical framework that may provide insight into gaps in patient safety (e.g. deference to expertise and extent of resilience). Descriptive statics included reporting
response as background information of the data. A basic assumption of EFA is that within the collection of observed variables, there exists a set of underlying factors, smaller than the observed variables, that can explain the interrelationships among those variables. Extraction method of principal components was used to extract the final items that represent the final indicators. The eigenvalues greater than one rule and scree tests were used to determine the number of factors to retain.

Psychological safety is measure as the perceived ability to report safety events with the assurance of security ad protection, the belief and trust that someone will not be punished when a mistake is made. Thus, questions that relate to security, protection and trust will be associated with this subscale. Feedback communication is key to the theoretical framework concept of degree of deference to expertise as it encourages communication voicing concerns and listening to experts despite the class/social hierarchy system. Therefore, questions that relate to feedback communication relate to this concept. The subscales reflect constructs that combine HSOPS® items into constructs from the theoretical framework. Our hypotheses include: HA1: The proposed subscales (psychological safety, feedback communication) can be measured by using the HSOPS® survey for acute care nurses. HA2: There are significant correlations among the proposed subscales for the acute care nurse population. The data includes 87 variables and 191,977 individual observations. Data will be analyzed using SPSS 27.0. The dataset provided by AHRQ has already been screened and cleaned. The findings from this study are clinically relevant for health care clinicians, managers, and researchers. Understanding the factors of psychological safety and feedback communication provide direction and need for further research. Research findings from this study, combined with findings from the
EXPLORATORY FACTOR ANALYSIS: EXAMINING THE

integrative review, and the systematic review provide a foundation for further research. In
the findings from the communication systematic review, social network analysis theory,
focusing on networks, rather than groups of people, such as nurses, may provide evidence
linking the need to direct the focus on networks, rather than individual groups. This
research can guide future research questions and direct targeted health care
communication need to improve patient safety. Health care communication, reporting of
adverse events, and understanding the factors that remain persistent barriers is clinically
necessary to improve quality of care and eliminate patient harm. This research may help
direct exploration and confirmation of a supplemental survey which can inform nursing
practice that can have a significant impact on improve health care safety and quality
through improved communication strategies.
Factor structure and the construct validity of a Hospital Survey on Patient Safety Culture Survey using exploratory factor analysis

ABSTRACT

Objective The purpose of this paper is to explore the underlying factor structure of the Hospital Survey on Patient Safety Culture Survey (HSOPS®), to evaluate correlations between factors, and to extend previous work by further estimating its construct validity in a large sample.

Methods We conducted exploratory factor analysis using secondary data from the Agency for Healthcare Research and Quality HSOPS® database (December 2017 to October 2020), reflecting individual responses from nurses about their perceptions of patient safety culture in the reporting of adverse events. Data were collected from 191,977 hospital nurse respondents from 320 U.S. hospitals and 249 hospital units; 87 variables were included. Construct validity was estimated using pattern matching to determine the extent to which survey items corresponded to the theoretical framework offered in this study.

Results The exploratory factor analysis obtained six factors with an eigenvalue >1 from the loading analysis, which explained 51% of the total variance. The Kaiser-Meyer-Olkin measure of sampling adequacy was 0.97. Of the 42 primary loadings, 32 were ≥0.50, 7 were ≥0.40, and 3 were ≥0.30. Factor 1 (communication-lead/advice/speak out) had the most loadings with 12 items (r=0.354-0.806). Factor 2 (organizational culture and culture of safety-environment) and Factor 5 (patient safety) tied for the second most loadings (r=0.605-0.849 and r=0.349-0.662 respectively). Factor 6 (communication and resilience-reporting/rebound/resilience/...
improvement) had the least number of loadings and the strongest items loading (r=0.751-0.924). Factor 3 (psychological safety-security/protection) had a moderate to moderately strong positive items loading (r=0.468-0.551). Factor 4 (psychological safety-support/trust) had a strong positive correlation with items (r=0.500-0.849). All factors had moderate to very strong associations with each other (range 0.354-0.924). Construct validity was moderately strong. The operationalization of patient safety culture in the HSOPS® was not sufficient regarding two elements of the theoretical framework: deference to expertise and commitment to resilience.

**Discussion** Based on the analysis, a change in the measurement of patient safety culture is recommended. A supplemental survey with items on deference to expertise and commitment to resilience should be developed and tested using confirmatory factor analysis. Attention to these elements, as well as use of comprehensive theoretical frameworks, is essential to the continued quest to achieve zero harm.

Keywords: Exploratory factor analysis; construct validity; patient safety culture; nursing
What is already known about this topic?

- The Agency for Healthcare Research and Quality Hospital Survey on Patient Safety Culture Survey (HSOPS®) is widely used and measures nurses’ views on patient safety culture in hospitals.

- Patient safety culture in adverse event reporting requires further study.

What this paper adds

- We successfully used exploratory factor analysis to determine the factor structure of the HSOPS®.

- To our knowledge, this is the first study that has pattern matched factors of the HSOPS® with a theoretical framework to examine construct validity.

- The current study offers an extensive theoretical framework as the new lens with which patient safety culture in adverse error reporting can be better understood.
EXPLORATORY FACTOR ANALYSIS: EXAMINING THE

INTRODUCTION

Zero harm reflects the idea that patients should receive no harm due to health care-associated plans and actions in the provision of care and that any potential harms should be caught by nurses through observation, anticipation, and planning before any actual harm occurs. After all, nurses are patient advocates who spend the most time giving direct care and, as such, are poised to identify and communicate potential and real harm that might reach patients. Yet, adverse events, the third leading cause of death in hospitals, are underreported by nurses (Sternberg, 2016).

