

NURSES' PERCEPTIONS OF PATIENT SAFETY CULTURE IN SAUDI ARABIA

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Legend

α	Cronbach's alpha
AHRQ	Agency for Healthcare Research and Quality
B	Unstandardized regression coefficient
CI	Confidence interval
CINAHL	Cumulative Index to Nursing and Allied Health Literature
d	Cohen's d effect size
EMBASE	Excerpta Medica Database
F	F statistic
GCC	Gulf Cooperation Council
HSOPSC	Hospital Survey on Patient Safety Culture
IOM	Institute of Medicine
I^2	Heterogeneity statistic in meta-analysis
IRB	Institutional Review Board
KSA	Kingdom of Saudi Arabia
LL	Lower limit of the confidence interval
M	Mean
MEDLINE	Medical Literature Analysis and Retrieval System Online
n	Sample size
N	Total sample size
OR	Odds ratio
p	Probability value (p -value)
PICO	Population, Intervention, Comparison, and Outcomes

PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PROSPERO	International Prospective Register of Systematic Reviews
r	Pearson correlation coefficient; also used as an effect size for the Wilcoxon signed-rank test
R^2	Coefficient of determination (R squared)
REB	Research Ethics Board
SAG	Safety Attitudes Questionnaire
Scopus	Scopus database
ρ	Spearman's rank correlation coefficient
SD	Standard deviation
SE	Standard error
t	t statistic
UL	Upper limit of the confidence interval
Z	Standardized test statistic
WHO	World Health Organization

Abstract

Background

Patient safety culture is a fundamental component of healthcare quality and patient safety. Nurses play a central role in promoting patient safety through their involvement in patient care. Evidence from Gulf Cooperation Council (GCC) countries remains fragmented, with limited quantitative synthesis. This dissertation investigated nurses' perceptions of patient safety culture in GCC hospitals and within a Saudi hospital using the Hospital Survey on Patient Safety Culture (HSOPSC) within Donabedian's Quality Framework.

Methods

A multi-method research design comprised a systematic review, a cross-sectional study completed with findings reported in three manuscripts, and a meta-analysis. The cross-sectional study was conducted among frontline nurses at Hail General Hospital, Saudi Arabia. Correlation and regression analyses examined relationships between patient safety culture dimensions and patient safety outcomes, while comparative analyses evaluated differences between HSOPSC versions. A meta-analysis generated pooled estimates of HSOPSC composite scores across GCC hospitals.

Results

Across all dissertation components, teamwork and organizational learning consistently emerged as strengths of patient safety culture, whereas staffing, response to error, and care transitions remained persistent challenges. Both HSOPSC versions demonstrated satisfactory overall reliability and identified significant associations between patient safety culture dimensions and patient safety outcomes. Communication, teamwork, organizational learning, leadership support, and responses to error were key process-level factors associated with safety perceptions and reporting behaviours. Comparison of HSOPSC versions demonstrated conceptual continuity,

while revisions in survey design may influence nurses' evaluations of patient safety culture. The meta-analysis confirmed similar patterns across GCC hospitals.

Conclusion

This dissertation advances understanding of patient safety culture among nurses in GCC hospitals and provides evidence regarding the assessment of patient safety culture using HSOPSC versions. Guided by the Donabedian's Quality Framework, the findings highlight the importance of communication, teamwork, organizational learning, leadership support, and safe reporting environments in improving patient safety outcomes. The findings support routine patient safety culture assessment, workforce and leadership development, and the promotion of learning-oriented, nonpunitive cultures to improve healthcare quality.

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**Chapter 1: Nurses' Perceptions of Patient Safety Culture in the Gulf Cooperation Council,
Including Saudi Arabia**

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Author Note

This thesis is written in partial fulfillment of the Ph.D. requirements for the Nursing doctoral program at the University of Ottawa.

Nurses' Perceptions of Patient Safety Culture in the Gulf Cooperation Council, Including Saudi Arabia

Patient safety is a cornerstone of healthcare quality and a critical concern across healthcare systems worldwide (Al-Zadjali et al., 2025; Soden et al., 2025). Research on medical errors and adverse events has been conducted for decades. For instance, Beecher and Todd's (1954) landmark analysis of 599,548 anesthetics demonstrated that anesthesia was a significant contributing factor to mortality in surgical patients. Similarly, the Harvard Medical Practice Study I examined adverse events among hospitalized patients in New York State and estimated that nearly 3.7% of hospital admissions were associated with adverse events, with a substantial proportion judged preventable (Brennan et al., 1991). Additionally, Raju et al. (1989) conducted a four-year prospective quality assurance study across neonatal and pediatric intensive care units and reported a medication error rate of 14.7% (approximately 1 per 6.8 admissions). Of these, 66 errors (3.1%) resulted in treatment-related injury, including 33 (10.5%) that were potentially serious, 32 (10.2%) that caused mild injury, and one case of acute aminophylline poisoning due to a ten-fold dosage error. The authors suggested that continuous monitoring of clinical processes can reveal medication-related complications and inform targeted prevention strategies (Raju et al., 1989).

Building on these early findings, Leape (1994) advanced a transformative perspective on medical error by arguing that traditional efforts to reduce harm had focused too narrowly on individual performance rather than on the systems in which clinicians work. Drawing on Reason's human error theory, Leape proposed a systems-based approach in which human error is viewed as inevitable, and safety improvement depends on designing processes that anticipate and mitigate those errors before they result in harm (Leape, 1994). Leape's conceptualization of error

laid the intellectual groundwork for the systems-thinking framework that subsequently shaped global patient safety policy (Chung et al., 2017; Wachter, 2012).

However, the issue gained unprecedented attention in the United States following the landmark report *To Err Is Human*, published by the Institute of Medicine (IOM) in 2000. This report estimated that between 44,000 and 98,000 patients die each year in U.S. hospitals because of medical errors, underscoring the magnitude of preventable harm (Donaldson et al., 2000). The IOM report amplified public awareness and policy discourse, triggering widespread recognition of patient safety as a fundamental dimension of healthcare quality (Schiff & Shojania, 2022). This concern subsequently led to increased interest in the investigation of patient safety culture on a global scale (Feng et al., 2008).

Consequently, the World Health Organization (WHO) launched the World Alliance for Patient Safety in 2004 in response to the escalating global burden of harm from adverse events or medical errors. This initiative sought to establish core principles, develop guidelines, and promote strategies aimed at reducing risks and preventing adverse events in health systems worldwide (WHO, 2004). According to WHO estimates, approximately 42.7 million avoidable adverse events occur annually across the globe, positioning unsafe care as the fourth leading cause of death worldwide, and emphasizing the scale of the challenge to deliver safe healthcare services (WHO, 2019; Ahmad & Anderson, 2021). The urgency of the problem was reinforced in May 2019 when the Seventy-second World Health Assembly adopted resolution WHA72.6 on Global action on patient safety, calling on the WHO Director-General to prioritize patient safety as a strategic objective within the broader effort to advance universal health coverage and reduce preventable harm (WHO, 2023).

To sustain global momentum, WHO has introduced several high-profile initiatives. World Patient Safety Day, commemorated annually on 17 September, was established to raise awareness, mobilize stakeholders, and strengthen commitment to eliminating preventable harm in healthcare delivery (WHO, 2023). Additionally, the Global Patient Safety Action Plan 2021–2030 outlines a comprehensive framework for international collaboration. Its vision is to achieve the maximum possible reduction in harm from unsafe care and to ensure that every patient, in every setting, consistently receives care that is both safe and respectful, thereby embedding patient safety as a universal standard of healthcare quality (WHO, 2023).

Conceptualizing Patient Safety and Patient Safety Culture

Patient safety has become a global healthcare imperative and a central component of high-quality healthcare delivery (Chen et al., 2025; Haque et al., 2024). The WHO defines patient safety as “the absence of preventable harm to a patient and reduction of risk of unnecessary harm associated with health care to an acceptable minimum” (WHO, 2023). Patient safety is influenced by healthcare institutions’ commitment, approach, and expertise in delivering safe, evidence-based care (Lestari et al., 2023). Despite extensive international initiatives, limited progress has been achieved in reducing preventable harm, resulting in persistent human, social, and economic consequences (WHO, 2023, 2025). Indeed, global patient harm statistics have remained largely unchanged over the past two decades, with approximately one in ten patients experiencing healthcare-related error, harm, or death despite substantial financial investment, programs, and policy reform (Swift et al., 2025; Wears et al., 2014).

Unsafe care continues to result in millions of preventable injuries, disabilities, and deaths annually, imposing psychological distress on families and straining health systems worldwide. The global economic burden of unsafe healthcare is estimated to reach trillions of U.S. dollars

annually, largely due to extended hospital stays, additional medical interventions, and related costs (Slawomirski et al., 2025; WHO, 2024, 2025). Consequently, healthcare systems must create organizational environments that proactively reduce accidental injuries and ensure patients' safety (Lestari et al., 2023). The delivery of safe and high-quality care requires systematic efforts to integrate safety principles into healthcare structures, processes, and professional behaviour. Patient safety thus encompasses coordinated actions that prevent errors, minimize risks, and identify or mitigate harm before it reaches the patient (Agency for Healthcare Research and Quality [AHRQ], 2024; WHO, 2024).

To Err Is Human (IOM, 2000) reframed patient safety as a systemic rather than individual responsibility. The report emphasized that ensuring patient safety extends beyond merely avoiding errors; it requires designing resilient systems capable of anticipating potential failures, learning from adverse events, and preventing harm from recurring (Donaldson et al., 2000). It also highlighted the importance of raising awareness among healthcare professionals and the public, embedding safety concepts in education and professional training, and fostering an institutional culture that values safety as a shared and enduring commitment (Ilan & Fowler, 2005). In this sense, patient safety is not an isolated concept but an organizational ethos that must be sustained through leadership, accountability, and a culture that encourages learning rather than blame.

From this perspective, patient safety culture has emerged as a cornerstone of healthcare improvement efforts and a key indicator of healthcare quality (Weaver et al., 2013; Murray et al., 2024). Patient safety culture refers to the shared values, beliefs, and norms within an organization that shape how safety is prioritized, discussed, and practiced (AHRQ, 2024; Haque et al., 2024). It represents the extent to which an organization supports and promotes safety through openness,

trust, and continuous learning rather than punitive responses to error (AHRQ, 2024). The concept of safety culture originated in high-reliability industries such as nuclear energy and aviation, where organizations operate under hazardous conditions yet maintain exemplary safety records through systemic resilience and collective mindfulness (Fontenele Lima de Carvalho & Bates, 2025). When adapted to healthcare, this concept evolved into patient safety culture, emphasizing system-wide openness, collaborative teamwork, continuous organizational learning, and a non-punitive approach to reporting and managing incidents (AHRQ, 2024; Kim et al., 2023).

A positive patient safety culture has been consistently associated with reduced medical errors, lower rates of hospital readmissions and adverse events, and improved staff wellbeing and patient outcomes. Stronger safety culture has been linked to lower medication error rates ($r = -0.28$), fewer adverse events ($OR = 0.61-0.76$), reduced burnout ($\beta = -0.24$), and lower stress levels ($r = -0.39$ to -0.46) (Alanazi et al., 2022; Hafezi et al., 2022; Hajizadeh et al., 2025). Additionally, approximately one in five older hospitalized patients in the United States is readmitted within 30 days, and around 27% of readmissions may be preventable (Auerbach et al., 2016). Conversely, a weak or punitive culture can inhibit error reporting, conceal systemic flaws, and perpetuate unsafe practices (AHRQ, 2024; Swift et al., 2025). Creating and maintaining a culture of safety is a complex and ongoing challenge that requires strong leadership, transparent communication, and the sustained engagement of healthcare staff (Bartonickova et al., 2021; Lestari et al., 2023). Organizations must regularly assess and strengthen their patient safety culture to ensure responsiveness to evolving risks and to reinforce trust within the clinical environment (Hanifa & Dhamanti, 2021).

Globally, national health authorities and policymakers advocate for regular evaluation of patient safety culture as a means of identifying organizational strengths, addressing

vulnerabilities, and monitoring progress over time (Kyriakeli et al., 2025). These assessments not only inform policy and accreditation requirements but also help build open, transparent, and learning-oriented healthcare systems where staff feel empowered to report incidents and contribute to safety improvement (Abdurabuh et al., 2024; Kim et al., 2023). Ultimately, patient safety culture forms the foundation for developing high-reliability healthcare organizations, where safety is embedded as a universal organizational value and a defining feature of institutional success (WHO, 2021).

Measuring Patient Safety Culture

Assessing patient safety culture is fundamental to improving the quality and safety of healthcare delivery. It enables healthcare organizations to identify strengths and weaknesses in their safety practices, target areas for improvement, and track progress over time (Hanifa & Dhamanti, 2021; Bartonickova et al., 2021). Evaluating safety culture provides insights into how safety is perceived and enacted across professional and organizational levels, reflecting the commitment of healthcare systems to continuous learning and harm prevention (Carvalho et al., 2023; Kim et al., 2023). Research on patient safety culture is essential to identify factors that can be addressed to improve organizational performance, clinician practices, and prevent patient harm.

Several instruments have been developed to measure patient safety culture, including the Hospital Survey on Patient Safety Culture (HSOPSC), Safety Attitudes Questionnaire (SAG), Manchester Patient Safety Framework, and Safety Climate Survey (Hanifa & Dhamanti, 2021; Bartonickova et al., 2021). The HSOPSC has emerged as the most widely used and validated tool globally (AHRQ, 2023; Haque et al., 2024). Developed by AHRQ in 2004, the HSOPSC assesses staff perceptions of safety-related behaviors, teamwork, communication, and

organizational learning (Sorra et al., 2018; Sorra et al., 2021). It has been translated into multiple languages and adapted for diverse settings, including hospitals, nursing homes, community care, and primary care facilities (AHRQ, 2023).

A synthesis of multiple systematic reviews underscores the prominence of the HSOPSC as the most widely used instrument for evaluating patient safety culture in healthcare settings. Azyabi et al. (2021) reviewed 66 studies on the perception of patient safety culture in hospitals between 2006 and 2020, reporting that the HSOPSC was employed in 54 studies, while the SAQ appeared in only five. Similarly, Carvalho et al. (2023) found that the HSOPSC ($n = 104$) was the most frequently used tool, followed by the SAQ ($n = 63$), with far fewer studies applying the Safety Climate Survey or Safety Organizing Scale ($n = 8$). Churrua et al. (2021) corroborated these findings, identifying HSOPSC as the instrument used in nearly half of the studies ($n = 312$) included in their systematic review of quantitative and qualitative assessments of safety culture in hospitals. Collectively, these reviews demonstrate that the HSOPSC remains the predominant and most validated global framework for measuring patient safety culture, reflecting its adaptability, psychometric robustness, and capacity to inform cross-cultural benchmarking in healthcare safety research.

Despite its widespread use, the HSOPSC has several limitations that should be considered when interpreting findings. First, the instrument measures healthcare professionals' perceptions of patient safety culture rather than directly measuring actual patient safety practices or patient outcomes (Sorra & Nieva, 2004; Sorra et al., 2021). As a self-reported survey, responses may also be influenced by response bias and differences in how participants interpret survey items. In addition, the psychometric performance of HSOPSC composites may vary across healthcare settings and cultural contexts, with substantial variability in internal

consistency reliability reported in both national and international studies (Aboshaiqah, 2010; Aljaffary et al., 2021; Alswat et al., 2017; Bodur & Filiz, 2009; Shu et al., 2015; Stoyanova et al., 2018). This issue may be particularly relevant in multicultural healthcare environments, where linguistic and cultural differences may influence how survey items are interpreted (Waterson et al., 2019). Furthermore, mixed or negatively worded items may increase cognitive burden and misunderstanding, particularly among multilingual respondents (Hubley & Zumbo, 2011; Streiner, 2003; Tavakol & Dennick, 2011). Finally, HSOPSC Versions 1.0 and 2.0 differ in item wording, number of items, and composite structure; therefore, comparisons between the two versions should be interpreted cautiously, as observed differences may reflect instrument-related variation rather than actual changes in patient safety culture (Sorra & Nieva, 2004; Sorra et al., 2021).

HSOPSC

The HSOPSC, originally introduced by the AHRQ, is one of the most extensively applied instruments for evaluating patient safety culture within hospitals worldwide (Sorra & Nieva, 2004; Haque et al., 2024). Over the past two decades, the tool has gained broad international acceptance, being implemented in more than 99 countries, including the United States, Italy, South Korea, and numerous Gulf Cooperation Council (GCC) nations, including Saudi Arabia, which underscores its adaptability across diverse healthcare systems (AHRQ, 2023; Azyabi et al., 2021).

The survey was first released in 2004 and was designed to capture organizational factors influencing patient safety at both unit and hospital levels. Its psychometric soundness has been consistently demonstrated, with reported Cronbach's alpha values ranging from 0.62 to 0.85 for the composites, indicating moderate to high internal reliability (Sorra & Dyer, 2010). Across the

GCC, the HSOPSC has been employed in several studies to assess nurses' views on patient safety culture and to identify areas requiring improvement (Rawas & Abou Hashish, 2023; Wazqar & Attallah, 2024).

The first version of HSOPSC comprises 12 composites, in addition to two questions addressing the perceived overall level of patient safety and the number of reported events in the preceding year (AHRQ, 2004). These 12 composites include: "Teamwork Within Units"; "Teamwork Across Units"; "Organizational Learning–Continuous Improvement"; "Supervisor/Manager Expectations and Actions Promoting Patient Safety"; "Handoffs & Transitions"; "Management Support for Patient Safety"; "Feedback and Communication About Error"; "Overall Perceptions of Patient Safety"; "Communication Openness"; "Frequency of Events Reported"; "Staffing"; and "Nonpunitive Response to Error".

In response to emerging patient safety evidence and extensive user feedback, AHRQ introduced the revised HSOPSC-II, which streamlines the survey by reducing the number of composites from 12 to 10. Two composites, Overall Perceptions of Patient Safety and Teamwork Across Units, were removed to enhance focus and reduce redundancy, while several remaining composites were refined conceptually and linguistically to better reflect contemporary safety frameworks (Sorra et al., 2019, 2021). The revision involved substantive item modifications, including newly added items ($n = 10$), items reworded for clarity ($n = 9$), significantly revised items ($n = 9$), and removed items that no longer contributed meaningfully to the construct ($n = 20$). The updated tool demonstrated improved psychometric performance, with Cronbach's alpha coefficients ranging from 0.67 to 0.89 across the revised composites (AHRQ, 2019).

The HSOPSC-II now assesses the following composites: "Teamwork"; "Hospital Management Support for Patient Safety"; "Communication About Error"; "Handoffs and

Information Exchange”; “Communication Openness”; “Organizational Learning–Continuous Improvement”; “Response to Error”; “Reporting Patient Safety Events”; “Supervisor, Manager, or Clinical Leader Support for Patient Safety”; and “Staffing and Work Pace” (Sorra et al., 2021). These refinements have reduced respondent burden, enhanced data quality, and aligned the instrument more closely with modern safety culture principles (Sorra et al., 2021).

Table 1

Comparative Composite Structure of HSOPSC. Versions 1.0 and 2.0

	HSOPSC 1.0 Composites (Items/ (Reliability))	HSOPSC 2.0 Composites (Items/ (Reliability))
1	Teamwork Within Units (4 items/ = .83)	Teamwork (3 items/ = .76)
2	Supervisor/ Manager Expectations & Actions Promoting Patient Safety (4 items/ = .79)	Supervisor, Manager, or Clinical Leader Support for Patient Safety (3 items/ = .77)
3	Organizational Learning–Continuous Improvement (3 items/ = .71)	Organizational Learning–Continuous Improvement (3 items/ = .76)
4	Management Support for Patient Safety (3 items/ = .79)	Hospital Management Support for Patient Safety (3 items/ = .77)
5	Feedback & Communication About Error (3 items/ = .78)	Communication About Error (3 items/ = .89)
6	Communication Openness (3 items/ = .73)	Communication Openness (4 items/ = .83)
7	Frequency of Events Reported (3 items/ = .85)	Reporting Patient Safety Events (2 items/ = .75)
8	Staffing (4 items/ = .62)	Staffing and Work Pace (4 item/ = .67)
9	Handoffs & Transitions (4 items/ = .81)	Handoffs and Information Exchange (3 items/ = .72)
10	Nonpunitive Response to Error (3 items/ = .78)	Response to Error (4 items/ = .83)
11	Overall Perceptions of Patient Safety (4 items/ = .74)	---
12	Teamwork Across Units (4 items/ = .79)	---
Note. Reliability coefficients for HSOPSC 1.0 are from Sorra and Dyer (2010). Reliability coefficients for HSOPSC 2.0 are from Sorra et al. (2021).		