Patient safety culture, first emphasized in the Institute of Medicine’s groundbreaking report, To Err Is Human (Kohn et al., 1999), is even more important today. Health care organizations continue to struggle with reaching zero harm. Patient safety culture is the extent to which these beliefs, values, and norms support and promote patient safety. Currently, nurses are more concerned and fearful than ever about reporting errors. In recent news reports, a nurse who voluntarily reported an adverse event was criminally charged (Sherman, 2022). Clinically, cultures are needed that create a safe environment for error reporting and ensure that optimal support for error reporting exists. According to the SOPS Hospital database report (2021), patient safety culture reflects what is rewarded, supported, expected, and accepted in an organization as it relates to patient safety. Equally important to clinical considerations, is the systematic evaluation of measures used to assess patient safety culture in hospitals.

The Agency for Healthcare Research and Quality (AHRQ) Hospital Survey on Patient Safety Culture™ (HSOPS®), developed by Westat, assesses nurses’ views on patient safety culture in hospital settings (Agency for Healthcare Research and Quality,
2016). Examination of its items and their relationships within the survey may reveal key areas to improve the measurement of patient safety culture. The primary purpose of this paper is to explore the underlying factor structure of the Hospital Survey on Patient Safety Culture. The second purpose is to evaluate correlations between the factors. Because only preliminary work on construct validity testing of the HSOPS was found in the literature (Sorra & Dyer, 2010), the third purpose is to extend previous work by further evaluating the construct validity of HSOPS in a large sample. Thus far, actions like wide-spread education on patient safety culture do not seem to be sufficient to advance hospitals’ mission to achieve zero harm. Creating innovative theoretical and methodologic approaches to improve patient safety culture might ultimately reduce adverse events resulting in patient harm.

**Theoretical framework**

The theoretical framework draws upon empirical studies (n=47), literature reviews (n=12), reports (n=4), and discussion papers (n=4). Several unique theories were identified in the studies: memorable messages theory, social network analysis theory, narrative theory, socialization theory, identity theory and group identity theory, organizational behavior management theory, competing values framework, and high reliability organization (HRO) theory—in particular, involves optimizing people, structures, and processes to support safety (Hendrich & Haydar, 2017). Though a systematic process, six elements emerged from the literature (Hage, 1972). The elements support the culture of reporting and looking for potential unsafe conditions before they become harmful. The elements are: (a) degree of psychological safety, (b) degree of organizational culture, (c) quality culture of safety, (d) degree of HRO, (e) degree of
deference to expertise, and (f) extent of resilience. Degree of psychological safety refers to feeling secure that one will not be punished when a mistake is made (Derickson et al., 2015). Degree of organizational culture refers to the beliefs, values, and norms shared by nurses throughout the organization that influence their actions and behaviors; inherent to this concept are the ideas of feeling supported, safety focused, and a sense of fairness (Hartmann, et al., 2009). Quality of culture of safety refers to the social values, behaviors, and environment (Sutcliffe, 2011). Degree of HRO refers to an organization with predictable and repeatable systems that support consistent operations while catching and correcting potentially catastrophic errors before they happen (Bonser, 2022). Degree of deference to expertise is the ability of the person with the most experience being able to speak up and lead despite hierarchy or traditional roles (Sutcliffe, 2011). Finally, extent of resilience refers to the ability to bounce back, rebound, and learn from mistakes (Sutcliffe, 2011). Through a comprehensive review of literature and this six-element theoretical framework of patient safety culture, we offer nurses a broader perspective including, yet going beyond, HRO theory, which has been used for decades.

METHODS

Participants and setting

We conducted an EFA to analyze secondary data from the AHRQ HSOPS® database, reflecting individual responses from nurses about their perceptions of patient safety culture in the reporting of adverse events. HSOPS® data came from hospital respondents surveyed between December 2017 and October 2020. These data were collected from 191,977 hospital nurse respondents from 320 U.S. hospitals and 249 hospital units; 87 variables were included. The average response rate from the hospitals
was 60% (Famolaro et al., 2021). The study was approved by the University Institutional Review Board (IRB #2082431) prior to implementation.

**Survey instrument**

The original HSOPS® Version 1 data were used in this analysis; a large data base pertinent to this measure was available. The HSOPS® has 44 items that assess nurses’ views on patient safety culture (safety culture, organizational culture, and quality of the culture of safety). Of these, the two items that provided rankings of overall hospital safety were not analyzed. The instrument’s 12 composite measures, items, and definitions are presented in Table 1. The survey uses a 6-point Likert scale (strongly disagree to strongly agree and does not apply or don’t know). Negatively worded questions were reverse coded (AHRQ, 2021). The psychometric properties of the HSOPS®, in both English and other language versions, have been analyzed using confirmatory factor analysis to assess the factor structure (Bodor & Filiz 2010; Ito et al., 2011; Perneger et al., 2014) and some work on the construct validity of the HSOPS® has been accomplished (Sorra & Dyer, 2010). The reliability of HSOPS® has been confirmed with Cronbach’s alpha (\(\alpha\)) for each composite measure ranging from 0.62 to 0.85, with an average of 0.77 (Sorra & Dyer, 2010). All composite measures had acceptable reliability (\(\alpha\geq0.70\)), except the staffing composite measure (\(\alpha=0.62\)) (Sorra & Dyer, 2010).

**Data collection**

Data collection began after requesting data for secondary analysis from the Westat Research company and 2021 AHRQ HSOPS® data. Deidentified data were provided, and no changes were made to the data.
Data analysis

EFA is not a single statistical method; rather, it includes structure-analyzing procedures to identify interrelationships among a large set of observed variables. Then, through data reduction, a smaller set of those variables is grouped into factors that have common characteristics. The aim of EFA is to describe variables in terms of a smaller number of underlying dimensions (Gaskin & Happel, 2014). In the current study, EFA was used to determine the factors explained by the items and how each factor correlated with each other. An EFA using the 42 items in the survey was conducted to determine which items met criteria for loading on each factor.