The Role of Nurses in Promoting Patient Safety Culture

Nursing is widely recognized as a professional discipline that lies at the heart of modern healthcare systems. Nurses play an indispensable role in delivering compassionate, evidence-based care aimed at preserving life, alleviating suffering, and promoting recovery (Rasheed et

al., 2024; White et al., 2025). As the largest group of healthcare professionals, constituting approximately half of the global health workforce, nurses represent the backbone of healthcare delivery and are pivotal to achieving safe and high-quality patient outcomes (WHO, 2025). Their continuous presence at the bedside positions them as the primary point of contact for patients and families, enabling them to detect subtle changes in patients' conditions and to ensure that their physical and emotional needs are met (Babaei et al., 2022; Zaitoun et al., 2023).

Nurses are deeply engaged in direct patient care and occupy a unique position at the intersection between patients, other healthcare professionals, and healthcare management (White et al., 2025). This proximity allows them not only to implement clinical and safety policies but also to observe how these policies are enacted in practice. Consequently, nurses play a dual role as both implementers of institutional safety protocols and observers of daily clinical operations, enabling them to identify gaps between prescribed standards and actual care delivery (Glarcher & Vaismoradi, 2025; Hajizadeh et al., 2025; Phillips et al., 2021; Reyes Ramos & Costa Abos, 2024). Nurses' insights contribute directly to organizational learning and system improvement, making their perspectives indispensable for advancing a robust patient safety culture.

Furthermore, nurses play a crucial advocacy role in shaping the culture of safety within healthcare organizations. They act as patient advocates, ensuring that the voices of vulnerable individuals are heard and that their rights to safe, dignified, and equitable care are protected (White et al., 2025; Zaitoun et al., 2023). By consistently applying safe practices, reporting hazards, and raising patient safety concerns, nurses actively contribute to embedding safety values and enhancing overall healthcare outcomes (Mahsoon & Dolansky, 2021; Ulit et al., 2020; Yan et al., 2021). Therefore, nurses' perceptions of patient safety culture are critical, as they reflect both their engagement in and the effectiveness of organizational safety systems. As

the frontline of care delivery, nurses' insights and participation are not supplementary but foundational to the development of resilient healthcare systems capable of learning from errors and sustaining safe practices (Glarcher & Vaismoradi, 2025; Yilmaz et al., 2025).

Global Overview of Nurses' Perceptions of Patient Safety Culture

Recent international studies reveal considerable variation in healthcare staffs' and nurses' perceptions of patient safety culture across regions, reflecting differences in healthcare infrastructure, resources, and organizational practices. Overall, teamwork within units and organizational learning consistently emerged as the most positively perceived composites of patient safety culture, whereas staffing/work pace, non-punitive response to errors, and handoffs/transitions were consistently identified as weak points.

In North America, nurses generally demonstrated moderate to high perceptions of patient safety. According to Tyler et al. (2024), nurses in the US reported high scores for teamwork within units (81%) and supervisor/manager support for safety (79%). Several composites were rated moderately, including communication openness (74%), reporting patient safety events (74%), communication about error (71%), organizational learning (69%), handoffs and information exchange (67%), and response to error (62%). In contrast, hospital management support (56%) and especially staffing and work pace (52%) reflected ongoing challenges (Tyler et al., 2024).

In South America, particularly Chile, nurses demonstrated a strong perception of safety culture. They reported high scores for communication and receptivity (84.4%) and reporting of patient safety events (83.8%), and a high score for supervisor support for patient safety (76%). However, communication regarding errors was moderate (73.8%), while administrative and management support (50.7%) was relatively weak (Hurtado-Arenas et al., 2024).

In Europe, findings from Portugal showed an unfavourable patient safety culture, with only teamwork within units rated high (80.7%) and organizational learning moderate (56.1%). Other composites were rated low, including supervisor support (50.4%), handoffs/transitions (47.4%), communication openness (47.4%), feedback about error (46.2%), teamwork across units (43.9%), overall perception (41.2%), management support (31.6%), frequency of event reporting (28.7%), staffing (28.1%), and non-punitive response to error (25.7%), indicating pervasive systemic weaknesses despite strong intra-unit teamwork (Oliveira et al., 2024).

In North Africa, a Tunisian study where nurses comprised 61% of the participants reported a weak overall patient safety culture, with teamwork within units performing best (48.8%) and non-punitive response to error the lowest (19.7%) (Tlili et al., 2022). By contrast, in Sub-Saharan Africa, Nigerian nurses reported a generally positive patient safety culture, with high perceptions of teamwork within units (91.1%), organizational learning (84.7%), teamwork across units (83%), and management support (80%). However, non-punitive response to error (42.8%) remained a concern, and staffing was alarmingly low (30.5%) (Kaware et al., 2022).

In the Middle East, Palestinian nurses reported high to moderate perceptions across most composites, except for non-punitive response to errors. High composites included organizational learning (87%), teamwork within units (86%), feedback/communication about errors (83%), and frequency of events reported (76%). Moderate composites included management support (69%), overall perception of safety (64%), supervisor support (59%), teamwork across units (59%), handoffs & transitions (53%), communication openness (52%), and staffing (52%), while non-punitive response to error remained low (22%) (Zabin et al., 2022).

In Central Asia, Kazakhstani nurses demonstrated a favourable patient safety culture, with an overall positive perception (73.5%). High composites included communication about

errors (90.3%), teamwork (83.4%), organizational learning (81.1%), communication openness (75.8%), and hospital management support (75.6%). Other composites were moderately rated including handoffs and information exchange (74.2%), supervisor/clinical leader support (72.2%), response to error (70.6%), while staffing and work pace (59.4%) and reporting patient safety events (52.1%) were lower (Aimoldina et al., 2025).

In South Asia, Indian healthcare staff (70% nurses) also reported a strong culture of patient safety, with teamwork (79%), management support (79%), communication about errors (77%), and organizational learning (76%) all rated highly. Moderate perceptions were observed in supervisor/clinical leader support (70%), handoffs and information exchange (69%), communication openness (59%), and event reporting (59%), whereas response to error (50%) and staffing (30%) were lowest (Aileen et al., 2024).

In East Asia, Vietnamese nurses reflected very high perceptions of patient safety culture, with teamwork within units (93.4%) being the strongest across all reviewed studies. High scores were also observed for supervisor support (85%), feedback and communication about errors (83.5%), and organizational learning (77.2%), while moderate scores were seen for frequency of events reported (69.1%) and handoffs & transitions (64.4%). Non-punitive response to errors (57.6%) and staffing (52.9%) remained weaker (Ha et al., 2023).

Finally, in the Pacific region, represented by Australian emergency departments, healthcare staff, predominantly nurses (65%), reported a weak patient safety culture. While teamwork within units was strong (79.7%), and organizational learning was nearly moderate (51.23%), all other composites were low, including supervisor/manager support (47.2%), management support (41.5%), communication openness (39.8%), teamwork across units (35%), feedback and communication about errors (33.3%), overall perception of safety (30.9%), non-

punitive response to error (27.6%), frequency of events reported (26.8%), staffing (26%), and handoffs & transitions (15.4%) (Alshyyab et al., 2023).

Overall, these findings indicate that while collaboration, teamwork, and organizational learning are mostly viewed positively worldwide, systemic challenges, particularly related to staffing issues, management engagement, inter-unit coordination, and punitive error cultures, remain persistent barriers to achieving a robust patient safety culture.

Patient Safety Culture in the GCC Region

The GCC is a regional alliance that brings together six member states, Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates, that share close historical, cultural, and economic ties. According to the World Health Organization (WHO, 2015), these nations belong to the first group of countries within the Eastern Mediterranean Region, characterized by advanced socioeconomic development, strong health system performance, and high levels of health expenditure. The GCC member states possess deeply rooted similarities in language, religion, governance, and social organization. All are Arabic-speaking, Islamic monarchies with societal structures grounded in tribal and extended family systems. Their geographical proximity across the Arabian Peninsula, along with shared natural resources, particularly oil and gas, has contributed to comparable economic models and parallel developmental trajectories (Alkhamis et al., 2014; Secretariat General of the Gulf Cooperation Council, 2024; Farag, 2017; Máté, 2025). These collective features have fostered regional cohesion and mutual priorities in public policy, including healthcare, making the GCC a coherent and meaningful context for examining patient safety culture.

Across the GCC region, studies assessing nurses' perceptions of patient safety culture demonstrate a generally moderate level of positivity, though with notable variation across countries and healthcare contexts.

In Kuwait, Alsaleh et al. (2025) conducted a nationwide assessment of patient safety culture across public and private hospitals, where nurses comprised 75.6% of the sample. The average composite positive response was 64.5%, reflecting a moderate level of safety culture. The highest-rated composites were organizational learning (87.5%), teamwork within units (87.2%), and management support for patient safety (77.9%). Conversely, staffing (36.2%) and nonpunitive response to errors (32.3%) were the lowest-rated, indicating persistent resource and accountability challenges despite improvements in teamwork and feedback.

In Oman, Al Ma'mari et al. (2019) focused specifically on critical care nurses' perceptions, revealing an overall positive response of 61.4%. The most favourable composites were teamwork within units (91.8%) and organizational learning (86.3%), followed by feedback and communication about errors (77.7%). The lowest-rated areas were nonpunitive response to errors (54.9%), communication openness (45.6%), and handoffs & transitions (15.3%), highlighting a persisting culture of blame that may inhibit open reporting and learning from incidents and handover processes between units.

In Qatar, Abdulla et al. (2023) assessed healthcare professionals' patient safety culture, where nurses represented the majority of respondents (60.1%). The overall positive response rate was 62.4%, indicating a moderate culture of safety. The highest-rated composites were teamwork within units (83.1%), organizational learning (82.0%), and management support for patient safety (79.2%). Conversely, communication openness (46.6%), staffing (40.1%), and

nonpunitive response to errors (27.7%) were identified as the weakest composites, suggesting that structural and communication barriers remain prevalent within the healthcare system.

In Saudi Arabia, Aboufour and Subbarayalu (2022) found an overall positive score of 67% among healthcare professionals working in Ministry of Health hospitals in the Eastern Province, where nurses composed 75.6% of the sample. Nurses perceived staffing (82.0%) and supervisor/manager expectations and actions promoting patient safety (76.9%) most favorably, while organizational learning (48.9%) and teamwork within units (25.4%) reflected lower perceptions. In contrast, Alquwez et al. (2023) reported a lower overall positive response of 61.5% among nurses in the Central region, with strengths in teamwork within units (82.7%) and organizational learning (79.3%), and weaknesses in staffing (38.1%) and nonpunitive response to errors (28.4%). Additionally, in a Saudi oncology-nurse sample from the Western region, high scores were observed for organizational learning (92.1%) and event reporting (75.0%), and moderate scores for teamwork within units (65.8%), whereas communication openness (27.1%), staffing (24.5%), and nonpunitive response to errors (22.4%) were low, underscoring persistent just-culture and resourcing gaps (Wazqar & Attallah, 2024). These contrasting findings illustrate that perceptions of patient safety culture among nurses in Saudi Arabia vary considerably across healthcare regions and institutions.

Collectively, studies from the GCC region reveal that nurses and other healthcare professionals generally perceive patient safety culture as moderate, with consistent strengths in teamwork and organizational learning, and recurrent weaknesses in staffing and nonpunitive response to errors. Importantly, notable regional variations, such as between the Eastern and Western regions of Saudi Arabia, suggest contextual influences on safety culture perceptions. These variations underscore the need for continued investigation of patient safety culture in the

GCC context to identify targeted strategies for strengthening safety practices and fostering a sustainable culture of learning and shared responsibility.

Purpose of the Study

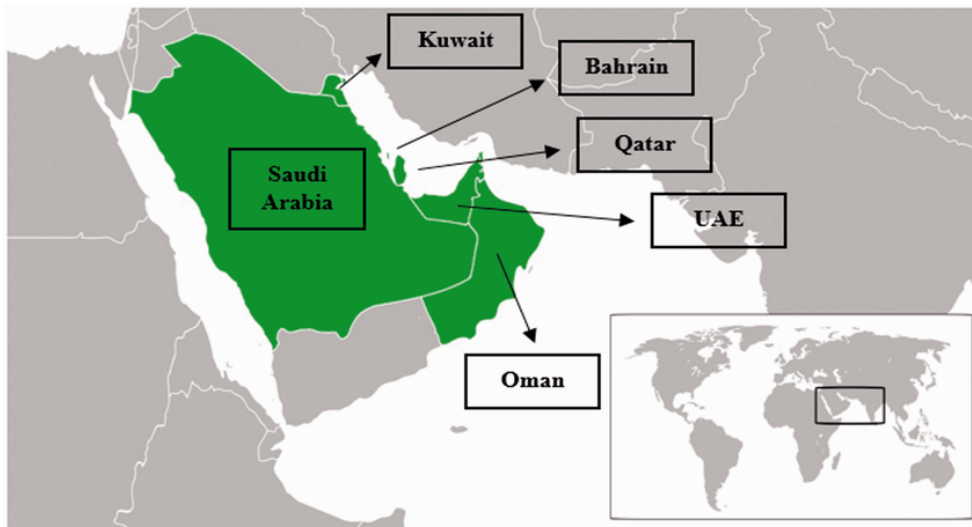
Despite the limited number of studies on patient safety culture in Saudi Arabia's healthcare context, existing research from Saudi healthcare institutions provides varied insights into nurses' perceptions. Additionally, the literature lacks a systematic review dedicated exclusively to understanding how nurses perceive patient safety culture in hospital and acute care contexts across the GCC region. To address this gap, this thesis adopts a multi-method design comprising of a (1) systematic review, (2) a cross-sectional quantitative survey among nursing staff at Hail General Hospital in Saudi Arabia, and (3) meta-analysis of patient safety culture in the GCC region (Figure 1) to ascertain nurses' perceptions of patient safety culture.

Conducting a systematic review enables a comprehensive analysis of the existing literature, facilitates a deeper understanding of the factors influencing patient safety culture within the GCC region, including Saudi Arabia, and contributes to the evidence-base needed to shape recommendations for future research.

Undertaking a meta-analysis is also essential to quantitatively synthesize the results, enhance statistical power, and generate more precise pooled estimates of patient safety culture composites across the GCC region. This approach strengthens the reliability of the conclusions drawn from the systematic review and provides a more robust evidence base to support targeted policy and practice recommendations for improving patient safety culture within healthcare systems across the GCC.

Figure 1

The Gulf Cooperation Council Map



Adapted from Al Wutayd O. (2020). Association of infections with multiple sclerosis in Gulf Cooperation Council countries: a review. *The Journal of international medical research*, 48(4), 300060519884151. <https://doi.org/10.1177/0300060519884151>

The quantitative survey delves into nurses' perspectives on patient safety in Saudi Arabia, providing empirical data to shape actionable recommendations for healthcare policymakers in the Saudi Ministry of Health. This will support the implementation of strategic initiatives aimed at bolstering patient safety culture in Saudi Arabia. The focal issue to be explored is the current state of patient safety culture in Hail City's oldest hospital.

No previous study has assessed patient safety culture from the viewpoint of nurses at this hospital. Therefore, using a validated instrument like the HSOPSC for this assessment is crucial. The survey will serve as a diagnostic tool for Hail General Hospital's administration and nursing management about the hospital's current state regarding patient safety culture, illuminating strengths and pinpointing areas in need of development within the hospital's patient safety framework (Alenezi et al., 2019). Alaska & Alkutbe (2023) have emphasized the importance of

ongoing data collection as a key preventive strategy to enhance patient safety culture.

Furthermore, implementing the HSOPSC will raise awareness about patient safety, allow for benchmarking patient safety culture against established standards, and facilitate formulation of comparative analyses to drive policy improvements (Rockville et al., 2016).

Donabedian's Quality Framework

Donabedian's Quality Framework was used as the organizing framework for this thesis research. Donabedian's Quality Framework is one of the most influential models for evaluating healthcare quality, conceptualizing quality through the interaction of three core elements: structure, process, and outcome (Ayanian & Markel, 2016). Structure refers to the organizational characteristics and contextual conditions under which care is delivered, such as human and financial resources, and administrative arrangements. Process represents the activities, behaviours, and internal mechanisms through which care is provided, and outcome reflects the consequences of care, including patient safety indicators, clinical results, and performance measures (Donabedian, 1988; McDonald et al., 2007).

Donabedian's Framework has been empirically validated in healthcare settings and is recognized as a robust model for assessing quality systems (Kunkel et al., 2007). Evidence indicates conceptual linkages among structure, process, and outcome elements in Donabedian's model, with processes commonly viewed as the mechanism through which structural conditions shape quality-related outcomes. (Kunkel et al., 2007). The strength and clarity of these interrelationships underpin the framework's suitability for guiding patient safety research.

In the present cross-sectional quantitative study, Donabedian's model is adopted as a conceptual orientation, with an analytical focus on the relationship between the process and outcome components. While demographic characteristics such as nurses' department, nationality,

education, age, years of experience, and working hours are collected and presented descriptively to contextualize the sample, they are not incorporated into the inferential analyses. Instead, they serve as background variables that define the environment in which patient safety culture is situated, consistent with Donabedian's view that structures shape, but are not always empirically tested within quality assessments (Donabedian, 2005; Liu et al., 2011).

The process domain is operationalized through the HSOPSC, in which the composites represent the internal practices, norms, and interactions that together form the patient safety culture within an organization. For HSOPSC 1.0, these composites include "Teamwork Within Units"; "Teamwork Across Units"; "Organizational Learning–Continuous Improvement"; "Supervisor/Manager Expectations and Actions Promoting Patient Safety"; "Handoffs & Transitions"; "Management Support for Patient Safety"; "Feedback and Communication About Error"; "Overall Perceptions of Patient Safety"; "Communication Openness"; "Frequency of Events Reported"; "Staffing"; and "Nonpunitive Response to Error". For HSOPSC 2.0, nine refined composites reflect updated safety culture constructs, including "Teamwork"; "Hospital Management Support for Patient Safety"; "Communication About Error"; "Handoffs and Information Exchange"; "Communication Openness"; "Organizational Learning–Continuous Improvement"; "Response to Error"; "Supervisor, Manager, or Clinical Leader Support for Patient Safety"; and "Staffing and Work Pace" (Sorra et al., 2018; Sorra et al., 2021; Sorra & Nieva, 2004).

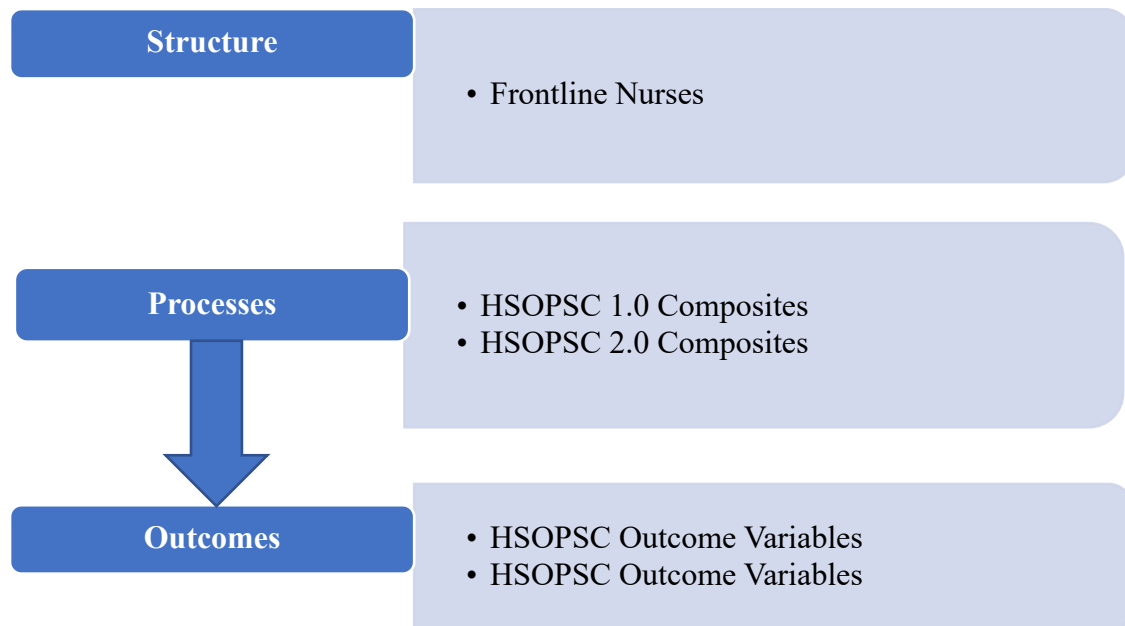
The outcome domain comprises the HSOPSC patient safety outcome variables. In HSOPSC 1.0, these include Overall Perceptions of Safety, Frequency of Events Reported, Patient Safety Grade, and Number of Events Reported. In HSOPSC 2.0, outcome variables include Reporting Patient Safety Events, Patient Safety Rating, and Number of Events Reported

(Sorra et al., 2018; Sorra et al., 2021; Sorra & Nieva, 2004). The study evaluates the associations between the process composites and these outcome variables, consistent with Donabedian's assertion that effective processes lead to improved healthcare outcomes (Ameh et al., 2017; Tossaint-Schoenmakers et al., 2021).