We used eigenvalues and factor matrix/structure matrix to examine factor loadings of each item. Kaiser’s rule of an eigenvalue >1 was used to determine the factors to retain (Mertler & Reinhart, 2017). The acceptable range for factor loading in EFA is >0.3 (Norman & Streiner, 2014). The cutoffs used for the Kaiser-Meyer-Olkin measure of sampling adequacy are 0.80 as good, 0.90 as great, and >0.90 as superb (Kellar & Kelvin, 2013). Also, the factor correlation matrix provided the correlation between factors. Oblique rotation is often used by nurse researchers to measure factors that are typically correlated, such as psychological and social factors with psychosocial constructs (Gaskin & Happel, 2014). Because we had a dataset with a large number of cases, we chose to apply oblique rotation Promax. This approach allowed us to reduce the number of measures of interest into a smaller number of factors to be used in the analysis. SPSS 27.0 was used with a significance level set at a 95% confidence interval and a $P$ value <0.05.
Construct validity is the degree to which a measure reflects its relevant theoretical framework or underpinnings (Nunnally & Bernstein, 1994; Trochim, 2001). To estimate construct validity, pattern matching was used (Shadish, Cook, & Campbell, 2002). A synthesis, illustrated in table form, was conducted to see if the items reflect the elements in the relevant theoretical framework (Trochim, 2001). From this, whether the measurement should be changed is determined.

RESULTS

Factor loadings

Factor loading for the 6 factors is presented in Table 2. All six factors had an eigenvalue >1 from the EFA. These six factors explained 51% of the total variance, and the Kaiser-Meyer-Olkin measure of sampling adequacy was 0.97. The structure identified six factors of the 42 primary loadings, 32 were ≥0.50, 7 were ≥0.40, and 3 were ≥0.30. No significant cross loadings were found. Factor 1 (communication-lead/advice/speak out) has the most loadings with 12 items with coefficients ranging from 0.354 to 0.806. The correlation was moderate to very strong. Factor 2 (organizational culture and culture of safety-environment) tied for the second most loadings, along with factor 5, having eight items with coefficients ranging from 0.605 to 0.849. The correlation was moderately strong to very strong. Factor 3 (psychological safety-security/protection) had the fourth most loadings out of the six factors, having seven items with coefficients ranging from 0.468 to 0.551. The correlation was moderate to moderately strong. Factor 4 (psychological safety-support/trust) was fifth out of six factor loadings, having four items with coefficients ranging from 0.500 to 0.849. The correlation was moderately strong to very strong. Factor 5 (patient safety) was tied for second most factor loadings,
having eight items with coefficients ranging from 0.349 to 0.662. The correlation was moderate to moderately strong. Factor 6 (communication and resilience-reporting/rebound/resilience/improvement) had the least number of factor loadings, having three items with coefficients ranging from 0.751 to 0.924. The correlation was very strong.

**Correlations among the obtained six factors**

Using EFA with oblique Promax rotation, analysis of the correlation of the six factors with each other is shown in Table 3. The strength of the relationship based on correlation coefficients can be interpreted using the following rule of thumb: a value of 0.00 indicates no relationship; values between 0.01 and 0.24 are weak; values between 0.25 and 0.49 are moderate; values between 0.5 and 0.74 are moderately strong; values between 0.75 and 0.99 are very strong; and a value of 1.00 is perfect (Holcomb, 2017).

Regarding the relationships between the factors, all were at least moderately to moderately strongly correlated, with three factors very strongly correlated with each other (Factors 1, 2, and 4). The strongest correlation, \(r=0.663\) was found between Factor 1 (communication-lead/advice/speak out) and Factor 4 (psychological safety-support/trust). The weakest correlation \(r=-0.252\) was found between Factor 3 (psychological safety-security/protection) and Factor 6 (communication and resilience-reporting/rebound/resilience/improvement).

**Construct validity**

Construct validity estimated through pattern matching was used to determine the extent to which survey items corresponded to the theoretical framework offered in this study.
Table 4 presents pattern matching (depicted as X) of items that loaded on HSOPS® factors compared with the theoretical framework. The most items matched with quality culture of safety. The least number of items (only 5 out of 42) matched with degree of deference to expertise; the second to the least number of items (only 7 out of 42) matched with extent of resilience, indicating the need for more items corresponding to these elements. Every time there was an X denoting a match for the degree of deference to expertise, there was also an X denoting a match for the degree of psychological safety.

**DISCUSSION**

We successfully used EFA to determine the factor structure of the HSOPS®. Construct validity was moderately strong. To our knowledge, this is the first study that has pattern matched factors of the HSOPS® with a theoretical framework to examine construct validity. The operationalization of patient safety culture in the HSOPS® was not sufficient regarding two elements of the theoretical framework: deference to expertise and commitment to resilience. Finally, the current study offers an extensive theoretical framework as the new lens with which patient safety culture in adverse error reporting can be better understood.

EFA of HSOPS® items were classified into six factors. Factor 1 measured communication and the ability to lead/advise and speak up and Factor 6 represented communication resilience including reporting, rebound/resilience, improvement. Factors 2 and 5 represented safety, patient safety and organizational culture. Factors 3 and 4 represented psychological safety (protective and trust respectively). The results indicated that Factor 3 and Factor 4 need to be examined further to better understand factors that affect perceptions of safety and voluntary reporting of errors by acute care nurses.
Results of this study are similar to those reported in previous studies focusing on HSOPS items factor analysis. Factor 1 (communication-lead/advice/speak up) was similar to findings reported by Sculli et al. (2020). They identified the freedom to speak up and report mistakes is provided when a safety net of trust and honest communication exists (Sculli et al., 2020). Factor 2 (organizational culture and culture of safety-environment) was also found to be important in perceived patient safety cultures, a standard that was set by health care leaders. Current studies identify necessary skillsets of HRO leaders. Among the 20 leadership skills found to be essential in recent studies, deference to expertise and resiliency are listed as required skills (Logan-Athmer, 2022).