By grounding the analysis in Donabedian's framework, this study positions patient safety culture as a quality process, with frontline nurses' perceptions serving as a key indicator of how safety-related behaviours and norms operate within hospital systems. The resulting conceptual orientation, process leading to outcome, contextualized by structure, offers a theoretically coherent model for interpreting nurses' perceptions of patient safety culture at Hail General Hospital and supports the study's overarching aim of informing quality and safety improvements in the Saudi healthcare context as part of the GCC region and world (Figure 2).

Figure 2

Theoretical Framework Based on Donabedian's Quality Framework



Adapted from Donabedian, A. (1988). The Quality of Care: How Can It Be Assessed?

JAMA : The Journal of the American Medical Association, 260(12), 1743–1748.

<https://doi.org/10.1001/jama.1988.03410120089033>

Research Questions

Systematic Review Question:

What are nurses' perceptions of patient safety culture, as defined by the Hospital Survey on Patient Safety Culture, in the Gulf Cooperation Council region, which includes Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates?

Cross-sectional Quantitative Survey Questions:

Q1: In the current Saudi Arabian healthcare context, how do nurses at Hail General Hospital perceive the patient safety culture within their respective practice settings?

Q2: What are the psychometric properties of the HSOPSC 1.0 and 2.0 composites at the overall sample level and across subgroups defined by department and nationality?

Q3: What is the relationship between patient safety culture composites and the outcome variables in HSOPSC 1.0, including Overall Perceptions of Safety, Frequency of Events Reported, Patient Safety Grade, and Number of Events Reported?

Q4: What is the relationship between patient safety culture composites and the outcome variables in HSOPSC 2.0, including Reporting Patient Safety Events, Patient Safety Rating, and Number of Events Reported?

Q5: Which patient safety culture composites predict the outcome variables in HSOPSC 1.0, including Overall Perceptions of Safety, Frequency of Events Reported, Patient Safety Grade, and Number of Events Reported?

Q6: Which patient safety culture composites predict the outcome variables in HSOPSC 2.0, including Reporting Patient Safety Events, Patient Safety Rating, and Number of Events Reported?

Q7: What are the differences in the composite metrics between HSOPSC 1.0 and HSOPSC 2.0, and how do these differences contribute to understanding patient safety culture through Donabedian's structure-process-outcome framework as assessed by nurses at Hail General Hospital?

Meta-analysis Question:

Which HSOPSC composites represent areas of strength and weakness in nurses' perceptions of patient safety culture across the Gulf Cooperation Council (GCC) region, including Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates, as identified through meta-analytic synthesis?

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**Chapter 2: Nurses' perceptions of patient safety culture measured by the Hospital Survey
on Patient Safety Culture in the Gulf Cooperation Council region: A systematic review**

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COUNCIL HOSPITALS: SYSTEMATIC REVIEW

Abstract**Background**

Patient safety is a global priority, and nurses play a central role in its implementation and monitoring. Understanding nurses' perceptions of patient safety culture supports refinement of safety strategies, evidence-informed policymaking, and sustained cultural change. This systematic review synthesizes studies using the Hospital Survey on Patient Safety Culture to assess nurses' perceptions in the Gulf Cooperation Council countries: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates.

Methods

The review was registered with PROSPERO and guided by the PRISMA guidelines. CINAHL, MEDLINE, and EMBASE were searched in September 2024 using predefined keywords related to nursing, patient safety, the Hospital Survey on Patient Safety Culture, and the Gulf Cooperation Council countries. Inclusion criteria were primary studies reporting nurses' Hospital Survey on Patient Safety Culture scores in hospital settings. Covidence software was used for study screening, duplicate removal, and eligibility assessment.

Results

From 54 identified records, 25 unique studies were screened, 20 underwent full-text review, and 9 met inclusion criteria. Eight studies employed the Hospital Survey on Patient Safety Culture version 1 (nurses: 2591; mean sample size: 323.88) and one study used the Hospital Survey on Patient Safety Culture version 2 (nurses: 402). Across version 1 studies, highest average composite scores were observed for Teamwork Within Units (71.92%) and Organizational Learning–Continuous Improvement (78.70%). Communication Openness (45.51%), Staffing (40.09%), Handoffs & Transitions (40.53%), and Nonpunitive Response to Error (35.42%) were

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lowest. Version 2 results showed similar trends: Teamwork (77%) and Organizational Learning - Continuous Improvement (72.3%) were high, while Staffing and Work Pace (46.17%) and Response to Error (39.75%) were low. The review's findings indicated substantial variation in nurses' perceptions across patient safety culture composites, from high ratings for teamwork to low ratings for staffing and nonpunitive error reporting.

Conclusions

Patient safety culture in the Gulf Cooperation Council hospitals shows strengths in teamwork and continuous improvement, but persistent weaknesses in staffing, error reporting, and care transitions. Aligned with national healthcare visions (e.g., Saudi Vision 2030 and Oman Vision 2040), evidence-based recommendations include implementing structured handoff processes, adopting nonpunitive and confidential approaches to promote nonpunitive error reporting, and strengthening workforce strategies to improve staffing adequacy and workload management. Additionally, it may be useful to develop instruments that are based on the sociocultural realities of these societies and not adapted from other countries' instruments.

Keywords

Patient safety, Patient safety culture, Hospital survey on patient safety culture, Nurses, Hospitals, Gulf Cooperation Council, Systematic review

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Patient Safety in Context

Patient safety is a critical priority for healthcare organizations worldwide (Atalla et al., 2025). In 2000, the Institute of Medicine in the United States (US) highlighted this issue in its influential report, *To Err Is Human*. Publication of this report has significantly increased public awareness of medical errors in the US (Donaldson et al., 2000). Subsequently, international interest in the examination of patient safety culture emerged (Feng et al. 2008). In response to the significant magnitude of the worldwide patient safety concern, the World Health Organization (WHO) established the World Alliance for Patient Safety in 2004, launched by WHO leadership alongside the Pan American Health Organization, UK and U.S. governmental representatives, WHO regional directors, patient advocates, and international safety experts (WHO, 2004a, 2004b). The primary objective of this alliance was to formulate fundamental principles, generate guidelines and make suggestions aimed at mitigating risks and minimizing adverse occurrences within healthcare systems (WHO, 2004a, 2004b). Furthermore, the adoption of resolution WHA72.6 on "Global action on patient safety" in May 2019 by the Seventy-second World Health Assembly reflects widespread international attention to patient safety. The resolution called upon the WHO Director-General to prioritize patient safety as a crucial strategic objective within the scope to promote universal health coverage (WHO, 2023). WHO supported the establishment of World Patient Safety Day, set to occur annually on the 17th of September. The primary aim of this initiative is to enhance public awareness and promote a global understanding of patient safety (WHO, 2023).

The Role of Nurses in Patient Safety

Nursing is a humanitarian vocation dedicated to helping the sick or injured and ensuring high standards of healthcare services. In medical facilities, nurses constitute the largest

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proportion of the medical staff. The nursing profession is considered the backbone of the healthcare system, bridging various health professions and playing a central role in healthcare processes. Nurses account for nearly 50% of the global health workforce (WHO, 2025). As frontline providers of care, nurses are central to the implementation and observation of patient safety practices. Their continuous presence at the bedside and involvement in both direct patient care and interdisciplinary communication give them a unique vantage point from which to assess the safety culture within clinical settings (Hajizadeh et al., 2025; Phillips et al., 2021). Because they operate at the intersection of policy and practice, nurses are often the first to identify deviations from standard protocols, emerging safety risks, or unintended consequences of system-level decisions (Glarcher & Vaismoradi, 2024; Hajizadeh et al., 2025). Additionally, nurses' dual role, as both implementers of institutional policy and observers of day-to-day clinical operations, positions nurses to detect and report gaps between standard safety procedures and care delivery. Their insights are indispensable for the development of safety strategies, facilitating organizational learning, and enhancing overall quality of care (Glarcher & Vaismoradi, 2024; Reyes Ramos & Costa Abos, 2024).

The Regional Healthcare Context of the Gulf Cooperation Council

This systematic review focuses on the Gulf Cooperation Council region, which includes Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates. The Gulf Cooperation Council member states share a common historical and political context. Additionally, deep religious and cultural connections unite the six states, and strong kinship bonds prevail among their citizens. These factors, along with geographical continuity across the Arabian Peninsula, have facilitated interactions among them and fostered similar values and characteristics. Furthermore, the Gulf Cooperation Council countries display comparable

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economic features due to their reliance on revenues derived from natural resources, particularly oil, to support national development and healthcare financing (Alkhamis et al., 2014; Secretariat General of the Gulf Cooperation Council, 2024). As Christie (1987, p.7) noted, unlike many international alliances that must overcome differences in language, culture, and political systems, the Gulf Cooperation Council emphasizes similarities among its members, including a shared religion (Islam), a common language (Arabic), similar systems of governance, parallel social structures rooted in extended family and tribal relationships, comparable levels of economic development, and shared geography (Al-Hamadi et al., 2007; Farag, 2017). In addition to these contextual similarities, healthcare systems across the Gulf Cooperation Council countries exhibit comparable organizational structures, regulatory environments, and workforce models, which provide a coherent basis for examining patient safety culture within hospital settings at the regional level (Alkhamis et al., 2014; WHO, 2020).

In the Gulf Cooperation Council region, nurses are the majority of healthcare professionals, playing a vital role in all aspects of patient care. In Saudi Arabia, as of 2023, the total number of nurses in the Saudi health sector reached 213,110, with only 94,021 being Saudi nationals. The remaining nurses are primarily foreign workers, predominantly from the Philippines, India, and Malaysia (Alluhidan et al., 2020; Ministry of Health, 2023; 2024). Similarly, in Oman, nurses comprise approximately 60% of all healthcare professionals and represent most of the healthcare workforce, with many being expatriates from India, the Philippines, and Sri Lanka (Ministry of Health, 2022; Valdez et al., 2021). A similar pattern is observed in Bahrain, where nurses constitute most of the healthcare workforce, though most are Bahraini nationals (Alhourani et al., 2022; Awadhalla et al., 2018). In the United Arab Emirates, the healthcare system heavily relies on expatriate nurses, with around 96% originating from the

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Philippines, India, Pakistan, Arab nations, America, and the British Commonwealth (Al-Yateem et al., 2022). In Qatar, nurses represent the largest professional workforce in the healthcare sector, with over 90% being expatriates from the Philippines and India (Al-Harashsheh et al., 2020; MacDonald et al., 2020). Additionally, in Kuwait, nurses make up the largest segment of healthcare practitioners, totalling 22,021. The vast majority (95.4%) are non-Kuwaiti expatriates, primarily from India, Egypt, the Philippines, and Malaysia (Aljarida, 2023; Al-Maaitah et al., 2023). This multinational workforce composition introduces additional complexity to patient safety culture, as nurses bring diverse educational backgrounds, languages, and professional norms into shared organizational environments.

Measuring Patient Safety Culture

Patient safety culture is widely recognized as a critical determinant of healthcare quality and clinical outcomes. It refers to the shared values, beliefs, and norms within a healthcare organization that influence staff attitudes and behaviours related to patient safety. It reflects the extent to which safety-related behaviours are supported, expected, and accepted across all organizational levels (Agency for Healthcare Research and Quality [AHRQ], 2024). A strong safety culture has been associated with lower rates of adverse events such as medication errors and hospital readmissions, as well as higher levels of patient satisfaction (Alanazi et al., 2022; Alsabri et al., 2022). Key elements of patient safety culture include such factors as open communication, error reporting, teamwork, leadership support, and a non-punitive response to errors (Churruca et al., 2021; Farokhzadian et al., 2018). Assessing patient safety culture allows healthcare organizations to identify strengths and areas for improvement, monitor changes over time, and implement targeted strategies to improve safety outcomes (Camacho-Rodríguez et al., 2022; Rawas & Abou Hashish, 2023). One of the most widely used tools for this purpose is the

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Hospital Survey on Patient Safety Culture developed by the AHRQ (AHRQ, 2023; Vikan et al., 2023).

The Hospital Survey on Patient Safety Culture appraises organizational elements that affect patient safety culture at both the hospital-wide level and within departments (Sorra & Nieva, 2004). The Hospital Survey on Patient Safety Culture is not only psychometrically solid, but its validity and consistency have been corroborated (Sorra & Dyer, 2010; Sorra et al., 2019). The Hospital Survey on Patient Safety Culture is considered psychometrically robust, with reliability analyses reporting Cronbach's alpha values for the composites ranging from 0.62 to 0.85, indicating moderate to strong internal consistency across most composites (Sorra & Dyer, 2010). The survey has been used in multiple investigations to assess nurses' perceptions and understandings of patient safety culture in various Gulf Cooperation Council hospitals (Rawas & Abou Hashish, 2023; Wazqar & Attallah, 2024). The Hospital Survey on Patient Safety Culture has been used in over 99 countries, including Korea, Brazil, Spain, and the Gulf Cooperation Council region, demonstrating its global relevance and adaptability (AHRQ, 2023; Alquwez et al., 2018; Reis et al., 2023). Although several tools are available for measuring safety culture, such as the Safety Attitudes Questionnaire and the Manchester Patient Safety Framework, the Hospital Survey on Patient Safety Culture remains the most widely used globally for assessing hospital-based patient safety culture. Recent evidence shows that 104 studies utilized the Hospital Survey on Patient Safety Culture, compared to 63 using the Safety Attitudes Questionnaire (Carvalho et al., 2023), while another review found that nearly half of all quantitative hospital-based studies ($n = 312$) utilized the Hospital Survey on Patient Safety Culture followed by the Safety Attitudes Questionnaire (30.7%) (Churruca et al., 2021). Additionally, Azyabi and colleagues (2021) conducted a systematic review to evaluate patient

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safety culture instruments, identifying 66 studies, of which 54 (82%) used the Hospital Survey on Patient Safety Culture.

The first version of the Hospital Survey on Patient Safety Culture was created in 2004 and is comprised of 12 composites, in addition to two overarching questions regarding the overall patient safety degree perceived by respondents in their respective units and the number of safety events reported in the past year (AHRQ, 2013). The 12 composites are Teamwork Within Units; Supervisor/Manager Expectations & Actions Promoting Patient Safety; Organizational Learning-Continuous Improvement; Management Support for Patient Safety; Overall Perceptions of Patient Safety; Feedback & Communication About Error; Communication Openness; Frequency of Events Reported; Teamwork Across Units; Staffing; Handoffs & Transitions; and Nonpunitive Response to Error.

The Hospital Survey on Patient Safety Culture-II is an updated and validated version of the original Hospital Survey on Patient Safety Culture, refined to reflect current patient safety research and feedback from healthcare users. It reduces the number of composites from 12 to 10, removing *Overall Perceptions of Patient Safety* and *Teamwork Across Units* to streamline the tool and focus on more actionable areas. The remaining composites were largely preserved, with some title revisions to better align with contemporary terminology and clinical practice. Survey items underwent a rigorous refinement process with some items unchanged ($n = 4$), added (10), others reworded for clarity ($n = 9$), and several were significantly revised ($n = 9$) or removed to eliminate redundancy ($n = 20$) (Sorra et al., 2019). The changes improved psychometric performance, with Cronbach's alpha for revised composites ranging from 0.67 to 0.89, reflecting enhanced internal consistency reliability (AHRQ, 2019). These changes lowered survey burden, improved response quality, and better aligned the tool with contemporary safety culture

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frameworks (AHRQ, 2019; Sorra et al., 2021). The Hospital Survey on Patient Safety Culture-II survey composites include: Communication About Error; Communication Openness; Handoffs and Information Exchange; Hospital Management Support for Patient Safety; Organizational Learning-Continuous Improvement; Reporting Patient Safety Events; Response to Error; Staffing and Work Pace; Supervisor, Manager, or Clinical Leader Support for Patient Safety; and Teamwork (AHRQ, 2019; Sorra et al., 2021).

Notwithstanding a dearth of studies on the subject in the Gulf Cooperation Council, previous studies have indicated varying perceptions of patient safety culture among healthcare workers, including nurses. Some studies have documented generally positive attitudes, with average composite scores exceeding 60% (Alaska & Alkutbe, 2023; Algethami et al., 2024), while others have highlighted significant areas for improvement, reporting average scores below 60% (Al Muharraq et al., 2024).

However, there remains a notable gap in synthesizing and comparing findings across the Gulf Cooperation Council, especially in hospital-based, acute, and critical care settings. This research gap aligns with broader findings from the Arab region, of which the Gulf Cooperation Council states are a part. Zubairi et al. (2023) reported that only 2% of global patient safety research originated from the Arab region, with limited output from most Gulf Cooperation Council countries except Saudi Arabia, and called for increased investment in patient safety research. Similarly, Elmontsri et al. (2017) noted significant variation in study settings and participant groups in Arab countries, limiting focused conclusions, particularly regarding nurses' perceptions. Despite this, no systematic review has yet exclusively examined nurses' perceptions of patient safety culture within hospital and acute care settings in the Gulf Cooperation Council region. Addressing this gap is essential for identifying strengths, weaknesses, and future

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opportunities to enhance patient safety from the perspective of those most closely involved in direct patient care.

This systematic review aims to address the question: What are nurses' perceptions of patient safety culture, as defined by the Hospital Survey on Patient Safety Culture, in the Gulf Cooperation Council region, which includes Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates?

This review synthesizes data from both versions of the survey, Hospital Survey on Patient Safety Culture and Hospital Survey on Patient Safety Culture-II, to capture detailed insights into the composites of patient safety measured by each version in the Gulf Cooperation Council region. It examines how patient safety culture has been integrated into healthcare settings across the Gulf Cooperation Council. The review further aims to identify common strengths, persistent challenges, and gaps in the existing evidence in order to inform evidence-based recommendations for research, practice, and policymakers to improve patient safety culture in the Gulf Cooperation Council region.

Methods

This systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (PRISMA, 2021) and was registered with the PROSPERO registry (Registration ID: CRD42024596704).

Literature Search Strategy

The electronic databases CINAHL, Medline, and EMBASE were queried in September 2024. The search used keywords "Nurs*," "health professional", "health provider", "health practitioner", "patient safety", "patient safety culture", "Bahrain," "Kuwait," "Oman," "Qatar,"

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“Saudi Arabia”, “Kingdom of Saudi Arabia”, “United Arab Emirates”, “Hospital Survey on Patient Safety Culture”, and "HSOPSC." Boolean operators AND and OR were applied to effectively combine search terms (Supplementary Table 1; <https://pmc.ncbi.nlm.nih.gov/articles/instance/12969805/bin/mmc1.docx>). The search covered the period from 2004 to 2024, reflecting the timeline since the Hospital Survey on Patient Safety Culture was first developed in 2004. Because healthcare systems in the Gulf Cooperation Council region primarily operate in English, the search was limited to studies published in English.

Eligibility Criteria

The Population, Intervention, Comparison, and Outcomes (PICO) framework was used to define inclusion and exclusion criteria for studies (Supplementary Table 2; <https://pmc.ncbi.nlm.nih.gov/articles/instance/12969805/bin/mmc2.docx>) (Schardt et al., 2007). Studies conducted in acute care settings and published in a peer-reviewed journal were included if they: (1) surveyed nurses or other health care practitioners but separately detailed nurses' perceptions, (2) were conducted solely in a country or countries within the GGC region, and (3) were quantitative studies that used Hospital Survey on Patient Safety Culture to survey nurses or mixed-methods studies that reported Hospital Survey on Patient Safety Culture quantitative data.

Studies were excluded if they (1) do not survey nurses or studies that do not detail nurses' perceptions separately, (2) were from all other countries and regions of the world, and (3) were quantitative studies that used other instruments to measure patient safety or mixed-method studies that did not use Hospital Survey on Patient Safety Culture or did not report Hospital Survey on Patient Safety Culture quantitative data. Although mixed-methods studies were eligible if they reported Hospital Survey on Patient Safety Culture quantitative data for nurses,

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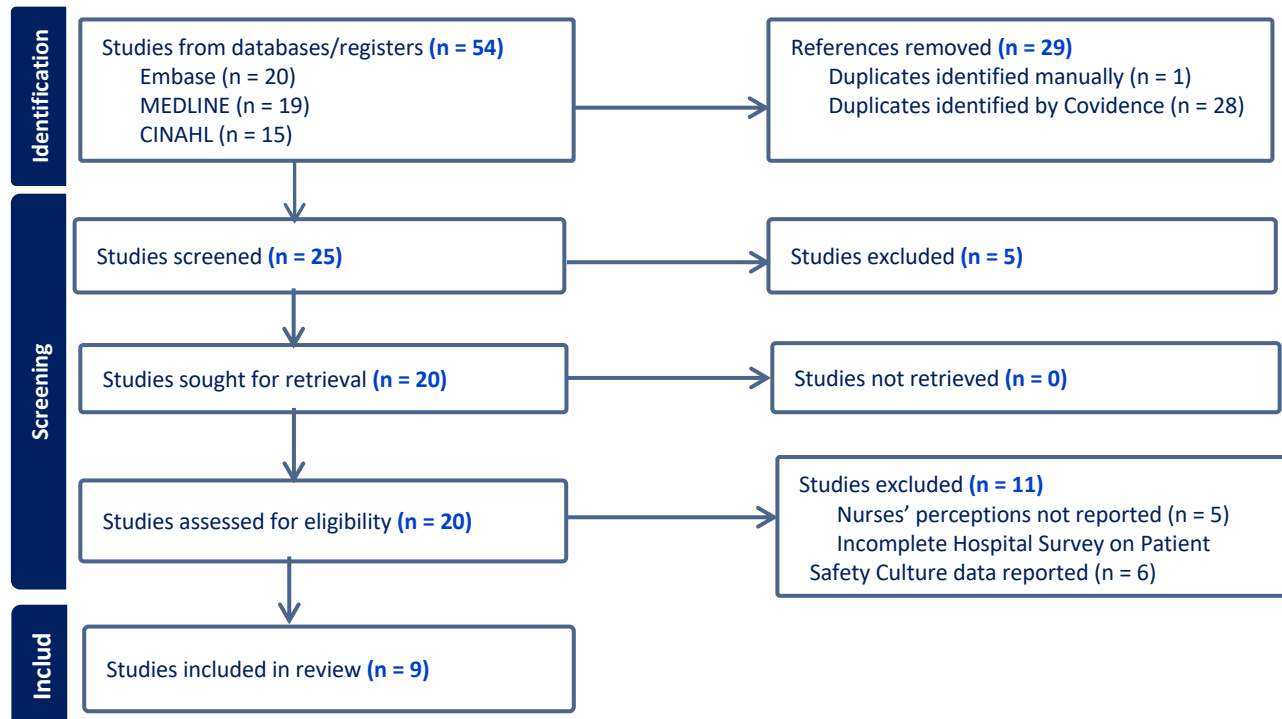
no mixed-methods studies met the inclusion criteria. All included studies were quantitative in design.

Review process

A rigorous and structured process was followed to ensure inclusion of relevant and eligible studies. Title, abstract, and full text screening were completed by two reviewers. After applying the predefined keywords, a total of 54 articles were identified across the three electronic databases, with 20 studies from EMBASE, 19 from MEDLINE, and 15 from CINAHL. Following removal of 29 duplicate studies, 25 articles remained for further evaluation.

During the abstract screening phase, five studies were excluded based on predefined inclusion and exclusion criteria. Subsequently, a full-text review was conducted to assess the eligibility of the remaining 20 studies, resulting in the exclusion of an additional 11 studies; five studies did not report nurses' data separately, and six studies did not present positive response percentage scores for Hospital Survey on Patient Safety Culture composites, which precluded inclusion in the review. Of the nine studies included in the final synthesis, eight were quantitative studies focusing exclusively on nurses, and one was a quantitative study in which nurses' perceptions were reported separately. At each stage of the review process, disagreements were resolved through discussions between two reviewers (MA, JCP) to achieve consensus. The Covidence systematic review software (Veritas Health Innovation, Melbourne, Australia) was used to organize articles, remove duplicates, and exclude ineligible studies, ensuring a transparent and reproducible process (Figure 1) (Veritas Health Innovation, n.d.).

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Figure 1*Eligibility Flowchart of Patient Safety Culture in the Gulf Cooperation Council region*

Note. Flowchart adapted from the PRISMA guidelines, based on study selection data generated in Covidence systematic review software (PRISMA, 2021; Veritas Health Innovation, n.d.)

Quality assessment

Quality of selected articles was independently assessed by two reviewers (MA, JCP) using the Checklist for Analytical Cross-Sectional Studies developed by the Joanna Briggs Institute (2020). This checklist includes eight criteria for evaluating study quality. To ensure relevance to the specific topic and methods of the included studies, the reviewers agreed to adapt certain criteria after careful consideration (Supplementary Table 3; <https://pmc.ncbi.nlm.nih.gov/articles/instance/12969805/bin/mmc3.docx>). The adaptations include assessing the validity and reliability of patient safety culture measurements, use of standard criteria, and clarity of the Hospital Survey on Patient Safety Culture. Additionally, the

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checklist examines whether the findings are appropriately summarized and reflect the collected data, ensuring both relevance and rigour for this review. Quality assessment scores for the included studies are presented in Table 1. Studies scoring below 50%, fewer than 4 out of 8 criteria, were excluded from the final synthesis of the systematic review. As with the review process, any disagreements during quality assessment were resolved through discussions between two reviewers (MA, JCP) to achieve consensus, ensuring reliability and objectivity of the evaluation. Quality assessment and data extraction were completed in Covidence.

Table 1

Quality Evaluation of Studies: Total Scores (Max = 8)

Study ID	Total Score (out of 8)
Al-Awa 2012	6
AlMuharraq 2024	8
Alquwez 2018	7
Ammouri 2015	5
Wazqar 2024	7
Aboshaiqah 2010	8
Rawas 2023	8
AlMa'mari 2019	6
SalehAboufour 2022	8

Source: Adapted from the Joanna Briggs Institute (2020).

Data extraction

Following quality assessment of the studies, two reviewers (MA, JCP) individually extracted data from the nine eligible studies. Extracted data included the study author and year, country, participant details, sample sizes, and patient safety culture composite scores. In case of disagreements, reviewers met to discuss and resolve the issues; if unresolved, two additional

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reviewers (JT, IB) were available to be consulted to provide a final resolution. Consultation was not required because initial reviewers were able to resolve all disagreements and arrive at a final resolution of the issues.

Results

Table 2

Studies Utilizing the First Version of Hospital Survey on Patient Safety Culture, Nurses' Perspectives (N = 2591)

Author, year	Aboshaiqah, 2010	Al-Awa, 2012	Ammouri, 2015	Alquwez, 2018	AlMa'mari, 2019	SalehAboufour, 2022	Rawas, 2023	Wazqar, 2024	Average *
Country	KSA	KSA	Oman	KSA	Oman	KSA	KSA	KSA	N/A
sample size, Nurses (n)	445	605	414	351	270	221	184	101	323.88
Composite scores									
Teamwork Within Units	70	68	83.4	85.8	94	25.4	82.95	65.84	71.92
Supervisor /Manager Expectations & Actions	49	51	60	54.3	59.9	76.9	72.86	46.54	58.81
Promoting Patient Safety									
Organizational Learning-Continuous Improvement	82	74	81.1	83.3	86.3	48.9	81.88	92.08	78.70
Management Support for Patient Safety	90	61	25.2	60.3	65.9	18.1	70.15	66.01	57.08
Feedback & Communication About Error	67	58	68.7	56.3	77.7	49.3	81.25	76.57	66.85

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Communication Openness	36	36	49.7	37.4	45.6	76.5	55.80	27.06	45.51
Frequency of Events Reported	61	57	58.8	20.3	61.7	68.3	73.82	75.04	59.50
Teamwork Across Units	55	51	66.1	59.3	50.2	69.3	67.29	69.31	60.94
Staffing	54	15	27	21.1	57	82	40.08	24.50	40.09
Handoffs & Transitions	22	47	57.7	46.1	15.3	25.3	39.06	71.79	40.53
Nonpunitive Response to Error	49	16	21.4	16.6	54.8	59.2	43.89	22.44	35.42
Overall Perceptions of Patient Safety	52	45	50.7	48.8	61.4	85.6	59.00	69.31	58.98

* Average values were calculated as the arithmetic mean of the values reported across the included studies.

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Table 3*Study Using Hospital Survey on Patient Safety Culture Version II*

Author, year	AlMuharraq, 2024
Country	KSA
Sample size, nurses	402
Composite scores	
Teamwork	77
Staffing and Work Pace	46.17
Organizational Learning-Continuous Improvement	72.3
Response to Error	39.75
Supervisor, Manager, or Clinical Leader Support for Patient Safety	59.56
Communication About Error	69.36
Communication Openness	55.75
Reporting Patient Safety Events	59.45
Hospital Management Support for Patient Safety	61.1
Handoffs and Information Exchange	58.3

Sociodemographic Characteristics of Samples Studied

This systematic review of studies on patient safety culture in the Gulf Cooperation Council region highlights key demographic characteristics and perceptions about patient safety among nurses ((Supplementary Table 4; <https://pmc.ncbi.nlm.nih.gov/articles/instance/12969805/bin/mmc4.docx>, Table 2, Table 3). The investigation included studies conducted between 2010 and 2024 that used the Hospital Survey on Patient Safety Culture to assess composites of safety culture in healthcare settings. Across multiple studies ($n = 6$), there was a notable representation of non-Arabic-speaking and expatriate nurses. For example, in one study in Saudi Arabia, most participants were non-Arabic

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speakers ($n = 387$, 87%; Aboshaiqah, 2010). Similarly, the studies by Al-Awa (2012) and Alquwez (2018) in Saudi Arabia revealed a predominant proportion of Indian and Filipino nurses, with Al-Awa reporting 44.5% Indian and 41% Filipino participants, and Alquwez reporting 38.7% Indian and 43.3% Filipino nurses. In Oman, AlMa'mari (2019) reported that 81.5% of nurses were non-Omani, while Rawas (2023) reported that 81% of participants in Saudi Arabia were non-Saudi. Conversely, the study by AlMuharraq (2024) in Saudi Arabia reported a sample of mostly Saudi nurses ($n = 349$, 86.8%). Gender distribution was a key characteristic across the studies (Aboshaiqah, 2010; Alquwez et al., 2018; AlMa'mari et al., 2019; Rawas & Abou Hashish, 2023; Wazqar & Attallah, 2024; AlMuharraq et al., 2024).

Female nurses were overwhelmingly represented in most studies ($n = 1,493$, 85.22%), with proportions ranging from 82.6% in Rawas (2023) to 91.5% in Alquwez (2018). In Oman, Ammouri (2015) reported 89.6% female nurses, while in Saudi Arabia, AlMuharraq (2024) reported 84.1% female participants. Wazqar (2024) in Saudi Arabia was unique in reporting a notable percentage of male nurses, with 39.6% of participants being male and 60.4% female.

The mean age of nurses across studies was relatively consistent, ranging from 28.63 years in Alquwez (2018) to 35.11 years in Aboshaiqah (2010). Studies in Oman, such as Ammouri (2015) and AlMa'mari (2019), reported mean ages of 35 years and 33.06 years, respectively. In Saudi Arabia, Rawas (2023), Wazqar (2024), and AlMuharraq (2024) reported mean ages of 32.5 years, 31 years, and 30.8 years, respectively. Work experience was another notable demographic feature.

In Aboshaiqah's (2010) study, 80.9% of nurses had more than six years of experience, while Wazqar (2024) reported 63.4% of participants with similar experience. On the other hand,

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Alquwez (2018) and Rawas (2023) reported that 72.1% and 57.1% of participants, respectively, had less than six years of nursing experience.

In terms of educational qualifications, most nurses across the studies held a bachelor's degree. For instance, Aboshaiqah (2010) reported 85.4% of nurses with a bachelor's degree, and Alquwez (2018) and Rawas (2023) reported 88.9% and 90.8%, respectively. However, diploma holders were significant in studies from Oman and Saudi Arabia ($n = 271$, 20.72%) (Aboshaiqah, 2010; Alquwez et al., 2018; AlMa'mari et al., 2019; Rawas & Abou Hashish, 2023; Wazqar & Attallah, 2024; AlMuharraq et al., 2024). For example, Ammouri (2015) reported that 65.4% of nurses held a diploma, and AlMa'mari (2019) found that 33.3% of nurses had a diploma. The study by AlMuharraq (2024) also reported 34.3% diploma holders and 5.7% holding master's degrees. Work hours varied across studies, with most nurses working 40–59 hours per week. For instance, Alquwez (2018) reported that 82.1% of nurses worked 40–59 hours weekly, while Rawas (2023) indicated that 67.4% worked similar hours. Wazqar (2024) reported that 79.2% of nurses worked more than 40 hours weekly.

Patient Safety Culture Composites Scores from Reviewed Studies

Two versions of the Hospital Survey on Patient Safety Culture survey were used to evaluate nurses' perceptions of various composites of patient safety culture in the Gulf Cooperation Council region. Studies employing the first version of the Hospital Survey on Patient Safety Culture (Table 2) included six investigations conducted in Saudi Arabia and two in Oman, with sample sizes ranging from 101 to 605 nurses, an average sample size of 323.88, and a total sample size across studies of 2591. Across these studies, the composite scores exhibited considerable variation.

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For the composite of Teamwork Within Units, scores ranged from 25.4% (SalehAboufour & Subbarayalu, 2022) to 94% (AlMa'mari et al., 2019), with many studies reporting relatively high values, indicating a generally positive perception of collaboration within individual units; across all studies, the average score was 71.92%.

Supervisor/Manager Expectations and Actions Promoting Patient Safety showed moderate variability, with scores between 46.54% (Wazqar & Attallah, 2024) and 76.9% (SalehAboufour & Subbarayalu, 2022), reflecting mixed perceptions of supervisory support for safety initiatives, with an average score of 58.81% across all studies.

Organizational Learning-Continuous Improvement was consistently one of the higher-scoring s, with values ranging from 48.9% (SalehAboufour & Subbarayalu, 2022) to 92.08% (Wazqar & Attallah, 2024), highlighting an emphasis on improvement efforts in many settings; across all studies, the average score was 78.70%.

Management Support for Patient Safety revealed significant variability, with scores spanning from a low of 18.1% (SalehAboufour & Subbarayalu, 2022) to a high of 90% (Aboshaiqah, 2010), suggesting inconsistent perceptions of managerial involvement across institutions, with an average score of 57.08% across all studies.

Feedback and Communication About Error had a range of 49.3% (SalehAboufour & Subbarayalu, 2022) to 81.25% (Rawas & Abou Hashish, 2023), indicating some strengths in sharing information about mistakes but also showing areas for potential growth. The average score across all studies was 66.85%.

Communication Openness was one of the lowest-scoring composites, with values between 27.06% (Wazqar & Attallah, 2024) and 76.5% (SalehAboufour & Subbarayalu, 2022),

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revealing ongoing challenges in fostering open discussions about patient safety; across all studies, the average score was 45.51%.

The Frequency of Events Reported composite showed variability as well, with scores from 20.3% (Alquwez et al., 2018) to 75.04% (Wazqar & Attallah, 2024), reflecting differences in the reporting culture across institutions, with an average score of 59.50% across all studies.

Teamwork Across Units scored between 50.2% (AlMa'mari et al., 2019) and 69.31% (Wazqar & Attallah, 2024), indicating moderate collaboration across institution units. The average score across all studies was 60.94%.

Staffing emerged as a significant challenge, with scores ranging from 15% (Al-Awa et al., 2012) to 82% (SalehAboufour & Subbarayalu, 2022), and an average of 40.09%, highlighting concerns about resource adequacy.

Similarly, Handoffs & Transitions scored poorly in most studies, ranging from 15.3% (AlMa'mari et al., 2019) to 71.79% (Wazqar & Attallah, 2024), illustrating persistent issues in ensuring safe transitions of care; across all studies, the average score was 40.53%.

Nonpunitive Response to Error was low in all studies ranging from 16% (Al-Awa et al., 2012) to 59.2% (SalehAboufour & Subbarayalu, 2022), potentially inferring institutions struggle with creating environments where staff feel safe to report errors without fear of blame or reprisal as the average score across all studies was 35.42%.

Lastly, Overall Perceptions of Patient Safety scored between 45% (Al-Awa et al., 2012) and 85.6% (SalehAboufour & Subbarayalu, 2022), reflecting varying overall assessments of safety within institutions, with an average score of 58.98% across all studies.

On the other hand, one study (Table 3) utilized the second version of Hospital Survey on Patient Safety Culture to evaluate patient safety culture in KSA, with a sample of 402 nurses

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(AlMuharraq, 2024). This study reported a strong score for Teamwork (77%), reflecting positive collaboration among staff. However, Staffing and Work Pace scored 46.17%, indicating concerns about workload and resources. Organizational Learning-Continuous Improvement achieved a score of 72.3%, underscoring ongoing efforts to enhance safety practices. The Response to Error composite scored 39.75%, highlighting the need for improvement in addressing and learning from errors. Supervisor, Manager, or Clinical Leader Support for Patient Safety scored 59.56%, reflecting moderate leadership involvement in promoting safety. Communication About Error was reported at 69.36%, suggesting relatively favourable practices in addressing errors. Communication Openness scored 55.75%, indicating progress but with room for further improvement in fostering transparent communication. Reporting Patient Safety Events received a score of 59.45%, pointing to moderate levels of event reporting. Hospital Management Support for Patient Safety achieved 61.1%, showing average perceptions of management's commitment to safety. Finally, Handoffs and Information Exchange scored 58.3%, reflecting moderate effectiveness in transitions of care and information sharing (AlMuharraq, 2024). Across all the studies, these findings provide a more comprehensive view of patient safety culture within healthcare institutions in the Gulf Cooperation Council region, with notable strengths and areas requiring significant improvement across different composites, which will be explored in the discussion section.

Discussion

This systematic review assessed patient safety culture among nurses in the Gulf Cooperation Council region using both the Hospital Survey on Patient Safety Culture and Hospital Survey on Patient Safety Culture -II. The findings highlighted demographic patterns,

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perceptions of patient safety culture, and key areas for improvement. Although all studies included in this systematic review were conducted in Saudi Arabia and Oman, a predominant representation of expatriate nurses across many studies of this review, particularly from India and the Philippines, was observed. Gender distribution also revealed a predominance of female nurses across studies, with variations in male representation in specific contexts. Nurses' perceptions of patient safety culture varied significantly across different composites. Teamwork Within Units was generally rated positively, whereas Staffing, Nonpunitive Response to Error, and Handoffs & Transitions emerged as key areas of concern, with consistently low scores across studies. These findings may be influenced by the global nursing shortage (WHO, 2025), high nurse turnover rates (Ren et al., 2024), and the persistence of blame-oriented cultures within clinical practice settings (Alaska & Alkutbe, 2023). Management Support for Patient Safety demonstrated significant variability, indicating inconsistent leadership commitment to safety culture. These findings align with global trends, including in Arab countries, where teamwork within units is typically a strength, while staffing and error-reporting cultures remain challenges (Al Muharraq et al., 2024; Elmontsri et al., 2017).

In addition, the expatriate profile of the nursing workforce is important for interpreting patient safety culture findings in Gulf Cooperation Council hospitals. Contemporary evidence from the United Arab Emirates suggests that language-related communication barriers experienced by expatriate (non-Arabic-speaking) healthcare practitioners may affect the quality and safety of care delivery, particularly in day-to-day clinical communication and information exchange (Al-Yateem et al., 2022). Evidence from large-scale patient safety monitoring also supports the broader relevance of language barriers to patient harm risk in hospital settings (Canadian Institute for Health Information, 2024).

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However, although some of the included studies reported the nationality composition of samples, none of the included studies reported Hospital Survey on Patient Safety Culture composite results stratified by nurse nationality or language group. Accordingly, it was not possible for this review to determine whether expatriate and national nurses perceived patient safety culture differently across Hospital Survey on Patient Safety Culture composites. This represents an important evidence gap and a priority for future patient safety culture research in the Gulf Cooperation Council.

When compared to international findings, the patient safety culture composites assessed in the Gulf Cooperation Council exhibit both similarities and unique challenges. Nurses in Iran reported low patient safety culture scores, with Nonpunitive Response to Error, Staffing, and Handoffs & Transitions being among the lowest-rated composites, similar to the Gulf Cooperation Council region (Kakemam et al., 2021). Likewise, a multicountry European analysis encompassing Germany, the Netherlands, Estonia, and the United Kingdom, found that handoffs & transitions, and staffing consistently underperformed across several health systems (Sharp et al., 2019). In Portugal, multiple composites were perceived negatively; four were rated below 36%, including Staffing, Nonpunitive Response to Error, Management Support for Patient Safety, and Frequency of Events Reported (da Costa Brás et al., 2023). Conversely, findings from a U.S. study indicated that all patient safety culture composites were rated more favorably, with scores exceeding 55% (Tyler et al., 2024), although a prior study had identified Handoffs & Transitions and Nonpunitive Response to Error as areas of concern (Famolaro et al., 2018). Notably, nurses in Jordan reported a positive patient safety culture and rated Communication Openness and Handoffs & Transitions as a strength, opposite to the Gulf Cooperation Council region (Oweidat et al., 2024). The findings of this review suggest that while continuous

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improvement and teamwork within units are prioritized across healthcare systems, staffing shortages and punitive cultures hinder progress in patient safety culture. In Saudi Arabia, making the culture of healthcare safer for patients and healthcare providers is a priority that aligns with Saudi Vision 2030, which emphasizes improving access to healthcare, modernizing facilities and equipment, enhancing private sector investment, and improving the value of healthcare (Vision 2030, 2025). Additionally, Oman Vision 2040 aspires to a leading healthcare system with international standards (Ministry of Health, 2025), the fifth pillar of Kuwait Vision 2035 focuses on high-quality healthcare (Ministry of Foreign Affairs, 2025), Qatar Vision 2030 aims to create a world-class, patient-centered healthcare system, and the United Arab Emirates' Vision 2031 prioritizes the availability of high-quality healthcare services for all citizens (Ashghal, 2025; We the UAE 2031, 2025). Additionally, Bahrain Vision 2030 aims to elevate health standards and improve the quality of life for all residents (Ministry of Health, 2025).