Factor 3 (psychological safety-security/protection) and Factor 4 (psychological safety-support/trust) differ in their center of focus. Conceptually these factors are different; security is external and trust is internal. Therefore, it makes sense that they loaded separately. Psychological safety is especially important when examining barriers to error reporting and minimizing harm in health care. These findings are in agreement with previous work and provide broader understanding of importance of supporting patient safety cultures, where health care staff, especially nurses, feel psychologically safe to report patient safety events and mitigate patient harm. A study exploring the importance of psychological safety found the relationship of perceived power distance and leader inclusiveness both predicted psychological safety and in turn, predicted intention to report adverse events as statistically significant ($P<0.01, R^2=0.36$; $P<0.05, R^2=0.10$, respectively; Appelbaum et al., 2016). Perceived psychological safety has been shown to an important predictor of willingness to report error across all roles based on more than 27,700 survey responses from VHA hospital staff (Derickson et al., 2015).
example, 77.9% of nurses in a recent study reported occasionally to always missing some aspect of nursing care. Predictors of missed care were overall perceptions of patient safety, management support for patient safety, and handoffs and transitions (Hessels et al., 2019).

Factor 5 (patient safety) was expected given that the aim of the HSOPS is to assess perceived views of patient safety culture; those concepts related to culture, environment, safety and quality could be expected to relate across the factors. Multiple studies support the importance of organizational cultures of safety as foundational in supporting patient safety cultures (Gorini et al., 2012; Hartmann et al., 2009; Kakemam et al., 2021; Pattison & Kline 2015; Wami et al., 2016).

Factor 6 (communication and resilience-reporting/rebound/resilience/improvement) was also expected. Since the recent COVID pandemic started, an emphasis on resilience is more often seen in the literature. Health care leaders are recognizing the importance of resilience, the ability to rebound from mistakes and learn, rather than merely blame. Recent reports consider resilience as key to reducing stress and coping with change. Stress has been associated with medication errors and other adverse events (Chiang & Pepper, 2006; Rutledge et al., 2018). Focusing on resilience is critical to supporting staff who feel safe to recognize, report, and speak up for patient safety, despite role or position (Sculli, 2020).

EFA is a statistical method often used in nursing research with the aim of explaining the correlations between items in terms of one or more latent factors. Correlations in this study found the strongest correlation was between Factor 1 (communication-lead/advice/speak out) and Factor 4 (psychological safety-support/trust).
As found in the literature review, a high correlation was expected between
communication and psychological safety (Derickson et al, 2015; Paradiso & Sweeney,
2019). By understanding the correlations, we may identify causes that contribute to
reporting adverse events as well as those contributing to failure to report adverse events.

Implications for practice, based on our study findings, include the discovery of
factors and their correlation with each other from nurse perceptions to improve patient
safety culture. Identifying the correlations with discovered factors may help health care
teams achieve zero harm through transparent, honest examination of such factors,
including those related to environments that support psychological safety, especially
deference to expertise, and commitment to resilience. Implications for future studies,
using a proposed supplemental survey built with the factors identified in this study, could
provide validity, and insight into how patient safety, communication and resilience, and
psychological safety can enhance error reporting. Furthermore, nurse educators may
focus simulation training on these factors to enhance safety in nurse reporting.

There are several limitations to this study that could not be avoided. First, due to
the large amount of data analyzed, correlations were more likely to occur. Second, data
only from hospital nurses may not be applicable to nurses in other settings. Finally,
construct validity does not provide proof but provides a degree to which a measure
matches the theoretical framework (Nunnally & Berstein, 1994). No external funding was
obtained for this study. The authors report no actual or potential conflicts of interest.

CONCLUSION

Factor analysis and construct validity advance the science by exploring factors
that influence perceptions of patient safety by nurses and ultimately, patient safety
outcomes. Based on the analysis, a change in the measurement of patient safety culture is recommended. A supplemental survey with items on deference to expertise and commitment to resilience should be developed and tested using confirmatory factor analysis. Attention to these elements, as well as use of comprehensive theoretical frameworks, is essential to the continued quest to achieve zero harm. Findings could direct changes in policy and practice, based on results measured through such a supplemental survey. We identify specific challenges health care leaders must address to improve nurse perceptions of patient safety culture, thus promoting trust and nonpunitive responses to reporting errors, improving communication, and enhancing resilience.
REFERENCES


Table 1. Hospital Survey HSOPS® Composite Measures, Items, and Definitions

<table>
<thead>
<tr>
<th>Composite Measures</th>
<th>Items</th>
<th>Definitions of Composite Measures, the Extent to Which:</th>
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<tbody>
<tr>
<td>1. Teamwork</td>
<td>4 items (A1, A3, A4, A11)</td>
<td>Staff support each other, treat each other with respect, and work together as a team.</td>
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<td>2. Supervisor/Manager Expectations &amp; Actions</td>
<td>4 items (B1, B2, B3, B4)</td>
<td>Supervisors/managers consider staff suggestions for improving patient safety, praise staff for following patient safety procedures, and do not overlook patient safety problems.</td>
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<td>Promoting Patient Safety</td>
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<td>3. Organizational Learning-Continuous Improvement</td>
<td>3 items (A6, A9, A13)</td>
<td>Mistakes have led to positive changes, and changes are evaluated for effectiveness.</td>
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<td>4. Management Support for Patient Safety</td>
<td>3 items (F1, F8, F9)</td>
<td>Hospital management provides a work climate that promotes patient safety and shows that patient safety is a top priority.</td>
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<td>5. Overall Perceptions of Patient Safety</td>
<td>4 items (A15, A18, A10, A17)</td>
<td>Procedures and systems are good at preventing errors, and there is a lack of patient safety problems.</td>
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<td>6. Feedback &amp; Communication About Error</td>
<td>3 items (C1, C3, C5)</td>
<td>Staff are informed about errors that happen, are given feedback about changes implemented, and discuss ways to prevent errors.</td>
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<td>7. Communication Openness</td>
<td>3 items (C2, C4, C6,)</td>
<td>Staff freely speak up if they see something that may negatively affect a patient and feel free to question those with more authority.</td>
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<td>8. Frequency of Events Reported</td>
<td>3 items (D1, D2, D3)</td>
<td>Mistakes of the following types are reported: (1) mistakes caught and corrected before affecting the patient, (2) mistakes with no potential to harm the patient, and (3) mistakes that could harm the patient but do not.</td>
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<td>9. Teamwork Across Units</td>
<td>4 items (F4, F10, F2, F6)</td>
<td>Hospital units cooperate and coordinate with one another to provide the best care for patients.</td>
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<td>10. Staffing</td>
<td>4 items (A2, A5, A7, A14)</td>
<td>There are enough staff to handle the workload, and work hours are appropriate to provide the best care for patients.</td>
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<td>11. Handoff &amp; Transitions</td>
<td>4 items (F3, F5, F7, F11)</td>
<td>Important patient care information is transferred across hospital units and during shift changes.</td>
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<td>12. Nonpunitive Response to Error</td>
<td>3 items (A8, A12, A16)</td>
<td>Staff feel that their mistakes and event reports are not held against them and that mistakes are not kept in their personnel file.</td>
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Table 2 EFA with Oblique Promax rotation: Factor loadings of the 42 items of the HSOPS®