Hospital Survey on Patient Safety Culture

The high average composites in Hospital Survey on Patient Safety Culture (75% and above) included Organizational Learning & Continuous Improvement (78.70%) (Westat et al., 2014). This composite consistently showed stronger performance across studies, aligning more closely with findings in Jordan (Oweidat et al., 2024) and Palestine (Zabin et al., 2022) studies. The high scores in this composite suggest that hospitals in the Gulf Cooperation Council region are actively engaging in continuous improvement efforts, which is a key strength in patient safety culture (Albalawi et al., 2020; Moafimadani et al., 2020).

The medium average composites (51% to 74%) included Teamwork Within Units (71.92%), Supervisor/Manager Expectations & Actions Promoting Patient Safety (58.81%), Management Support for Patient Safety (57.08%), Feedback & Communication About Error

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(66.85), Frequency of Events Reported (59.50%), Teamwork Across Units (60.94%), and Overall Perceptions of Patient Safety (58.98%) (Westat et al. 2014). These composites indicated moderate levels of implementation and effectiveness. Latin American hospitals, Sweden, Spain, and Croatia scored lower in management support except for Hungary, with similar results, while Palestine and Jordan scored higher than Gulf Cooperation Council hospitals (Camacho-Rodríguez et al., 2022; Granel-Giménez et al., 2022; Oweidat et al., 2024; Zabin et al., 2022). The moderate performance in feedback and communication about errors and Frequency of Events Reported in the Gulf Cooperation Council may be influenced by a lack of structured feedback systems and an entrenched culture of blame (Abdurabuh et al., 2024; Kaud et al., 2022). Additionally, a lack of management support was observed in some Gulf Cooperation Council hospitals, leading to reduced reporting of adverse events and lower Overall Perceptions of Patient Safety (Alaska & Alkutbe, 2023). This may reflect the dominant top-down management structure in many healthcare systems, where limited participatory leadership and restricted communication channels can hinder cross-unit collaboration and discourage frontline staff from actively engaging in safety initiatives (Essex et al., 2023; Kanaris, 2023). Encouraging effective communication, learning from previous errors and giving feedback have been linked to better patient safety outcomes (Famolaro et al., 2018; Labrague et al., 2020). Additionally, supervisors, managers, and healthcare providers should work collaboratively to promote teamwork within and across units, addressing patient safety issues and fostering a more supportive safety culture (Hayashi et al., 2020; Rosen et al., 2018).

The low average composites (50% and below) included Staffing (40.09%), Nonpunitive Response to Error (35.42%), Handoffs & Transitions (40.53%), and Communication Openness (45.51%; Westat et al. 2014). These composites require urgent improvement, as they are

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consistently rated poorly among Gulf Cooperation Council nurses, highlighting challenges in maintaining adequate workforce levels and ensuring high-quality healthcare. The low ratings of these composites align with findings from studies in Iran and Latin American hospitals (Camacho-Rodríguez et al., 2022; Kakemam et al., 2021). Similarly, nurses in European countries such as Spain, Hungary, and Croatia rated these composites poorly – except for Handoffs & Transitions – confirming that blame culture, poor communication, and nursing shortages are global issues (Granel-Giménez et al., 2022). In contrast, nurses in Palestine rated these composites positively, with even higher scores reported in Jordan (Oweidat et al., 2024; Zabin et al., 2022). The stronger ratings in Jordan may be attributed to a greater emphasis on transparent communication, nonpunitive environments, and hospital management support, all of which have been shown to enhance patient safety culture (Abdurabuh et al., 2024; Daheshi et al., 2023).

Hospital Survey on Patient Safety Culture-II

A similar comparison was conducted using the second version of the Hospital Survey on Patient Safety Culture, in which a single study assessed 10 patient safety culture composites. High-average composite scores (75% and above) included Teamwork (77%) (Westat et al., 2014). These findings were comparable to results from Brazil, China, and India using Hospital Survey on Patient Safety Culture-II (Aileen et al., 2024; Reis et al., 2023; Wu et al., 2022). Although teamwork was rated positively by nurses in this Gulf Cooperation Council study, similarly high ratings were observed in Brazil, China, and India (Al Muharraq et al., 2024). Additionally, the Chinese findings from Hospital Survey on Patient Safety Culture-II demonstrated higher scores in Teamwork compared to other studies, along with superior ratings in Supervisor or Clinical Leader Support for Patient Safety and Hospital Management Support.

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Since the healthcare field relies on collaboration among diverse specialists to deliver effective care, teamwork plays a crucial role in shaping patient safety culture (Schot et al., 2020).

Moreover, fostering a strong safety culture through strategies such as promoting teamwork and effective leadership has been shown to enhance healthcare outcomes and reduce adverse clinical events (Daheshi et al., 2023; Labrague et al., 2020). These findings suggest that structured leadership programs in Chinese hospitals could serve as a model for improving patient safety culture in Gulf Cooperation Council institutions.

Medium-average composite scores (51% to 74%) were observed in Organizational Learning & Continuous Improvement (72.3%), Supervisor, Manager, or Clinical Leader Support for Patient Safety (59.56%), Communication About Error (69.36%), Communication Openness (55.75%), Reporting Patient Safety Events (59.45%), Hospital Management Support for Patient Safety (61.1%), and Handoffs and Information Exchange (58.3%) (Westat et al., 2014). These results align with findings from India (Aileen et al., 2024) and Brazil (Reis et al., 2023), where similar levels of communication and leadership involvement were reported. Although Chinese nurses faced some challenges in reporting patient safety events, they demonstrated stronger performance in communication about errors, leadership, and management support (Wu et al., 2022). This highlights the need for greater efforts to enhance communication and leadership engagement in the Gulf Cooperation Council region. In contrast, Organizational Learning & Continuous Improvement in this Gulf Cooperation Council study was rated higher than in China, which may be attributed to the availability of dedicated educational spaces in Gulf Cooperation Council hospitals that support organizational learning (Alkhazim et al., 2015).

The low-average composite scores (50% and below) included Staffing and Workplace (46.17%) and Response to Error (39.75%; Westat et al., 2014). When comparing these results

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with findings from Brazil, India, and China, the Gulf Cooperation Council study's scores were lower than those reported in the other studies, except for the Staffing and Workplace rating in India (Aileen et al., 2024; Reis et al., 2023; Wu et al., 2022). Although Gulf Cooperation Council countries employ foreign workers to address healthcare workforce shortages, including in nursing, staffing issues remain a persistent challenge (Al Muharraq et al., 2024). These staffing shortages directly impact patient safety and the overall quality of healthcare services (Ali et al., 2022). Additionally, previous studies have consistently identified Staffing and Response to Error as among the lowest-rated composites by nurses, including those in the Gulf Cooperation Council region (Alaska & Alkutbe, 2023; El-Shabrawy et al., 2017). This may be attributed to a prevailing blame-and-shame culture, fear of punishment, high stress levels, job dissatisfaction, and burnout factors that are exacerbated by staffing shortages (Azyabi et al., 2022; He et al., 2023). Therefore, fostering a non-punitive response culture and maintaining adequate staffing levels are essential for improving patient safety culture (Falcone et al., 2022).

Implications

This review synthesized findings from both versions of the Hospital Survey on Patient Safety Culture, providing a more comprehensive assessment of patient safety culture composites in the Gulf Cooperation Council region than a single study can provide. By systematically analyzing studies from 2010 to 2024, this review captured trends and variations in perceptions over time. The use of PRISMA guidelines ensured transparent reporting, while Covidence software facilitated transparent data management. Additionally, the focus on nurses' perceptions allowed for a targeted analysis of frontline healthcare providers who play a critical role in patient safety.

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The findings of this review have significant implications for policy and practice in the Gulf Cooperation Council region. First, the consistently low composites for Staffing, Nonpunitive Response to Error, and Handoffs & Transitions suggest priority targets for organizational interventions and health system planning. In international Hospital Survey on Patient Safety Culture-II benchmarking, staffing has been repeatedly identified among the lowest-scoring composite measures, indicating that this domain represents a persistent vulnerability that is sensitive to system pressures and workforce capacity (Tyler et al., 2024). Accordingly, Gulf Cooperation Council leadership strategies should prioritize workforce retention, safe staffing models, and workload management to reduce time pressure and support safer care delivery.

Second, strengthening a learning environment that supports reporting without blame is essential. The consistently low nonpunitive response composites indicate a need to build “learning-oriented” reporting systems and leadership behaviours that focus on improvement rather than punishment. These changes are also likely to strengthen event reporting and feedback mechanisms, which were only moderate in the included studies.

Third, the high representation of expatriate nurses highlights the need to strengthen communication and safety practices within multicultural and multilingual clinical environments. Evidence from the United Arab Emirates indicates that expatriate clinicians experience language-related communication barriers in routine care delivery, which has implications for patient safety and quality (Al-Yateem et al., 2022).

Fourth, Tailored interventions, such as structured handoff tools, communication training, and accessible interpretation support, may be particularly relevant to improving handoffs, communication openness, and event reporting in Gulf Cooperation Council hospitals.

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Finally, future research should explore the longitudinal impact of national patient safety initiatives, such as those under Saudi Vision 2030 and other Gulf Cooperation Council national healthcare visions, on patient safety culture improvement. The Saudi Health Sector Transformation Program explicitly aims to improve healthcare access and quality, providing a strategic opportunity to link routine safety culture measurement to targeted improvement initiatives in hospital settings (Vision 2030, 2025).

Future studies ought to examine the effectiveness of confidential incident reporting systems, culturally responsive leadership development, and routine safety culture assessment to guide targeted interventions.

Limitations

Several limitations should be acknowledged. First, this review relied on studies from only three databases and reported nurses' findings separately, which may have excluded other relevant perspectives from additional studies. Although English is the official language used for healthcare scholarship and institutional reporting in Gulf Cooperation Council settings, relevant evidence indexed elsewhere or disseminated through local outlets may not have been captured.

Second, all included studies were quantitative and relied on self-reported survey data, which may be subject to response bias and limit causal inference. The absence of qualitative or mixed-methods studies reduces the ability to explain why certain composites were low and how organizational dynamics influence reporting behaviour.

Third, the evidence base was geographically concentrated: included studies were conducted in Saudi Arabia and Oman, which limits generalizability to other Gulf Cooperation Council countries. This is a major contextual limitation and underscores the need for expanded research across Bahrain, Kuwait, Qatar, and the United Arab Emirates. In addition, the focus on

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Gulf Cooperation Council countries and the inclusion of studies using the Hospital Survey on Patient Safety Culture instrument may influence the extent to which findings can be generalized to different regions or studies using alternative measurement tools. However, this methodological approach enhanced consistency and comparability of composite scores across studies, supporting a more coherent synthesis of patient safety culture findings within similar healthcare contexts.

Fourth, while expatriate nurses were prominent in several samples, the primary studies did not consistently provide Hospital Survey on Patient Safety Culture outcomes stratified by nationality, language, or country of training. As a result, the review cannot determine whether differences in perceptions exist between expatriate and national nurses or among expatriate subgroups. Future Gulf Cooperation Council studies should incorporate standardized reporting of Hospital Survey on Patient Safety Culture composites by nationality/language group and examine multilingual communication factors that may shape safety culture.

Finally, this review included both the Hospital Survey on Patient Safety Culture version 1 and Hospital Survey on Patient Safety Culture-II. Although comparability concerns were mitigated by analyzing findings separately by instrument version, differences in composite structure mean that direct pooling across versions remains inappropriate.

Conclusion

This systematic review underscores the complexity of patient safety culture in Gulf Cooperation Council hospital settings, highlighting both strengths and areas needing improvement. Across included studies, teamwork and organizational learning—continuous improvement were relatively strong, suggesting a foundation for improvement efforts. However,

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four composites require targeted action: staffing, handoffs & transitions, communication openness, and non-punitive response to error. These findings provide an evidence base for prioritizing workforce strategies, safer transition processes, and leadership practices that support learning from errors without blame. Evidence-based recommendations derived from the review's composite patterns include: (1) strengthening staffing capacity and managing work pace to support safe care delivery; (2) implementing and monitoring structured handoff processes; (3) adopting nonpunitive and confidential reporting approaches to improve response to error; and (4) investing in communication and teamwork interventions tailored to multilingual, multicultural nursing teams. In parallel, future research should expand coverage across all Gulf Cooperation Council countries and report safety culture outcomes stratified by nurse nationality/language to better understand safety culture in expatriate-majority hospital workforces. These actions align with Gulf Cooperation Council health sector transformation agendas and provide a practical pathway for improving patient safety culture based on the empirical patterns identified in this review. Additionally, it may be useful to develop instruments that are based on the sociocultural realities of these societies and not adapted from other countries' instruments.

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Chapter 3: Application of Donabedian's Quality Framework to Understand Nurses'**Patient Safety Culture Perceptions in a Saudi Hospital****Majed S. Alshammari, Jane Tyerman, Idrissa Beogo, J. Craig Phillips****School of Nursing, University of Ottawa, Ottawa, Canada****Alshammari: 0000-0002-4928-0811****Tyerman: 0000-0001-8158-0833****Beogo: 0000-0003-1467-2169****Phillips: 0000-0002-6697-0515**

This research was conducted as part of the doctoral dissertation of the first author in partial fulfillment of the requirements for the PhD degree in Nursing at the University of Ottawa. The second, third, and fourth authors served as academic supervisors for this dissertation.

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Abstract

Background

Patient safety culture is a critical component of healthcare quality and is commonly assessed using the Hospital Survey on Patient Safety Culture (HSOPSC). To improve conceptual clarity and measurement performance, the Agency for Healthcare Research and Quality revised HSOPSC Version 1.0 and released Version 2.0. Guided by Donabedian's Quality Framework, this study compared nurses' perceptions of patient safety culture using both HSOPSC versions and examined how differences in survey design may influence the assessment and interpretation of patient safety culture processes and outcomes.

Methods

A quantitative cross-sectional survey was conducted among frontline nurses at Hail General Hospital, Saudi Arabia, between February and April 2025. Both HSOPSC Version 1.0 and Version 2.0 items were administered concurrently to the same sample. Comparative analyses were conducted using paired-samples t-tests and Wilcoxon signed-rank tests, as appropriate, to examine differences between corresponding composites across survey versions. Findings were interpreted within Donabedian's structure–process–outcome framework.

Results

A total of 129 nurses participated in the study. Significant differences were identified between several corresponding composites across HSOPSC versions. Nonpunitive Response to Error demonstrated the largest improvement in Version 2.0 compared with Version 1.0 ($p < .001$), followed by Handoffs & Transitions ($p = .004$). In contrast, Teamwork, Organizational Learning–Continuous Improvement, and Hospital Management Support for Patient Safety were rated significantly lower in Version 2.0 (all $p < .001$). Several composites, including

Supervisor/Manager Support, Communication Openness, Communication About Error, Reporting Patient Safety Events, and Staffing and Work Pace, showed no significant differences between versions. Within Donabedian's framework, communication, organizational learning, leadership support, teamwork, and responses to error emerged as key process-level dimensions associated with patient safety outcomes.

Conclusions

The findings demonstrate substantial conceptual continuity between HSOPSC Versions 1.0 and 2.0 while highlighting the influence of survey design on nurses' evaluations of patient safety culture dimensions. Application of Donabedian's Quality Framework reinforced the importance of process-level safety culture factors as mechanisms linking organizational context to patient safety outcomes. These findings contribute to understanding how measurement refinement may affect patient safety culture assessment and support the continued evaluation of revised safety culture instruments across diverse healthcare settings.

Keywords

Patient safety culture; Hospital Survey on Patient Safety Culture; HSOPSC 1.0; HSOPSC 2.0; Donabedian Quality Framework; Nurses; Saudi Arabia; Patient safety outcomes.

Application of Donabedian's Quality Framework to Understand Nurses' Patient Safety Culture Perceptions in a Saudi Hospital.

Patient safety is recognized internationally as a core dimension of healthcare quality and a critical indicator of organizational and clinical performance (Al-Zadjali et al., 2025; Soden et al., 2025). Early landmark investigations, including Beecher and Todd's (1954) analysis of anesthesia-related mortality and Brennan et al.'s (1991) study of preventable adverse events in hospitals, demonstrated the extent of avoidable harm associated with healthcare delivery. Additional evidence regarding the prevalence and consequences of iatrogenic injury that occur with frequent and severe medication errors that resulted in clinically significant injury (Raju et al., 1989; Vikan et al., 2023; World Health Organization [WHO], 2023). Collectively, these findings established patient safety as a fundamental component of healthcare quality assessment and improvement.

The emergence of systems-based approaches to patient safety, influenced by Reason's human error theory and Leape's application of systems thinking to healthcare, shifted attention toward organizational processes and safety culture as key determinants of patient outcomes (Leape, 1994; Reason, 1992; Wachter, 2012). These developments informed major international patient safety initiatives, including the WHO World Alliance for Patient Safety and the Global Patient Safety Action Plan 2021–2030 (WHO, 2019, 2023). Despite these efforts, preventable harm remains a major challenge for healthcare systems worldwide (Slawomirski et al., 2025; WHO, 2024, 2025a). Accordingly, continuous assessment of patient safety culture using validated measurement frameworks remains essential for understanding organizational safety processes and supporting safer healthcare delivery.

The Role of Nurses in Advancing Patient Safety Culture

Nurses comprise approximately half of the global healthcare workforce and remain the healthcare professionals most consistently involved in direct patient care (WHO, 2025b). In Saudi Arabia, the nursing workforce reached nearly 213,000 in 2023, of whom approximately 94,000 (44%) were Saudi nationals, while the remainder consisted primarily of expatriate nurses from countries such as the Philippines, India, and Malaysia (Alshammari et al., 2026; Ministry of Health, 2023). Their continuous clinical presence enables them to identify safety concerns, detect patient deterioration, implement preventive actions, and observe how organizational safety practices are enacted within everyday healthcare delivery (Babaei et al., 2022; Zaitoun et al., 2023). Operating at the interface of patient care, interprofessional teamwork, and healthcare management also positions nurses to recognize discrepancies between formal safety policies and actual clinical practice environments (Glarcher & Vaismoradi, 2025; Hajizadeh et al., 2025; White et al., 2025).

Within Donabedian's quality framework, nurses' perceptions of patient safety culture are particularly relevant because they reflect process-level organizational behaviours and practices related to communication, teamwork, leadership support, organizational learning, and responses to errors. Comparing nurses' perceptions across both Hospital Survey on Patient Safety Culture (HSOPSC) Version 1.0 and Version 2.0 provides an opportunity to examine how modifications introduced in the revised instrument may improve the assessment of these safety-related processes within healthcare organizations. In supportive safety cultures, nurses are more likely to report incidents, participate in organizational learning, and sustain safe clinical practices, whereas punitive cultures may discourage reporting and limit organizational learning opportunities (Mahsoon & Dolansky, 2021; Yan et al., 2021). Consequently, nurses' perceptions

of patient safety culture represent an important indicator of healthcare quality, organizational performance, and safety-related clinical processes (Glarcher & Vaismoradi, 2025; Yilmaz et al., 2025).

Global Overview on Nurses' Perceptions of Patient Safety Culture

International research has documented substantial variation in nurses' perceptions of patient safety culture across regions (Aileen et al., 2024; Aimoldina et al., 2025; Alshyyab et al., 2023; Ha et al., 2023; Kaware et al., 2022; Oliveira et al., 2024; Tlili et al., 2022; Tyler et al., 2024; Zabin et al., 2022). Globally, teamwork within units and organizational learning are often perceived as strengths, whereas non-punitive response to error, staffing, and handoffs/transitions are recurrent weaknesses. For instance, in North America, U.S. nurses report strong teamwork (81%) and supervisor support (79%) but low staffing (52%) (Tyler et al., 2024). In South America, Chilean nurses identify high communication and receptivity (84.4%) and event reporting (83.8%), while administrative and management support (50.7%) is relatively weak (Hurtado-Arenas et al., 2024). European evidence from Portugal reflects high teamwork (80.7%) but markedly low perceptions in the other patient safety cultures composites, such as frequency of event reporting (28.7%), staffing (28.1%), and non-punitive response (25.7%) (Oliveira et al., 2024). African findings vary widely, with an overall weak patient safety culture in Tunisia (Tlili et al., 2022), whereas Nigerian nurses report strong teamwork and organizational learning despite ongoing staffing problems (Kaware et al., 2022). Across Asia, studies from Palestine, India, Vietnam, and Kazakhstan consistently identify high teamwork and organizational learning but weak staffing and punitive culture (Aileen et al., 2024; Aimoldina et al., 2025; Ha et al., 2023; Zabin et al., 2022). In Australia, emergency departments reveal low performance across nearly all composites despite relatively strong teamwork (Alshyyab et al., 2023). These trends

illustrate enduring global challenges related to staffing, punitive reporting climates, and communication inefficiencies.

Patient Safety Culture in the GCC Region

The Gulf Cooperation Council (GCC) includes six countries, Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates, characterized by shared cultural, linguistic, and socioeconomic features, including strong health system investment (Alkhamis et al., 2014; Secretariat General of the Gulf Cooperation Council, 2024; WHO, 2015). These similarities give the region an analytically coherent context for examining patient safety culture. Across the GCC region, studies reveal moderate overall perceptions of patient safety culture, though levels vary considerably between countries and healthcare settings. In Kuwait, overall patient safety culture was moderate (64.5%) with strong teamwork and organizational learning but weak staffing (36.2%) and non-punitive response (32.3%) (Alsaleh et al., 2025). Oman showed strong teamwork (91.8%) and organizational learning (86.3%), yet extremely weak handoffs (15.3%) (Al Ma'mari et al., 2019). In Qatar, moderate patient safety culture (62.4%) with high management support but weak staffing and non-punitive response were observed (Abdulla et al., 2023). Findings from Saudi Arabia were particularly inconsistent. In the Eastern Region, staffing was highly rated (82%) but teamwork within units was exceptionally low (25.4%) (Aboufour & Subbarayalu, 2022); in the Central Region, teamwork (82.7%) and organizational learning (79.3%) were rated positively but staffing and non-punitive response were low (Alquwez et al., 2023); and in the Western Region, organizational learning was strong (92.1%) whereas staffing (24.5%) and non-punitive response to errors (22.4%) were weak (Wazqar & Attallah, 2024). Similar patterns were identified in a recent systematic review of nurses' perceptions of patient safety culture in GCC hospitals, which found that teamwork and organizational learning were

consistently rated positively, whereas staffing, handoffs & transitions, communication openness, and non-punitive response to error were among the lowest-scoring composites across the region (Alshammari et al., 2026). These findings highlight recurring challenges in staffing, openness in communication, and punitive cultures, reflecting global patterns while underscoring the importance of regional context.

Purpose of the Study

In Saudi Arabia, particularly in Hail General Hospital, no prior study has specifically examined nurses' perceptions of patient safety culture within the context of a theoretical healthcare quality framework. Applying Donabedian's Quality Framework to examine patient safety culture provides an opportunity to explore how process- and outcome-related factors may influence nurses' safety perceptions within this hospital context. Additionally, the simultaneous use of the HSOPSC versions 1.0 and 2.0 offers a unique opportunity to compare the conceptual and composite structures of both instruments and assess their applicability within the Saudi healthcare setting. This framework-based evaluation may support hospital leadership and nursing management in identifying organizational strengths and safety vulnerabilities, align with national recommendations for continuous monitoring of patient safety culture (Alaska & Alkutbe, 2023; Alenezi et al., 2019), and contribute to future benchmarking and patient safety improvement initiatives within Saudi Arabia.

HSOPSC

Several instruments have been developed to evaluate patient safety culture in healthcare settings, including the Safety Attitudes Questionnaire (SAQ), Manchester Patient Safety Framework (MaPSaF), and Safety Climate Survey (Bartonickova et al., 2021; Hanifa & Dhamanti, 2021). Among these, the HSOPSC is the most widely used instrument for assessing

patient safety culture in hospitals and has been adopted in more than 99 countries (Agency for Healthcare Research and Quality [AHRQ], 2023; Azyabi et al., 2021; Haque et al., 2024). The original HSOPSC Version 1.0, released in 2004, evaluates organizational factors influencing patient safety at both unit and hospital levels through 12 safety culture composites and two outcome measures (Sorra & Nieva, 2004). To reflect advances in patient safety research and user feedback, AHRQ later introduced HSOPSC Version 2.0, which revised the instrument structure by reducing the number of composites from 12 to 10, adding 10 new items, modifying the wording of several existing items, and removing 20 items considered redundant or less informative (Table 1). These changes were designed to improve conceptual clarity, content relevance, and psychometric performance (AHRQ, 2019; Sorra et al., 2018, 2021).

Table 1

Comparative Composite Structure of HSOPSC Versions 1.0 and 2.0

	HSOPSC 1.0 Composites	HSOPSC 2.0 Composites
1	Teamwork Within Units	Teamwork
2	Supervisor/ Manager Expectations & Actions Promoting Patient Safety	Supervisor, Manager, or Clinical Leader Support for Patient Safety
3	Organizational Learning–Continuous Improvement	Organizational Learning–Continuous Improvement
4	Management Support for Patient Safety	Hospital Management Support for Patient Safety
5	Feedback & Communication About Error	Communication About Error
6	Communication Openness	Communication Openness
7	Frequency of Events Reported	Reporting Patient Safety Events
8	Staffing	Staffing and Work Pace
9	Handoffs & Transitions	Handoffs and Information Exchange
10	Nonpunitive Response to Error	Response to Error
11	Overall Perceptions of Patient Safety	---
12	Teamwork Across Units	---
Note. Sources: Sorra and Nieva (2004) for HSOPSC 1.0; Sorra et al. (2021) for HSOPSC 2.0		

A unique aspect of the present study was the simultaneous administration of both HSOPSC Version 1.0 and Version 2.0 within the same hospital setting and nursing sample. This

provided an opportunity to compare the applicability and conceptual relevance of both instrument versions in the clinical context of Hail General Hospital. Guided by Donabedian's quality framework, the study examined how the process domain of healthcare quality relates to nurses' perceptions of patient safety outcomes and how both HSOPSC versions capture these dimensions within the Saudi healthcare context.

Donabedian's Quality Framework

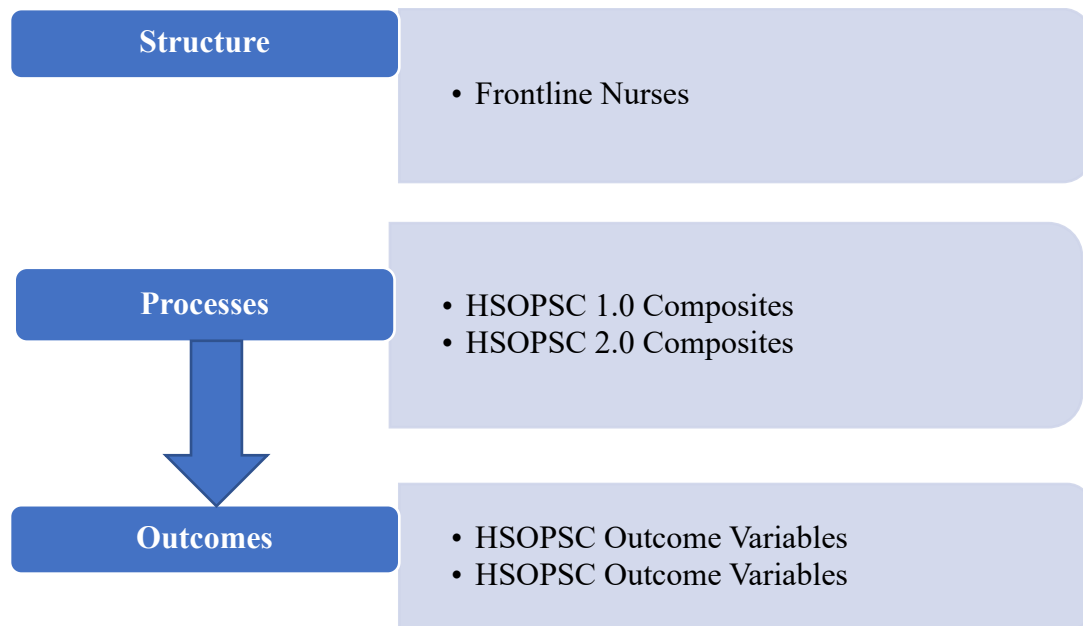
Donabedian's Quality Framework, which consists of structure, process, and outcome domains, provides the theoretical foundation for this study (Donabedian, 1988, 2005). Within the framework, structure refers to the organizational conditions under which care is delivered, including staffing, leadership systems, policies, and available resources; process reflects the interpersonal, professional, and organizational practices through which healthcare is provided; and outcomes represent the consequences of care for patients and healthcare organizations (McDonald et al., 2007; Kunkel et al., 2007).

In patient safety culture research, HSOPSC composites are most appropriately conceptualized within the process domain because they assess communication practices, teamwork, organizational learning, leadership support, feedback about errors, and other patient safety-related processes that influence day-to-day clinical care delivery. Donabedian's framework further proposes that structural conditions influence patient safety outcomes primarily through healthcare processes rather than through direct effects alone (Donabedian, 2005). Accordingly, Donabedian's model has been widely applied to examine relationships between safety-related processes and patient safety outcomes across different healthcare settings (Ameh et al., 2017; Tossaint-Schoenmakers et al., 2021). In the present study, the framework was used to examine how process-level patient safety culture composites measured using both HSOPSC

Version 1.0 and HSOPSC Version 2.0 relate to patient safety outcome measures within the clinical context of a Saudi hospital (Figure 1). The process-level composites of HSOPSC 1.0 include Teamwork Within Units; Supervisor/ Manager Expectations & Actions Promoting Patient Safety; Organizational Learning-Continuous Improvement; Management Support for Patient Safety; Feedback & Communication About Error; Communication Openness; Staffing; Handoffs & Transitions; Nonpunitive Response to Error; Teamwork Across Units, while the process-level composites of HSOPSC include Teamwork; Supervisor, Manager, or Clinical Leader Support for Patient Safety; Organizational Learning–Continuous Improvement; Hospital Management Support for Patient Safety; Communication About Error; Communication Openness; Staffing and Work Pace; Handoffs and Information Exchange; Response to Error (Sorra & Nieva, 2004). The patient safety outcome measures of HSOPSC 1.0 include Overall Perceptions of Patient Safety, Frequency of Events Reported, Patient Safety Grade, and Number of Events Reported. The patient safety outcome measures of HSOPSC 2.0 include Reporting Patient Safety Events, Patient Safety Rating, and Number of Events Reported (Sorra & Nieva, 2004).

Figure 1

Theoretical Framework Based on Donabedian's Quality Framework



Adapted from Donabedian, A. (1988). The Quality of Care: How Can It Be Assessed?

JAMA : The Journal of the American Medical Association, 260(12), 1743–1748.

<https://doi.org/10.1001/jama.1988.03410120089033>

Research Questions

Q1: What are the differences in the composite metrics between HSOPSC 1.0 and HSOPSC 2.0, and how do these differences contribute to understanding patient safety culture through Donabedian's structure-process-outcome framework as assessed by nurses at Hail General Hospital?

Ethical Considerations

This study received ethical approval from both the University of Ottawa Research Ethics Board (REB: H-11-24-10989) and the Institutional Review Board of the Saudi Ministry of Health, Hail Health Cluster (IRB Log Number: 2024-113). Throughout all stages of the research,

stringent measures were implemented to ensure participant anonymity and confidentiality. No identifying information was collected, and all data were securely stored to safeguard participants' privacy and protect personal information.

Results

Demographic Characteristics

A total of 129 nurses participated in the study. Half of the respondents were Saudi nationals (50.4%), followed by Filipino (24.0%) and Indian (18.6%) nurses. Most participants held a bachelor's degree (71.3%) and were aged 24–34 years (62%). The largest proportion worked in the Emergency Department (23.3%), followed by the Neonatal Intensive Care Unit (13.2%) and Intensive Care Unit (11.6%). Professional experience was primarily concentrated between 6 and 10 years (41.1%), while over three-quarters of participants (78.3%) reported working more than 40 hours per week (Table 2).

Table 2*Demographic Characteristics of Participants at Hail General Hospital*

Demographic Characteristics	<i>n</i>	%
Nationality		
Indian	24	18.6
Filipino	31	24.0
Saudi	65	50.4
Other	9	7.0
Education		
Diploma	23	17.8
Bachelor's Degree	92	71.3
Master's Degree	14	10.9
Age		
24 to 34 Years	80	62
35 to 44 Years	42	32.6
45 or more Years	7	5.4
Department		
(ICU) Intensive Care Unit	15	11.6
(ED) Emergency Department	30	23.3
(MMW) Male Medical Ward	6	4.7
(FMW) Female Medical Ward	11	8.5
(DSW) Day Surgical Ward	3	2.3
(IU) Isolation Unit	4	3.1
(DR) Delivery Room	6	4.7
(OGD) Obstetrics and Gynecology	8	6.2
Department		
(NICU) Neonatal Intensive Care Unit	17	13.2
(OPD) Outpatient Department	4	3.1
(OR) Operating Room	8	6.2
(UK) Unknown	17	13.2
Experience		
Less than 5 Years	35	27.1
6 to 10 Years	53	41.1
11 or more Years	41	31.8
Hours worked per week		
30 to 40 Hours per Week	28	21.7
More Than 40 Hours per Week	101	78.3
Note. <i>N</i> = 129 (<i>n</i> = number of participants for each condition).		

Comparisons of HSOPSC 1.0 and HSOPSC 2.0

In this section, findings from HSOPSC 1.0 and 2.0 are compared to provide insight into how revisions to the survey instrument influenced results and whether consistent patterns emerge across versions (Table 3). To determine the appropriate statistical test, the normality of difference scores was assessed using the Shapiro–Wilk test. Composites with differences meeting the assumption of normality ($p > .05$) were analyzed using paired-samples *t*-tests, whereas those violating the assumption ($p \leq .05$) were examined with the non-parametric Wilcoxon signed-rank test. This dual approach ensured that the choice of test was aligned with the data distribution, thereby strengthening the robustness of the results. It is also important to note that two composites included in HSOPSC 1.0, Overall Perceptions of Patient Safety and Teamwork Across Units, were removed in HSOPSC 2.0 and were therefore not included in the comparative analyses.

Table 3*Results Table: Comparison of HSOPSC 1.0 and HSOPSC 2.0*

Composite	Mean V1+ SD	Mean V2+ SD	Mean Difference	Test Statistic	p-value	Effect Size
Paired t-test (Test Used)						
Supervisor/Manager Expectations & Actions	3.57 + .632	3.59 + .550	-.03	$t(128) = -.64$	.523	$d = -.056$
Handoffs & Transitions	3.37+ .775	3.51 + .730	-.14	$t(128) = -2.93$	.004**	$d = -.258$
Nonpunitive Response to Error	2.67+ .828	3.11+ .639	-.45	$t(128) = -11.98$	<.001***	$d = -1.055$
Wilcoxon (Test Used)						
Teamwork Within Units	—	—	—	$Z = -7.39$	<.001***	$r = .69$
Organizational Learning—Continuous Improvement	—	—	—	$Z = -6.02$	<.001***	$r = .70$
Hospital Management Support for Patient Safety	—	—	—	$Z = -4.36$	<.001***	$r = .62$
Feedback & Communication About Error	—	—	—	$Z = -.50$	.621	$r = .10$
Communication Openness	—	—	—	$Z = -.40$	.692	$r = .04$
Reporting Patient Safety Events (Frequency)	—	—	—	$Z = -.14$	.887	$r = .02$
Staffing & Work Pace	—	—	—	$Z = -1.78$	.075	$r = .20$

Note. *** $p < .001$, ** $p < .01$, * $p < .05$

Improvements Across Composites

Several patient safety culture composites showed statistically significant improvements from HSOPSC 1.0 to 2.0 in the context of Hail General Hospital. Most notably, Nonpunitive Response to Error improved substantially ($M = 2.67$ vs. 3.11), $t(128) = -11.98$, $p < .001$, with a very large effect ($d = -1.055$). Similarly, Handoffs & Transitions showed a moderate but significant improvement ($M = 3.37$ vs. 3.51), $t(128) = -2.93$, $p = .004$, $d = -0.258$. Together, these results highlight areas where HSOPSC 2.0 was rated more favorably by nurses at Hail General Hospital.

Declines Across Composites

By contrast, several composites demonstrated significant declines from HSOPSC 1.0 to 2.0. Teamwork Within Units decreased markedly ($Z = -7.39$, $p < .001$, $r = 0.69$). Organizational Learning–Continuous Improvement also declined significantly ($Z = -6.02$, $p < .001$, $r = 0.70$). Similarly, Hospital Management Support for Patient Safety decreased ($Z = -4.36$, $p < .001$, $r = 0.62$). These findings point to areas where perceptions of patient safety culture became more critical in the updated instrument.

Composites Showing Stability

Other composites revealed no significant differences between versions. For instance, Supervisor/Manager Expectations & Actions remained stable ($M = 3.57$ vs. 3.59), $t(128) = -0.64$, $p = .523$, $d = -0.056$. Similarly, Feedback & Communication About Error ($Z = -0.50$, $p = .621$, $r = 0.10$), Communication Openness ($Z = -0.40$, $p = .692$, $r = 0.04$), and Reporting Patient Safety Events (Frequency) ($Z = -0.14$, $p = .887$, $r = 0.02$) did not differ across versions. Staffing & Work Pace showed a non-significant trend toward improvement ($Z = -1.78$, $p = .075$, $r =$

0.20), but the change did not reach statistical significance. Collectively, these results suggest that while certain aspects of safety culture improved or declined, others remained unchanged.

Discussion

HSOPSC 1.0 vs 2.0 Means Comparisons

While several studies and validations have examined the statistical psychometrics of both HSOPSC 1.0 and 2.0, empirical research directly comparing both versions using paired statistical testing remains limited. Thus, this study examined differences in nurses' responses to patient safety culture composites derived from HSOPSC 1.0 and HSOPSC 2.0 when items from both versions were administered concurrently to the same sample of nurses at Hail General Hospital. By merging version-specific items into a single survey, this design enabled a direct comparison of how alternative item formulations capturing similar safety culture constructs were interpreted and rated by respondents under identical organisational and temporal conditions. As such, observed differences between HSOPSC 1.0 and HSOPSC 2.0 composites reflect measurement-level effects attributable to instrument revision rather than changes in the underlying safety culture. These findings suggest that differences in survey design may influence not only measured scores but also how patient safety culture processes are interpreted. Changes in composite structure, item organization, and item wording may shape respondents' evaluations of organizational learning, leadership support, communication, and responses to error, thereby influencing the way safety culture is conceptualized and measured within healthcare organizations.

Two composites, Nonpunitive Response to Error and Handoffs & Transitions, demonstrated statistically significant differences, with higher scores observed for HSOPSC 2.0 items compared with HSOPSC 1.0 items. This directional pattern indicates that, when

responding to the revised HSOPSC 2.0 items, nurses tended to endorse higher response options than when responding to the corresponding HSOPSC 1.0 items measuring similar concepts. Importantly, because both sets of items were answered by the same respondents in the same survey administration, these differences cannot be attributed to contextual or temporal variation. Instead, they suggest that the revised wording and framing of HSOPSC 2.0 items elicit systematically different evaluations of nonpunitive responses to error and handoff processes. This finding for these two composites favouring HSOPSC 2.0 aligns with trends observed in AHRQ pilot testing (Sorra et al., 2018), underscores the sensitivity of these constructs to item formulation, and highlights how subtle changes in wording may influence respondents' appraisals of safety culture composites. The substantial improvement observed for Response to Error may be related to revisions introduced in HSOPSC 2.0. The revised items place greater emphasis on how organizations respond to mistakes and use errors as opportunities for improvement, potentially encouraging respondents to evaluate these practices differently than in HSOPSC 1.0. (AHRQ, 2019; Sorra et al., 2019). This finding further suggests that modifications in item wording and construct framing can influence how patient safety culture dimensions are interpreted and assessed.

Significant declines were also observed for Teamwork Within Units, Organizational Learning–Continuous Improvement, and Hospital Management Support for Patient Safety, as indicated by the Wilcoxon signed-rank test results. These results indicate that these composites were rated less favourably using HSOPSC 2.0 items than with HSOPSC 1.0 items. This finding aligns partially with trends observed in AHRQ pilot testing, where the average positive percent scores were lower for Hospital Management Support for Patient Safety version 2 and slightly

higher for Teamwork Within Units and Organizational Learning–Continuous Improvement version 2 (Sorra et al., 2018).