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<td>A9. Mistakes have led to positive changes here.</td>
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<td>A13. After we make changes to improve patient safety, we evaluate</td>
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<td>B1. My supervisor/manager says a good word when he/she sees a job</td>
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<td>done according to established patient safety procedures.</td>
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<td>B2. My supervisor/manager seriously considers staff suggestions for</td>
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<td>B3. Whenever pressure builds up, my supervisor/manager wants us to</td>
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<td>work faster, even if it means taking shortcuts.</td>
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<td>B4. My supervisor/manager overlooks patient safety problems that</td>
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<td>C1. We are given feedback about changes put into place based on</td>
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<td>C2. Staff will freely speak up if they see something that may</td>
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<td>C3. We are informed about errors that happen in this unit.</td>
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<td>C4. Staff feel free to question the decisions or actions of those</td>
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<td>C5. In this unit, we discuss ways to prevent errors from happening</td>
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<td>C6. Staff are afraid to ask questions when something does not</td>
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<td>F2. Hospital units do not coordinate well with each other.</td>
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<td>F3. Things &quot;fall between the cracks&quot; when transferring patients from</td>
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<td>F4. There is good cooperation among hospital units that need to</td>
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<td>F5. Important patient care information is often lost during shift</td>
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<td>F6. It is often unpleasant to work with staff from other hospital</td>
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<td>F7. Problems often occur in the exchange of information across</td>
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<td>F10. Hospital units work well together to provide the best care for</td>
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<td>F11. Shift changes are problematic for patients in this hospital.</td>
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<td>A5. Staff in this unit work longer hours than is best for patient</td>
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<td>.510</td>
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<tr>
<td>A7. We use more agency/temporary staff than is best for patient</td>
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<td>.468</td>
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<td>care.</td>
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<tr>
<td>A8. Staff feel like their mistakes are held against them.</td>
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<td>.551</td>
<td></td>
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<tr>
<td>A10. It is just by chance that more serious mistakes don't happen</td>
<td></td>
<td>.469</td>
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<td>around here.</td>
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<tr>
<td>A12. When an event is reported, it feels like the person is being</td>
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<td>.519</td>
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<td>written up, not the problem.</td>
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<tr>
<td>A14. We work in &quot;crisis mode&quot; trying to do too much, too quickly.</td>
<td></td>
<td>.518</td>
<td></td>
<td></td>
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<tr>
<td>A16. Staff worry that mistakes they make are kept in their personnel</td>
<td></td>
<td>.534</td>
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<tr>
<td>A1. People support one another in this unit.</td>
<td></td>
<td>.849</td>
<td></td>
<td></td>
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<tr>
<td>A3. When a lot of work needs to be done quickly, we work together as</td>
<td></td>
<td>.831</td>
<td></td>
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<tr>
<td>a team to get the work done.</td>
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<td>Item</td>
<td>Question</td>
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<tr>
<td>A4</td>
<td>In this unit, people treat each other with respect.</td>
<td>.760</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>A11</td>
<td>When one area in this unit gets really busy, others help out.</td>
<td>.500</td>
<td></td>
<td></td>
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<tr>
<td>A2</td>
<td>We have enough staff to handle the workload.</td>
<td>.349</td>
<td></td>
<td></td>
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<tr>
<td>A6</td>
<td>We are actively doing things to improve patient safety.</td>
<td>.425</td>
<td></td>
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<tr>
<td>A15</td>
<td>Patient safety is never sacrificed to get more work done.</td>
<td>.533</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>A17</td>
<td>We have patient safety problems in this unit.</td>
<td>.508</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>A18</td>
<td>Our procedures and systems are good at preventing errors from happening.</td>
<td>.414</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>F1</td>
<td>Hospital management provides a work climate that promotes patient safety.</td>
<td>.662</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>F8</td>
<td>The actions of hospital management show that patient safety is a top priority.</td>
<td>.661</td>
<td></td>
<td></td>
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<tr>
<td>F9</td>
<td>Hospital management seems interested in patient safety only after an adverse event happens.</td>
<td>.379</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>D1</td>
<td>When a mistake is made, but is caught and corrected before affecting the patient, how often is this reported?</td>
<td>.797</td>
<td></td>
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<tr>
<td>D2</td>
<td>When a mistake is made, but has no potential to harm the patient, how often is this reported?</td>
<td>.924</td>
<td></td>
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<tr>
<td>D3</td>
<td>When a mistake is made that could harm the patient, but does not, how often is this reported?</td>
<td>.751</td>
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</tbody>
</table>
Table 3. EFA with Oblique Promax rotation: Correlation among the obtained 6 factors

<table>
<thead>
<tr>
<th>Factors</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Communication-lead/advice/speak out</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>1.000</td>
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<tr>
<td>2 Organizational culture and culture of safety-environment</td>
<td>-0.563</td>
<td></td>
<td></td>
<td></td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>3 Psychological safety-security, protection</td>
<td>-0.579</td>
<td>0.480</td>
<td></td>
<td></td>
<td></td>
<td>1.000</td>
</tr>
<tr>
<td>4 Psychological safety-support/trust</td>
<td>0.663</td>
<td>-0.464</td>
<td>-0.467</td>
<td></td>
<td></td>
<td>1.000</td>
</tr>
<tr>
<td>5 Patient safety</td>
<td>0.620</td>
<td>-0.595</td>
<td>-0.418</td>
<td>0.532</td>
<td></td>
<td>1.000</td>
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<tr>
<td>6 Communication -resilience, rebound, improvement</td>
<td>0.503</td>
<td>-0.398</td>
<td>-0.252</td>
<td>0.313</td>
<td>0.442</td>
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Table 4 Pattern matching (depicted as X) of items that loaded on HSOPS® factors compared with the theoretical framework

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<thead>
<tr>
<th>Factor Item</th>
<th>Degree of Psychological Safety</th>
<th>Degree of Organizational Culture</th>
<th>Quality Culture of Safety</th>
<th>Degree of HRO</th>
<th>Degree of Deference to Expertise</th>
<th>Extent of Resilience</th>
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### Factor 4

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### Factor 5

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### Factor 6

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Chapter 5: Summary

The integrative review manuscript adds new knowledge about adverse event reporting and posits four priorities. Assumptions are also offered that adverse event reporting needs to be improved. Perceptions about AER affect reporting rates. Leadership support promotes a foundation for AER. Trust is necessary for reporting adverse events. The four key concepts include: 1) understanding and reducing barriers to adverse event reporting; 2) improving perceptions of adverse event reporting within health care hierarchies; 3) improving organizational culture; and 4) improving outcomes measurement. A paucity of literature on AER within acute care hospital settings was found. Studies provided a sense of the structure (culture, climate, environment) and processes (communication training) that contribute to the result; underreporting of adverse events in complex acute care hospital systems. The evidence strongly supports the idea that perceptions of fear and blaming and retaliation, the lack of feedback, and comfort level of challenging someone more powerful present the greatest barriers to AER. Based on qualitative studies, obtaining trusting relationships and sustaining that trust, especially in a hierarchical healthcare system, are difficult to achieve. Given that patient safety trainings are a common strategy clinically, only four published articles examined the effectiveness of such trainings (Sculli et al., 2020; Brilli et al., 2013; McFarland and Doucette, 2018; Xie et al., 2017).

Implications for nursing education, research, and practice include focused education for nursing managers. Training using observational behavior management theory provides a structured method for providing consistent clear feedback to staff which may improve closed-loop communication, encouraging nurses to increase the
reporting of adverse events. Nurse managers believe that nurses report all adverse events, yet only about 14% of adverse events are reported. Nurses compared to physicians report more adverse events. While the HSOPS® focuses on interdisciplinary team communication, assessing why nurses underreport error can uncover new ways to examine error reporting.

In summation from the systematic review on communication in hospital settings to improve patient safety, of the trainings studied, many focused on HRO training for all staff. Future studies exploring specific strategies to improve (a) feedback communication, both to individuals and to groups, and (b) learning environment work practices are innovative approaches that warrant more and larger RCTs. Improving communication in hospitals to improve patient safety requires changing the approach to a focus beyond merely teaching but rethinking the way learning environments are cultivated and how to create sustainable methods for delivering timely, relevant, and effective communication that sets the stage for improved patient safety culture and quality of care.

**Future Research**

More RCTs comparing effective handoff communication tools are warranted to improve patient safety consistently across healthcare systems as opposed to individual organizations developing and using self-created handoff checklists that have not been validated by systematic, scientific inquiry. Communication strategies need to move beyond training and provide theory-based communication education that can change the way communication is encouraged and provided for staff to feel safe to report errors without fear of blame and punishment.
The exploratory factor analysis study findings have implications for future research might reveal that these two topics, psychological safety and feedback communication, hidden in the background of clinical health care communication, might be playing a major role in the persistent problem of underreporting AER. Exploring the factor structure and construct validity of HSOPS® items using exploratory factor analysis resulted in six factors which did not overlap with each other. Through the theoretical framework described in this study, we offered eight theories from the literature, which are likely to provide a more diverse perspective as we continue to examine adverse event reporting and patient safety cultures. Construct validity through pattern matching was used to determine the extent to which survey items corresponded to the theoretical framework offered in this study. Construct validity was moderately high. The importance of factor 4, psychological safety-support/trust was found to pattern match every time deference to expertise and extent of resilience matched. Future examination of psychological safety and feedback communication, using a proposed supplemental survey, has advantages clinically. Understanding the barriers to adverse event reporting, especially by acute care nurses can change the way nursing education, practice, and research are focused going forward. These studies will help researchers identify new research questions, and guide communication training in new directions with communication theory foundations. We recommend assessing nurse perceptions through a supplemental survey aimed at the missing concepts and validated for reliability using confirmatory factor analysis. Findings may provide insight into how patient safety, communication and resilience and psychological safety can enhance error reporting by nurses. Findings from these studies would directly address the theoretical framework
EXPLORATORY FACTOR ANALYSIS: EXAMINING THE

concepts of deference to expertise and commitment to resilience that are important clinically, yet underexplored. These proposed factors have implications for identifying assessing and evaluating factors that are important to nurses’ views of patient safety and foster measurable outcomes, such as reporting errors and reduced adverse events. By improving adverse event reporting, through a proposed new theoretical framework, derived from eight theories, moving beyond the HRO theory driving safety, we may move the needle of patient safety that has not been appreciably accomplished in the past two decades. High reliability organization and patient safety culture assessment to date, have been assessed and examined separately, however there may be overlap between the two than can lead to missed opportunities to address improvement in AER. Of the theoretical framework concepts, two, degree of deference to expertise and extent of commitment to resilience have not been previously examined through the factors, subscales, of psychological safety and feedback communication. More research on these subscales as they relate to a proposed theoretical framework and patient safety culture, with communication strategies targeted at key nursing staff can potentially improve patient safety significantly for future generations.