In contrast, several composites, including Supervisor/Manager Expectations & Actions, Feedback & Communication About Error, Communication Openness, Staffing & Work Pace, and Reporting Patient Safety Events (Frequency), showed no statistically significant differences between versions. The stability of these composites when both versions are administered simultaneously may suggest that, for certain aspects of patient safety culture, HSOPSC 1.0 and HSOPSC 2.0 items function similarly when administered under the same conditions. These findings are inconsistent with trends observed in AHRQ pilot testing, where these composites had small to large average positive percent scores on HSOPSC 2.0 than on HSOPSC 1.0. (Sorra et al., 2018).

Although HSOPSC 2.0 was developed as a revised version of HSOPSC 1.0 with modified composites and improved psychometric properties, HSOPSC 1.0 remains available for use (AHRQ, 2023). The findings should also be interpreted within the broader Saudi healthcare context, where a highly multicultural nursing workforce, traditionally hierarchical organizational structures, and ongoing healthcare reforms associated with Vision 2030 may influence communication practices, reporting behaviours, and perceptions of leadership support for patient safety (Vision 2030, 2025). These contextual factors may shape how nurses experience and evaluate patient safety culture, regardless of the survey version used. Regardless of which version is used, patient safety culture should be established as a central institutional priority, supported by health policies that mandate regular annual evaluations to detect areas of weakness and guide targeted quality improvement efforts (Camacho-Rodríguez et al., 2022).

Theoretical Integration: Donabedian's Quality Framework

The Structure–Process–Outcome dimensions of Donabedian's quality framework provide a well-established theoretical foundation for interpreting the present findings, particularly given its longstanding application in evaluating healthcare quality and patient safety (Donabedian, 1988, 2005).

Importantly, the present study does not seek to model structural determinants of patient safety directly. Rather, consistent with Donabedian's formulation, it focuses on examining how process-level safety culture composites are associated with patient safety outcomes, reflecting the mechanisms through which underlying structural conditions are likely to exert their influence. This distinction is theoretically important, as Donabedian emphasized that outcomes are rarely influenced by structure in a direct or linear manner; instead, their effects are mediated through the processes of care delivery (Donabedian, 2005).

Interpreted within this framework, the correlation and regression findings derived from both HSOPSC 1.0 and HSOPSC 2.0 provide empirical support for the central role of safety culture processes as proximal determinants of patient safety outcomes. Across analytical approaches and survey versions, composites related to feedback about error, communication openness, organizational learning–continuous improvement, leadership and management support, and responses to error consistently emerged as salient correlates and predictors of outcome measures. These findings suggest that it is not merely the availability of structural resources, such as human and financial resources, policies, or reporting systems, but rather how these structures are enacted through everyday organizational processes that most strongly shape nurses' perceptions of safety and engagement with safety-related behaviours.

The prominence of communication- and learning-oriented processes in the present study aligns with prior theoretical and empirical work demonstrating that care processes function as key mediators between organizational structure and patient outcomes (Carayon et al., 2006; Hafezi et al., 2022; Lee & Dahinten, 2021). For example, while hospitals may possess formal incident reporting systems or leadership hierarchies, these structural features are unlikely to improve patient safety outcomes in the absence of open communication, nonpunitive responses to error, and active learning from adverse events. The present findings reinforce this mediation logic by showing that process-level safety culture perceptions consistently accounted for variation in safety outcomes.

The differential behaviour of outcome measures observed in this study can also be theoretically explained within Donabedian's framework. Perceptual outcomes, such as overall perceptions of patient safety and patient safety ratings, represent proximal evaluations of system functioning and are therefore closely aligned with process perceptions. In contrast, reporting-related outcomes are more distal and context-sensitive, influenced not only by formal reporting systems but also by psychological safety, trust, and organizational responses to error (Camacho-Rodríguez et al., 2022; Lee & Dahinten, 2021; Singal, 2020). The consistent associations between communication openness and feedback about error and reporting outcomes observed across both HSOPSC versions underscore the role of fostering a supportive, nonpunitive, and safe work environment as a core process mechanism, enabling staff to translate structural reporting systems into actual reporting behaviour (Brubakk et al., 2021).

Crucially, the stability of these process–outcome relationships across HSOPSC 1.0 and HSOPSC 2.0 strengthens the theoretical interpretation of the findings. Despite differences in item wording, construct specification, and scale composition, both instruments collectively

converged in identifying almost similar patient safety aspects as central to patient safety outcomes. From a theoretical standpoint, the findings support the continued relevance of Donabedian's framework for contemporary patient safety research, including studies employing multiple instrument versions and conducted in diverse, multinational healthcare settings.

Overall, the present study contributes to theory by empirically demonstrating that process-level patient safety culture composites function as consistent and meaningful links between organizational context and patient safety outcomes. By situating both HSOPSC 1.0 and HSOPSC 2.0 findings within Donabedian's framework, the study reinforces the central theoretical claim that sustained improvements in patient safety are most likely to be achieved through targeted attention to the clinical and organizational processes through which care is delivered.

Implications of the Findings for Nursing Science

Implications for Practice

The findings of this study indicate that practical efforts to improve patient safety culture should prioritize process-level interventions grounded in the empirical relationships identified through correlation and regression analyses, while also considering patterns observed in percent positive composite scores. Across both HSOPSC versions, communication about error, organizational learning—continuous improvement, teamwork, and nonpunitive response to error consistently emerged as influential domains, suggesting that practical improvement strategies should target these areas as foundational drivers of safety culture.

First, regression analyses demonstrated that communication about error and organizational learning were among the strongest predictors of reporting behaviors and patient safety ratings. These findings imply that healthcare organizations should strengthen structured

feedback mechanisms following incident reporting, ensuring that reported events lead to visible organizational learning and system changes. Practical interventions may include multidisciplinary safety briefings, regular feedback loops to frontline staff, and transparent dissemination of lessons learned from incidents.

Second, the strong predictive role of nonpunitive response to error underscores the importance of cultivating nonpunitive and safe work environments. Despite relatively strong scores in teamwork and organizational learning, percent positive findings revealed extremely low ratings for nonpunitive response to error, highlighting a critical disconnect between learning-oriented practices and perceptions of blame. Practical implementation should therefore move beyond formal policy statements toward consistent behavioural modelling by leaders and supervisors, including constructive responses to error disclosure and reinforcement of learning rather than punishment.

Third, staffing and work pace emerged as important contextual factors associated with reporting outcomes. The low percent positive scores for staffing, combined with regression findings linking staffing to reporting behaviours, suggest that low staffing and work pace may influence nurses' capacity to engage in safety activities. Practical improvements may include workflow redesign, adjustment of staffing models to match clinical demand, and protected time for reporting and safety-related discussions.

Fourth, moderate ratings for communication openness and handoffs indicate opportunities for strengthening interprofessional collaboration and cross-unit coordination. Practical strategies may include standardized handoff protocols, simulation-based communication training, and leadership initiatives promoting open dialogue across hierarchical levels.

Finally, the comparison between HSOPSC 1.0 and 2.0 highlights that measurement framing can influence staff perceptions of safety culture domains. From a practice perspective, organizations should interpret survey results cautiously and consider triangulating findings with qualitative feedback to ensure that improvement strategies are responsive to frontline experiences rather than solely driven by numeric scores.

Implications for Policy

At the policy level, the study reinforces national and organizational patient safety priorities, emphasizing leadership engagement, learning-oriented systems, and supportive reporting cultures. The consistent associations observed between process-level safety culture composites and outcome measures support policy approaches that frame patient safety as an organizational capability rather than solely a compliance requirement.

Within the Saudi healthcare context, the findings align with Vision 2030 goals emphasizing quality improvement, workforce development, and patient-centred care (Vision 2030, 2025). Policy initiatives may therefore prioritize strengthening the leadership dimension for safety culture, including structured leadership training programs focused on communication, safety, and just culture principles. Given that “nonpunitive response to error” emerged as both a weak composite and a key predictor of safety perceptions, policies should emphasize mechanisms that translate formal just culture principles into everyday clinical practice.

The multinational composition of the nursing workforce also has policy implications. Variability in composite reliability and perceptions across nationality groups suggests that cultural and linguistic factors may influence how safety culture constructs are interpreted. Policymakers should therefore consider culturally sensitive training programs, standardized

communication frameworks, and inclusive leadership models that acknowledge diversity within the workforce.

Additionally, the demonstrated conceptual continuity between HSOPSC 1.0 and HSOPSC 2.0 suggests that policymakers may adopt HSOPSC 2.0 for contemporary assessment while maintaining HSOPSC 1.0 for longitudinal benchmarking where historical comparisons are required. Policy guidance should emphasize contextual interpretation of survey findings rather than reliance on absolute thresholds, recognizing that reporting frequency and safety ratings may reflect psychological safety as much as actual incident prevalence.

Contribution to the Nursing Knowledge Corpus

This study contributes to nursing knowledge by extending understanding of how patient safety culture is measured and interpreted using different versions of the HSOPSC. By administering HSOPSC Versions 1.0 and 2.0 concurrently within the same nursing sample and organizational context, the study demonstrated that revisions in composite structure, item organization, and item wording can influence nurses' evaluations of patient safety culture dimensions. These findings suggest that differences between survey versions may reflect differences in measurement and construct representation rather than actual differences in patient safety culture within the hospital setting.

The study also contributes to the patient safety literature through the application of Donabedian's Quality Framework. By situating findings from both HSOPSC versions within a structure–process–outcome perspective, the study highlights the central role of process-level safety culture dimensions, including communication, organizational learning, leadership support, and responses to error, in shaping patient safety outcomes. This application extends current

understanding of patient safety culture as a mechanism through which organizational contexts influence safety-related perceptions and behaviours.

Finally, the findings provide evidence relevant to nursing leadership, quality improvement, and future patient safety culture research. The results highlight the importance of communication, learning-oriented practices, and supportive responses to error as key areas for patient safety improvement, while also demonstrating the need for researchers and healthcare organizations to consider measurement characteristics when interpreting patient safety culture findings across different survey instruments and healthcare settings.

Limitations

Several limitations should be considered when interpreting the findings. First, the study was conducted in a single hospital setting, which may limit generalizability. Organizational characteristics such as leadership style, patient acuity, and workforce composition may differ across institutions.

Second, reliance on self-reported survey data introduces potential response biases, including social desirability and subjective interpretation of survey items. Nevertheless, patient safety culture is inherently perceptual and relational, and self-report instruments remain the most appropriate method for capturing these constructs.

Third, although both HSOPSC versions were administered concurrently, comparisons between HSOPSC 1.0 and 2.0 should be interpreted as conceptual rather than strictly psychometric equivalence. Future research incorporating measurement invariance analyses and mixed-methods approaches would further strengthen understanding of safety culture measurement across diverse workforces.

Finally, while Donabedian's Quality Framework provides a useful structure for examining relationships between organizational processes and patient safety outcomes, it assumes relatively linear relationships among structure, process, and outcome domains. In practice, patient safety culture is influenced by complex interactions among organizational, professional, and contextual factors that may not be fully captured within this framework. Consequently, the findings should be interpreted as one perspective on patient safety culture rather than a comprehensive explanation of all factors influencing safety outcomes.

Conclusion

This study provides a comparative examination of nurses' perceptions of patient safety culture and their relationships with patient safety outcomes at Hail General Hospital using both HSOPSC Versions 1.0 and 2.0 within the framework of Donabedian's quality framework. By integrating percent positive composite analyses with correlation and regression findings, the study demonstrates that process-level patient safety culture composites, particularly communication about error, organizational learning–continuous improvement, teamwork, leadership support, and nonpunitive response to error, play a central role in shaping safety perceptions and reporting behaviours.

The findings highlight a nuanced safety culture profile characterized by strong intra-unit teamwork and learning-oriented practices alongside persistent structural and cultural challenges, especially staffing pressures and punitive perceptions of error management. Regression results further emphasize that communication and learning processes are associated with safety outcomes, reinforcing theoretical perspectives that organizational processes mediate the relationship between structural conditions and patient outcomes.

Comparisons between HSOPSC 1.0 and 2.0 revealed substantial conceptual continuity across instruments while illustrating how measurement refinement can influence staff evaluations of safety culture domains. This dual-instrument approach contributes methodologically to patient safety research by demonstrating that revised measurement tools may alter response patterns without necessarily reflecting substantive changes in organizational culture.

Overall, the study advances understanding of patient safety culture within the Saudi healthcare context and underscores the importance of targeted process-level interventions that foster open communication, continuous learning, supportive leadership, and safe reporting environments. Strengthening these domains may enhance both safety perceptions and engagement with reporting behaviours, ultimately contributing to safer healthcare delivery. Viewed through Donabedian's Quality Framework, the findings reinforce the importance of process-level safety culture dimensions as key mechanisms linking organizational context to patient safety outcomes. Furthermore, the comparison of HSOPSC Versions 1.0 and 2.0 highlights the importance of considering how survey design influences the assessment and interpretation of patient safety culture. Future research should continue evaluating revised patient safety culture instruments across diverse healthcare settings to strengthen the applicability of safety culture instruments. Regular assessment of patient safety culture is essential for nurses, healthcare leaders, and policymakers to identify priorities for improvement, strengthen patient safety practices, and support the delivery of high-quality healthcare.

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Chapter 4: Nurses' Patient Safety Culture Perceptions in a Saudi Hospital: A Cross-sectional Hospital Survey on Patient Safety Culture (HSOPSC) Study

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Abstract

Background

Patient safety culture is a critical determinant of healthcare quality, influencing error reporting, organizational learning, teamwork, and patient outcomes. Nurses play a central role in monitoring and sustaining patient safety culture because of their continuous involvement in patient care. Assessing nurses' perceptions of patient safety culture can identify organizational strengths and areas requiring improvement. This study examined nurses' perceptions of patient safety culture at Hail General Hospital, Saudi Arabia, using the Hospital Survey on Patient Safety Culture (HSOPSC) Version 1.0.

Methods

A quantitative cross-sectional survey was conducted among frontline nurses at Hail General Hospital between February and April 2025. Eligible participants were registered nurses with at least six months of clinical experience at the hospital. Data were collected using the HSOPSC Version 1.0 questionnaire. Descriptive statistics were used to calculate composite percent-positive scores. Internal consistency reliability was assessed using Cronbach's alpha. Correlation and regression analyses examined relationships between patient safety culture composites and patient safety outcomes, including overall perceptions of patient safety, frequency of events reported, patient safety grade, and number of events reported.

Results

Of 144 distributed questionnaires, 129 valid responses were analyzed (response rate: 91.7%). The average composite positive score was 56.9%. Teamwork Within Units (92.4%), Organizational Learning–Continuous Improvement (81.4%), and Feedback and Communication About Error (76.7%) were identified as areas of strength. Staffing (41.3%), Handoffs &

Transitions (47.7%), and Nonpunitive Response to Error (17.1%) were the lowest-rated composites. The overall HSOPSC scale demonstrated satisfactory reliability (Cronbach's $\alpha = .87$), although reliability varied considerably across composites. Correlation analyses revealed significant associations between most patient safety culture composites and safety outcomes. Regression analyses identified Nonpunitive Response to Error as the sole predictor of overall perceptions of patient safety. Teamwork Within Units, Feedback and Communication About Error, and Nonpunitive Response to Error predicted frequency of events reported. Management Support for Patient Safety and Feedback and Communication About Error predicted patient safety grade, while Communication Openness, Staffing, and Nonpunitive Response to Error predicted the number of events reported.

Conclusions

Patient safety culture at Hail General Hospital demonstrates strengths in teamwork, organizational learning, and communication about errors but continues to face challenges related to staffing adequacy, care transitions, and nonpunitive responses to error. Strengthening leadership support, promoting open communication, implementing structured handoff processes, and fostering a blame-free reporting environment may improve patient safety outcomes. These findings support ongoing patient safety culture monitoring and targeted interventions to enhance healthcare quality in Saudi hospital settings.

Keywords

Patient safety culture; Hospital Survey on Patient Safety Culture; HSOPSC 1.0; Hospital; Nurses; Patient safety outcomes; Event reporting; Saudi Arabia

**Nurses' Patient Safety Culture Perceptions in a Saudi Hospital: A Cross-sectional Hospital
Survey on Patient Safety Culture (HSOPSC) Study**

Patient safety is widely recognized as a fundamental dimension of healthcare quality and an important determinant of clinical and organizational performance (Al-Zadjali et al., 2025; Alshammari et al., 2026). Early investigations of medical error, including Beecher and Todd's (1954) analysis of anesthesia-related mortality and Brennan et al.'s (1991) study of preventable adverse events in hospitalized patients, highlighted the magnitude of preventable harm within healthcare systems. The increasing emphasis on patient safety subsequently led to the development of systems-based safety approaches and the implementation of organizational strategies aimed at reducing preventable harm (Donaldson et al., 2000; Wachter, 2012). Despite substantial advances in patient safety research and policy, unsafe care continues to contribute to millions of preventable injuries and deaths annually and imposes considerable economic burdens on healthcare systems worldwide (Slawomirski et al., 2025; World Health Organization [WHO], 2024, 2025a). These concerns reinforce the importance of continuous monitoring of patient safety culture as a key component of healthcare quality improvement within hospital settings.

Conceptualizing Patient Safety and Patient Safety Culture

Patient safety, defined as minimizing preventable harm and managing healthcare risks to an acceptable level, is a concept that underscores the need for proactive leadership, evidence-based systems, and resilient organizational cultures capable of anticipating errors and learning from failures (Donaldson et al., 2000; Ilan & Fowler, 2005; Lestari et al., 2023; WHO, 2023). Patient safety culture has emerged as a central determinant of healthcare quality, reflecting the shared organizational values, norms, and behaviours that influence how safety is prioritized, communicated, and enacted (Agency for Healthcare Research and Quality [AHRQ],

2024; Haque et al., 2024). Originating in high-reliability industries, safety culture in healthcare emphasizes openness, teamwork, trust, and non-punitive approaches to incidents (Fontenele Lima de Carvalho & Bates, 2025; Kim et al., 2023). Patient safety culture has improved clinical outcomes, reduced error rates, enhanced staff engagement, and increased patient satisfaction (Alanazi et al., 2022; Lee & Quinn, 2020). Conversely, punitive cultures discourage reporting, obscure system weaknesses, and perpetuate unsafe practices (AHRQ, 2024; Swift et al., 2025). Routine assessment of patient safety culture is increasingly endorsed to identify system strengths and gaps while fostering transparent, learning-oriented environments that empower staff to report incidents and improve safety (Abdurabuh et al., 2024; Kyriakeli et al., 2025; Hanifa & Dhamanti, 2021).

Measuring Patient Safety Culture

Multiple tools have been developed to assess patient safety culture, including the Safety Attitudes Questionnaire, Manchester Patient Safety Framework, and Safety Climate Survey (Hanifa & Dhamanti, 2021; Bartonickova et al., 2021). The Hospital Survey on Patient Safety Culture (HSOPSC), developed by the AHRQ, is the most widely adopted and validated instrument globally (AHRQ, 2023; Haque et al., 2024). It measures staff perceptions across domains of teamwork, communication, event reporting, organizational learning, safety climate, and leadership support (Sorra et al., 2018; Sorra et al., 2021). Systematic reviews (Azyabi et al., 2021; Churrua et al., 2021) and a scoping review (Carvalho et al., 2023) consistently identify the HSOPSC as the predominant patient-safety culture instrument, appearing the most frequently in studies across analyses, underscoring its psychometric properties and global cross-cultural suitability.

The Role of Nurses in Advancing Patient Safety Culture

Nurses constitute approximately half of the global healthcare workforce and serve as the primary point of contact for patients and families. Their continuous clinical presence enables nurses to detect patient deterioration, identify safety hazards, and implement preventive actions (Babaei et al., 2022; WHO, 2025b; Zaitoun et al., 2023). Positioned at the intersection of patient care, interprofessional teamwork, and healthcare management, nurses also enforce safety protocols and observe their real-world application, allowing them to detect gaps between policy and practice (Glarcher & Vaismoradi, 2025; Hajizadeh et al., 2025; White et al., 2025).

In addition to bedside care, nurses act as advocates for patient rights and safety, ensuring that concerns are raised when care is not equitable, safe, and dignified (White et al., 2025; Zaitoun et al., 2023). Nurses who operate within supportive safety cultures are more likely to report incidents, participate in organizational learning, and sustain safe clinical behaviours (Mahsoon & Dolansky, 2021; Yan et al., 2021). Nurses' perceptions of patient safety culture serve as a critical indicator of both organizational performance and healthcare quality (Glarcher & Vaismoradi, 2025; Yilmaz et al., 2025).