As a result of this body of work, what was learned was the importance of following the evidence where the data leads. As researchers, we may have preconceived biases about causality and factors, and through the journey of this study, the focused shifted from analyzing HRO theory and principles, to use of construct validity to consider the sum of the theories provided in the literature, rather than relying on merely one theory. That shift created a new paradigm within which to consider the factors that contribute to perceptions of patient safety by nurses. The proposed theoretical framework
provided the opportunity to consider the six factors found through the EFA as potential subscales for a possible new, supplemental survey that may get at the root of the problem related to adverse event reporting. Nurse researchers think beyond what is known and expected and consider the possibility that there is more to learn and understand, and study, to advance nursing science and practice for future nurses. Relinquishing preconceived ideas which may limit thinking, and using advanced theory assisted in taking the study from EFA to EFA and CV, which was enhanced and thus improved because of the relationships and lack of alignment found within the factors and theoretical framework concepts. Another important learning from the dissertation journey was the importance of patience, and revisions when writing for publication. Clear, concise writing is a skill that is honed through writing manuscripts and advancing the science through conducting research and sharing knowledge. Another important lesson learned is the importance of time management, ethical approval from the IRB, and patiently awaiting reviews after manuscripts have been submitted. And editing, it is a staple in research and writing for publication. Publishing is not always easy, but it is very rewarding to share information that can benefit other nurses knowledge, skills, and abilities.

Findings from these three manuscripts have implications for improving adverse event reporting and bring to the forefront the underlying factors that play a major role in the persistent problem of underreporting adverse events. The evidence strongly supports the idea that perceptions of fear and blaming and retaliation, the lack of feedback, and comfort level of challenging someone more powerful present the greatest barriers to AER. The reviews describe gaps in the literature regarding the four priorities identified in
the integrative review: understanding and reducing barriers, improving perceptions of AER within healthcare hierarchies, improving organizational culture and improving outcomes measurement.

Based on the EFA and CV study, a new theoretical framework is offered. Additionally, the factors identified in the EFA may provide subscales to be explored in a future research study using a proposed supplemental survey, targeting the specific factors identified in this study. The finds from these reviews may help clinicians and researchers to reduce adverse events and develop future research questions. Advancing nursing science and theory contribute to new knowledge and understanding of critical factors that affect voluntary reporting of errors by nurses.

The implications for nurse researchers, nurse educators, nursing leaders, communication specialists, and patient safety managers are offered. Targeted communication strategies, supplemental surveys, new theory with constructs previously not widely researched, have the potential to advance patient safety, and sustain improvements that result in measurable patient safety outcomes in the future.
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https://doi.org/10.1016/j.nepr.2017.08.003

Appendices

Hospital SOPS survey 2021

SOPS® Hospital Survey

Version: 1.0
Language: English

• For more information on getting started, selecting a sample, determining data collection methods, establishing data collection procedures, conducting a web-based survey, and preparing and analyzing data, and producing reports, please read the Hospital Survey Version 1.0 User’s Guide.

• For the survey items grouped according to the safety culture composite measures they are intended to assess, please refer to the Hospital Survey Version 1.0 Items and Composite Measures document.

• To participate in the AHRQ Hospital Survey on Patient Safety Culture Database, you must have administered the survey in its entirety without modifications or deletions:
  o No changes to any of the survey item text and response options.
  o No reordering of survey items.
  o Questions added only at the end of the survey after Section F, before the Background Questions section.

For assistance with this survey, please contact the SOPS Help Line at 1-888-324-9749 or SafetyCultureSurveys@westat.com.
**Hospital Survey on Patient Safety**

**Instructions**

This survey asks for your opinions about patient safety issues, medical error, and event reporting in your hospital and will take about 10 to 15 minutes to complete. If you do not wish to answer a question, or if a question does not apply to you, you may leave your answer blank.

An “**event**” is defined as any type of error, mistake, incident, accident, or deviation, regardless of whether or not it results in patient harm. **Patient safety** is defined as the avoidance and prevention of patient injuries or adverse events resulting from the processes of health care delivery.

**SECTION A: Your Work Area/Unit**

In this survey, think of your “unit” as the work area, department, or clinical area of the hospital where you spend most of your work time or provide most of your clinical services.

What is your primary work area or unit in this hospital? Select ONE answer.

- [ ] a. Many different hospital units/No specific unit
- [ ] b. Medicine (non-surgical)
- [ ] c. Surgery
- [ ] d. Obstetrics
- [ ] e. Pediatrics
- [ ] f. Emergency department
- [ ] h. Psychiatry/mental health
- [ ] i. Rehabilitation
- [ ] j. Pharmacy
- [ ] k. Laboratory
- [ ] l. Radiology
- [ ] n. Other, please specify: _____________________________
Please indicate your agreement or disagreement with the following statements about your work area/unit.

Think about your hospital work area/unit…

1. People support one another in this unit ..............................................
2. We have enough staff to handle the workload.................................
3. When a lot of work needs to be done quickly, we work together as a team to get the work done ..........................................................
4. In this unit, people treat each other with respect ..............................
5. Staff in this unit work longer hours than is best for patient care ........

SECTION A: Your Work Area/Unit (continued)

Think about your hospital work area/unit…

6. We are actively doing things to improve patient safety ........................
7. We use more agency/temporary staff than is best for patient care ....
8. Staff feel like their mistakes are held against them ..............................
9. Mistakes have led to positive changes here .........................................
10. It is just by chance that more serious mistakes don’t happen around here ..........................................................................................

☐ g. Intensive care unit (any type)  ☐ m. Anesthesiology
11. When one area in this unit gets really busy, others help out..............

12. When an event is reported, it feels like the person is being written up, not the problem

13. After we make changes to improve patient safety, we evaluate their effectiveness

14. We work in "crisis mode" trying to do too much, too quickly

15. Patient safety is never sacrificed to get more work done

16. Staff worry that mistakes they make are kept in their personnel file

17. We have patient safety problems in this unit

18. Our procedures and systems are good at preventing errors from happening

SECTION B: Your Supervisor/Manager

Please indicate your agreement or disagreement with the following statements about your immediate supervisor/manager or person to whom you directly report.

1. My supervisor/manager says a good word when he/she sees a job done according to established patient safety procedures

2. My supervisor/manager seriously considers staff suggestions for improving patient safety

3. Whenever pressure builds up, my supervisor/manager wants us to work faster, even if it means taking shortcuts
4. My supervisor/manager overlooks patient safety problems that happen over and over ..............................................................

□ 1 □ 2 □ 3 □ 4 □ 5

SECTION C: Communications

How often do the following things happen in your work area/unit?

Think about your hospital work area/unit…

1. We are given feedback about changes put into place based on event reports .................................................................

□ 1 □ 2 □ 3 □ 4 □ 5

2. Staff will freely speak up if they see something that may negatively affect patient care ........................................................

□ 1 □ 2 □ 3 □ 4 □ 5

3. We are informed about errors that happen in this unit .........................

□ 1 □ 2 □ 3 □ 4 □ 5

4. Staff feel free to question the decisions or actions of those with more authority ......................................................................

□ 1 □ 2 □ 3 □ 4 □ 5

5. In this unit, we discuss ways to prevent errors from happening again ...

□ 1 □ 2 □ 3 □ 4 □ 5

6. Staff are afraid to ask questions when something does not seem right .

□ 1 □ 2 □ 3 □ 4 □ 5

SECTION D: Frequency of Events Reported

In your hospital work area/unit, when the following mistakes happen, how often are they reported?

1. When a mistake is made, but is caught and corrected before affecting the patient, how often is this reported? ..............................................................

□ 1 □ 2 □ 3 □ 4 □ 5

2. When a mistake is made, but has no potential to harm the patient, how often is this reported? ..............................................................

□ 1 □ 2 □ 3 □ 4 □ 5

3. When a mistake is made that could harm the patient, but does not, how often is this reported? ..............................................................

□ 1 □ 2 □ 3 □ 4 □ 5
SECTION E: Patient Safety Grade
Please give your work area/unit in this hospital an overall grade on patient safety.

A  Excellent  B  Very Good  C  Acceptable  D  Poor  E  Failing

SECTION F: Your Hospital
Please indicate your agreement or disagreement with the following statements about your hospital.

Think about your hospital...

1. Hospital management provides a work climate that promotes patient safety

2. Hospital units do not coordinate well with each other

3. Things “fall between the cracks” when transferring patients from one unit to another

4. There is good cooperation among hospital units that need to work together

SECTION F: Your Hospital (continued)

Think about your hospital...

5. Important patient care information is often lost during shift changes

6. It is often unpleasant to work with staff from other hospital units

7. Problems often occur in the exchange of information across hospital units
8. The actions of hospital management show that patient safety is a top priority ................................................................. □ 1 □ 2 □ 3 □ 4 □ 5

9. Hospital management seems interested in patient safety only after an adverse event happens.......................................................... □ 1 □ 2 □ 3 □ 4 □ 5

10. Hospital units work well together to provide the best care for patients .......................................................... □ 1 □ 2 □ 3 □ 4 □ 5

11. Shift changes are problematic for patients in this hospital......................... □ 1 □ 2 □ 3 □ 4 □ 5

SECTION G: Number of Events Reported
In the past 12 months, how many event reports have you filled out and submitted?

☐ a. No event reports    ☐ d. 6 to 10 event reports
☐ b. 1 to 2 event reports    ☐ e. 11 to 20 event reports
☐ c. 3 to 5 event reports    ☐ f. 21 event reports or more

SECTION H: Background Information
This information will help in the analysis of the survey results.

1. How long have you worked in this hospital?
   □ a. Less than 1 year    □ d. 11 to 15 years
   □ b. 1 to 5 years    □ e. 16 to 20 years
   □ c. 6 to 10 years    □ f. 21 years or more

2. How long have you worked in your current hospital work area/unit?
   □ a. Less than 1 year    □ d. 11 to 15 years
   □ b. 1 to 5 years    □ e. 16 to 20 years
   □ c. 6 to 10 years    □ f. 21 years or more
3. Typically, how many **hours per week** do you work in this hospital?
   - [ ] a. Less than 20 hours per week
   - [ ] b. 20 to 39 hours per week
   - [ ] c. 40 to 59 hours per week
   - [ ] d. 60 to 79 hours per week
   - [ ] e. 80 to 99 hours per week
   - [ ] f. 100 hours per week or more

**SECTION H: Background Information (continued)**

4. What is your staff position in this hospital? Select ONE answer that best describes your staff position.
   - [ ] a. Registered Nurse
   - [ ] b. Physician Assistant/Nurse Practitioner
   - [ ] c. LVN/LPN
   - [ ] d. Patient Care Asst/Hospital Aide/Care Partner
   - [ ] e. Attending/Staff Physician
   - [ ] f. Resident Physician/Physician in Training
   - [ ] g. Pharmacist
   - [ ] h. Dietician
   - [ ] i. Unit Assistant/Clerk/Secretary
   - [ ] j. Respiratory Therapist
   - [ ] k. Physical, Occupational, or Speech Therapist
   - [ ] l. Technician (e.g., EKG, Lab, Radiology)
   - [ ] m. Administration/Management
   - [ ] n. Other, please specify:

5. In your staff position, do you typically have direct interaction or contact with patients?
   - [ ] a. YES, I typically have direct interaction or contact with patients.
   - [ ] b. NO, I typically do NOT have direct interaction or contact with patients.

6. How long have you worked in your current specialty or profession?
   - [ ] a. Less than 1 year
   - [ ] d. 11 to 15 years
b. 1 to 5 years
c. 6 to 10 years
d. 11 to 15 years
e. 16 to 20 years
f. 21 years or more

SECTION I: Your Comments

Please feel free to write any comments about patient safety, error, or event reporting in your hospital.

THANK YOU FOR COMPLETING THIS SURVEY.
**UMSL eCompliance**

**IRB #2082431 SL**

- **Project number**: 2082431
- **Principal Investigator**: Falcone, Maureen (UMSL-Student)
- **Project title**: Examining the associations of HSOPS items with HRQ principles for acute care nurses
- **Status**: Acknowledged
- **Submitted by**: Werner, Kimberly Borkowski

**1. Human Subjects Research**

1. **Project Investigators**