Purpose of the Study

In Saudi Arabia, particularly in Hail City, no prior study has specifically examined nurses' perceptions of patient safety culture using the HSOPSC version 1.0 in Hail General Hospital. Evaluating patient safety culture using the validated HSOPSC version 1.0 instrument is essential to identify strengths and areas requiring improvement across the original patient safety culture composites, including teamwork, communication, staffing, and non-punitive response to error. Such an assessment may support hospital leadership and nursing management in diagnosing safety challenges, align with national recommendations for continuous monitoring of

patient safety culture (Alshammari et al., 2026), and facilitate benchmarking against regional and international studies that have extensively used HSOPSC version 1.0 (Rockville et al., 2016).

This study will provide evidence regarding nurses' perceptions of patient safety culture within this Saudi hospital setting and inform targeted interventions to strengthen patient safety practices.

HSOPSC

The HSOPSC, is the most used hospital patient safety culture instrument and has been adapted for use in more than 99 countries (AHRQ, 2023; Azyabi et al., 2021; Sorra & Nieva, 2004; Haque et al., 2024). The original HSOPSC (Version 1.0), released in 2004, was designed to evaluate organizational factors that influence patient safety at both unit and hospital levels. Its psychometric reliability has been well documented, with Cronbach's alpha values ranging from 0.62 to 0.85 across composites scores, indicating moderate to strong internal consistency (Sorra & Dyer, 2010). Within the Gulf Cooperation Council (GCC) region, the survey has been used to assess nurses' perceptions of patient safety culture and to identify opportunities for improvement (Rawas & Abou Hashish, 2023; Wazqar & Attallah, 2024).

HSOPSC Version 1.0 includes 12 composites and two outcome items addressing overall patient safety grade and the number of events reported in the past year (Sorra & Nieva, 2004). The composites include: "Teamwork Within Units"; "Teamwork Across Units"; "Organizational Learning–Continuous Improvement"; "Supervisor/Manager Expectations and Actions Promoting Patient Safety"; "Handoffs & Transitions"; "Management Support for Patient Safety"; "Feedback and Communication About Error"; "Overall Perceptions of Patient Safety"; "Communication Openness"; "Frequency of Events Reported"; "Staffing"; and "Nonpunitive Response to Error". In this study, both HSOPSC Version 1.0 and HSOPSC Version 2.0 were administered to

evaluate the applicability of the patient safety culture composites within the clinical context of Hail General Hospital.

Research Questions

Q1: In the current Saudi Arabian healthcare context, how do nurses at Hail General Hospital perceive the patient safety culture within their respective practice settings using HSOPSC Version 1.0?

Q2: What are the psychometric properties of the HSOPSC 1.0 composites at the overall sample level and across subgroups defined by department and nationality?

Q3: What is the relationship between patient safety culture composites and the outcome variables in HSOPSC 1.0, including Overall Perceptions of Safety, Frequency of Events Reported, Patient Safety Grade, and Number of Events Reported?

Q4: Which patient safety culture composites predict the outcome variables in HSOPSC 1.0, including Overall Perceptions of Safety, Frequency of Events Reported, Patient Safety Grade, and Number of Events Reported?

Methodology

Study Design

This study used a quantitative, cross-sectional survey design to assess nurses' perceptions of patient safety culture at Hail General Hospital in Saudi Arabia. The cross-sectional approach is widely recognized as the predominant survey design for capturing nurses' attitudes and experiences at a single point in time and is frequently used in healthcare research (Creswell, 2009).

Setting and Sampling

A convenience sampling approach to recruit frontline nurses from Hail General Hospital in Saudi Arabia was used in this study. Eligibility criteria include being a registered nurse of any nationality, having at least six months of work experience at Hail General Hospital, currently working in a frontline clinical role, being present during the data collection period, and having the ability to read and write in English, the official language used by medical staff across the Saudi healthcare system (Alhamami, 2020). Nurses with fewer than six months of experience were excluded, as they may still be undergoing orientation and may not have sufficient exposure to the hospital's routines and safety practices to provide informed assessments (Alquwez et al., 2018).

Measurement Instrument and Data Collection

The study employed a self-administered questionnaire, HSOPSC, to gather data from frontline nursing staff. In addition to the core patient safety culture composites, participants provided demographic information, including department, nationality, education level, age, years of clinical experience, and weekly working hours. The HSOPSC uses a five-point Likert scale, ranging from 1 (strongly disagree, never, or failing) to 5 (strongly agree, always, or excellent), to measure levels of agreement or frequency of safety-related behaviours and perceptions.

Paper questionnaires in English were distributed across all participating wards. Evidence suggests that paper-based questionnaires generally achieve higher participation rates than web-based formats (Sorra et al., 2018), supporting the decision to use a paper delivery method to maximize response rates. A total of 144 questionnaires were distributed between February to April 2025, 132 were returned, and 3 were excluded due to incomplete responses, resulting in 129 valid surveys, yielding a response rate of 91.7 %.

Data Analysis

Survey responses were first coded and entered into Microsoft Excel for initial data management. The cleaned dataset was subsequently imported into the Statistical Package for the Social Sciences (SPSS) for comprehensive statistical analysis. Descriptive statistics were used to summarize sample demographic characteristics.

Following the HSOPSC user guidelines, positive responses for each survey item were tallied to calculate the percentage of positive responses per item. Composite-level scores were then computed by averaging the percentage of positive responses across all items within each composite. To interpret these results, composites with a positive rating of 75% or higher were classified as areas of strength. Composites with less than or equal to 50% positive responses were identified as areas requiring improvement, consistent with the analytical approach recommended by Westat et al. (2014). Further, internal consistency reliability was assessed using Cronbach's α for each composite at the overall sample level and disaggregated by department and nationality.

To address Research Questions 3 and 4, correlation analyses were performed using Pearson's or Spearman's correlation coefficients to examine the strength and direction of associations between patient safety culture composites and the outcome measures. Regression analyses were then conducted to identify which patient safety culture composites were significantly associated the outcome variables.

Ethical Considerations

Ethical approval for this study was obtained from the University of Ottawa Research Ethics Board (REB: H-11-24-10989) and the Institutional Review Board of the Saudi Ministry of Health, Hail Health Cluster (IRB Log Number: 2024-113). Participant confidentiality and

anonymity were maintained throughout the study process. No personal identifiers were collected from participants, and all study data were securely managed and stored to ensure the protection of participants' privacy.

Results

Nurses' perceptions of patient safety culture at Hail General Hospital, including participant characteristics, percent-positive composite scores, composite reliability, associations between HSOPSC composites and patient-safety outcomes are reported in this section. First, the demographic characteristics of the sample are described, including department, nationality, education, age, experience, and work hours. Second, percent-positive composite scores for HSOPSC 1.0 are reported to highlight strengths and weaknesses in perceptions of patient safety culture. Third, composite reliability analyses are presented for overall and across subgroups defined by department and nationality. Fourth, correlations between composites and outcome measures for HSOPSC 1.0 are reported with overall perceptions of patient safety, frequency of events reported, patient safety grade, and number of events reported. Building on these analyses, regression models are presented to identify predictors of key outcomes. Specifically, HSOPSC 1.0 composites are tested as predictors of overall perceptions of patient safety, frequency of events reported, patient safety grade, and number of events reported.

Demographic Characteristics

Demographic characteristics of the study participants included nationality, education, age, department, experience, and hours worked per week (Table 1).

A total of 129 nurses completed the survey. Of the 129 nurses surveyed, half identified as Saudi nationals ($n = 65$, 50.4%), followed by Filipino ($n = 31$, 24.0%), and Indian ($n = 24$, 18.6%). The remaining nine respondents (7.0%) reported other nationalities.

Among the 129 nurses, the vast majority held a bachelor's degree ($n = 92$, 71.3 %). Fourteen nurses (10.9 %) had completed a master's degree, while 23 (17.8 %) reported a diploma as their highest qualification.

Among the 129 nurses, age was heavily concentrated in early to mid-career, with most participants aged 24–34 years ($n = 80$, 62.0%). Another sizeable group was aged 35–44 ($n = 42$, 32.6 %), and just seven nurses (5.4 %) were 45 or older.

Among the 129 nurses, most nurses worked in the Emergency Department (ED; $n = 30$, 23.3%), followed by the Neonatal Intensive Care Unit (NICU; $n = 17$, 13.2%), the Intensive Care Unit (ICU; $n = 15$, 11.6%), the Female Medical Ward (FMW; $n = 11$, 8.5%), the Obstetrics & Gynecology Department (OGD; $n = 8$, 6.2%), the Operating Room (OR; $n = 8$, 6.2%), the Delivery Room (DR; $n = 6$, 4.7%), the Outpatient Department (OPD; $n = 4$, 3.1%), the Male Medical Ward (MMW; $n = 6$, 4.7%), the Isolation Unit (IU; $n = 4$, 3.1%), the Day Surgery Ward (DSW; $n = 3$, 2.3%). Seventeen respondents (13.2%) returned their surveys without specifying a department, which were coded as “Unknown”, so their safety culture perceptions still inform the overall study findings.

Among the 129 nurses, professional tenure was skewed toward relatively early career stages. Thirty-five respondents (27.1%) had been on the job for one to five years, and the largest group, fifty-three nurses (41.1%), reported between six and ten years of experience. The remaining forty-one participants (31.8%) had eleven or more years of service.

Finally, looking at the weekly workload, most nurses reported working in excess of the standard full-time range. Twenty-eight respondents (21.7%) worked between 30 and 40 hours per week, while the majority, 101 nurses (78.3%), regularly worked more than 40 hours.

Table 1*Demographic Characteristics of Participants at Hail General Hospital*

Demographic Characteristics	<i>n</i>	%
Nationality		
Indian	24	18.6
Filipino	31	24.0
Saudi	65	50.4
Other	9	7.0
Education		
Diploma	23	17.8
Bachelor's Degree	92	71.3
Master's Degree	14	10.9
Age		
24 to 34 Years	80	62
35 to 44 Years	42	32.6
45 or more Years	7	5.4
Department		
(ICU) Intensive Care Unit	15	11.6
(ED) Emergency Department	30	23.3
(MMW) Male Medical Ward	6	4.7
(FMW) Female Medical Ward	11	8.5
(DSW) Day Surgical Ward	3	2.3
(IU) Isolation Unit	4	3.1
(DR) Delivery Room	6	4.7
(OGD) Obstetrics and Gynecology	8	6.2
Department		
(NICU) Neonatal Intensive Care Unit	17	13.2
(OPD) Outpatient Department	4	3.1
(OR) Operating Room	8	6.2
(UK) Unknown	17	13.2
Experience		
Less than 5 Years	35	27.1
6 to 10 Years	53	41.1
11 or more Years	41	31.8
Hours worked per week		
30 to 40 Hours per Week	28	21.7
More Than 40 Hours per Week	101	78.3

Note. *N* = 129 (*n* = number of participants for each condition).

Percent Positive Composite Scores

Across the twelve HSOPSC 1.0 composites, nurses' average ratings ranged from 17.1% to 92.4%, delineating clear strengths and opportunities for improvement (Table 2). Three composites, Teamwork Within Units (92.4%), Organizational Learning–Continuous Improvement (81.4%), and Feedback & Communication About Error (76.7%), exceeded the 75% threshold typically regarded as areas of strength. Scores between 50% and 75% indicate potential areas for improvement. Six composites fell within this range: Supervisor/Manager Expectations & Actions Promoting Patient Safety (58.7%), Management Support for Patient Safety (64.6%), Overall Perceptions of Patient Safety (50.6%), Communication Openness (50.1%), Frequency of Events Reported (50.4%), and Teamwork Across Units (51.7%). Finally, three composites scored below 50%, signalling areas of particular concern. These included Staffing (41.3%), Handoffs & Transitions (47.7%), and Nonpunitive Response to Error (17.1%).

Table 2

Percent Positive Response Scores for Patient Safety Culture Composites (HSOPSC 1.0)

Composite	Percent Positive Score	SD
HSOPSC 1.0		
Teamwork Within Units	92.44	16.71
Supervisor/ Manager Expectations & Actions Promoting Patient Safety	58.72	27.18
Organizational Learning–Continuous Improvement	81.40	27.92
Management Support for Patient Safety	64.60	24.56
Overall Perceptions of Patient Safety	50.58	24.50
Feedback & Communication About Error	76.74	32.70
Communication Openness	50.13	33.10
Frequency of Events Reported	50.39	42.92
Teamwork Across Units	51.74	34.82
Staffing	41.28	28.06
Handoffs & Transitions	47.67	37.95
Nonpunitive Response to Error	17.05	30.65
Average Composite Percent Positive Score of HSOPSC 1.0	56.9	—

Note. SD: Standard Deviation.

Reliability Analyses

The reliability analysis for HSOPSC 1.0 revealed substantial variation across composites, with some demonstrating strong internal consistency and others performing poorly (Table 3). Cronbach's α values ranged from 0.10 to 0.88. The overall internal consistency of the full scale was satisfactory, with a Cronbach's α of 0.87 for the 44 items of HSOPSC 1.0.

Supervisor/ Manager Expectations & Actions Promoting Patient Safety demonstrated low reliability overall ($\alpha = .477$). Reliability estimates varied sharply across subgroups: while some departments (e.g., IU = .771; MMW = .763) showed acceptable consistency, others (e.g., OGD = $-.852$; OPD = $-.333$) revealed very poor values. Similarly, nationality patterns showed heterogeneity: Indian nurses displayed higher reliability ($\alpha = .743$), while Saudi ($\alpha = .145$) nurses yielded weak estimates. Organizational Learning–Continuous Improvement was moderately reliable ($\alpha = .697$), with acceptable consistency in many subgroups (e.g., MMW = .843; NICU = .897). However, results were weaker in some areas (e.g., OR = .261).

Management Support for Patient Safety yielded a low internal consistency ($\alpha = .485$). Examination of item-level statistics indicated that the negatively worded item, “Hospital management seems interested in patient safety only after an adverse event happens”, showed weak or even negative correlations with the other items across nationality groups, thereby substantially reducing the overall reliability. Notably, removing this item increased Cronbach's alpha to ($\alpha = .817$).

Overall Perceptions of Patient Safety had the lowest reliability ($\alpha = .077$), with very weak or negative item-total correlations. Subgroup reliabilities confirmed instability across nearly all groups.

Communication Openness demonstrated very low internal consistency ($\alpha = .202$). Item-level analyses revealed weak or even negative corrected item-total correlations. Reliability estimates across departments and nationalities were also inconsistent, with several negative values observed.

Staffing demonstrated poor reliability ($\alpha = .337$). Several items showed weak or negative correlations with the total scale, and reliability varied by nationality, higher among Indian staff ($\alpha = .607$), lower among Saudi ($\alpha = .258$) and Filipino staff ($\alpha = .141$).

By contrast, several composites showed strong internal consistency. Feedback & Communication About Error demonstrated high reliability ($\alpha = .818$), with consistently strong reliabilities across most departments (e.g., NICU = .875; MMW = .906) and nationalities, except for a few weaker estimates. Frequency of Events Reported yielded the highest reliability ($\alpha = .884$), with stability across nearly all subgroups.

Teamwork Within Units was reliable overall ($\alpha = .788$). Subgroup results showed consistently strong performance across most departments and nationalities.

Teamwork Across Units also demonstrated acceptable reliability ($\alpha = .723$), though subgroup variation was more pronounced. Filipino ($\alpha = .722$) and Saudi ($\alpha = .788$) nurses reported strong internal consistency, while Indian nurses showed much weaker reliability ($\alpha = .138$), and the "Other" group even displayed a negative value ($\alpha = -.264$).

Handoffs & Transitions demonstrated acceptable reliability overall ($\alpha = .730$). Most departments showed strong consistency (e.g., FMW = .927; OR = .925; DR = .912), though reliability was weaker in MMW ($\alpha = .461$). Across nationality groups, results were stable, with Indian ($\alpha = .650$), Filipino ($\alpha = .759$), Saudi ($\alpha = .667$), and Other ($\alpha = .770$) staff all reporting moderate to strong consistency. Item-level analysis revealed that a negatively worded item,

“Problems often occur in the exchange of information across hospital units”, performed poorly ($\alpha = .141$), substantially reducing internal consistency. Notably, removal of this item would increase reliability to ($\alpha = .877$).

Nonpunitive Response to Error demonstrated strong reliability overall ($\alpha = .784$). Several departments reported high internal consistency, including FMW ($\alpha = .946$), ED ($\alpha = .841$), and OR ($\alpha = .861$), whereas weaker or negative values were observed in units such as DSW ($\alpha = -1.500$) and OGD ($\alpha = -1.538$).

Table 3*Reliability of Patient Safety Culture Composites (HSOPSC 1.0)*

Composite	Cronbach's α (Overall)	Range by Department Lowest — Highest	Range by Nationality Lowest — Highest
HSOPSC 1.0			
Teamwork Within Units	.788	-.242 (OPD) — .876 (MMW)	.684 (Filipino) — .898 (Other)
Supervisor/ Manager Expectations & Actions Promoting Patient Safety	.477	-.852 (OGD) — .763 (MMW)	.145 (Saudi) — .743 (Indian)
Organizational Learning— Continuous Improvement	.697	-1.500 (OR) — .897 (NICU)	.613 (Indian) — .948 (Other)
Management Support for Patient Safety	.485	-1.406 (OGD) — .773 (NICU)	-.214 (Other) — .503 (Indian)
Overall Perceptions of Patient Safety	.077	-1.362 (ICU) — .533 (IU)	-.474 (Other) — .173 (Filipino)
Feedback & Communication About Error	.818	-3.563 (OGD) — .926 (UK)	.682 (Filipino) — .885 (Indian)
Communication Openness	.202	-4.000 (OPD) — .643 (IU)	-.040 (Saudi) — .325 (Indian)
Frequency of Events Reported	.884	.500 (DSW) — .992 (IU)	.846 (Other) — .921 (Indian)
Teamwork Across Units	.723	-3.556 (NICU) — .866 (OR)	-.264 (Other) — .788 (Saudi)
Staffing	.337	-2.833 (OR) — .759 (IU)	.141 (Filipino) — .607 (Indian)
Handoffs & Transitions	.730	.461 (MMW) — .927 (FMW)	.650 (Indian) — .770 (Other)
Nonpunitive Response to Error	.784	-1.538 (OGD) — .946 (FMW)	-1.554 (Other) — .849 (Indian)
Total Scale (42 items)	.872	—	—
Note. (ICU) Intensive Care Unit, (ED) Emergency Department, (MMW) Male Medical Ward, (FMW) Female Medical Ward, (DSW) Day Surgical Ward, (IU) Isolation Unit, (DR) Delivery Room, (OGD) Obstetrics and Gynecology Department, (NICU) Neonatal Intensive Care Unit, (OPD) Outpatient Department, (OR) Operating Room, (UK) Unknown.			

Correlation Analyses

To better understand the associations between composite scores and patient safety culture outcomes, correlation analyses were conducted. Correlation coefficients identify the strength and direction of associations and indicate which patient safety culture composites are associated with patient safety outcomes (Table 4). The correlation analyses of HSOPSC 1.0 indicated meaningful relationships with overall perceptions of patient safety, frequency of events reported, patient safety grade, and number of events reported.

All but one of the ten safety culture composites showed significant positive correlations with overall perceptions of patient safety. The strongest correlates were Teamwork Across Units ($r = .552, p < .001$) and Handoffs & Transitions ($r = .505, p < .001$). Management Support for Patient Safety ($r = .468, p < .001$), Communication Openness ($r = .446, p < .001$), and Organizational Learning–Continuous Improvement ($r = .440, p < .001$) also emerged as strong correlates.

Moderate positive associations were observed for Teamwork Within Units ($r = .417, p < .001$), Nonpunitive Response to Error ($r = .386, p < .001$), Feedback & Communication About Error ($r = .377, p < .001$), and Supervisor/Manager Expectations & Actions Promoting Patient Safety ($r = .377, p < .001$). Frequency of Events Reported ($r = .363, p < .001$) was positively associated as well. In contrast, Staffing was not significantly related to overall perceptions of patient safety ($r = -.140, p = .114$).

Most composites showed positive associations with the frequency of events reported. The strongest was Teamwork Within Units ($r = .368, p < .001$), followed by Overall Perceptions of Patient Safety ($r = .363, p < .001$), and Feedback & Communication About Error ($r = .340, p < .001$). Additional positive associations were observed for Management Support for Patient Safety

($r = .322, p < .001$), Handoffs & Transitions ($r = .251, p = .004$), Teamwork Across Units ($r = .251, p = .004$), Organizational Learning–Continuous Improvement ($r = .339, p < .001$), Communication Openness ($r = .238, p = .007$), and Nonpunitive Response to Error ($r = .199, p = .024$).

In contrast, Staffing was negatively correlated with reporting frequency ($r = -.239, p = .006$). Finally, Supervisor/Manager Expectations & Actions Promoting Patient Safety was not significantly related to reporting frequency ($r = .037, p = .677$).

Most composites showed positive and significant associations with patient safety grade. The strongest were Organizational Learning–Continuous Improvement ($\rho = .550, p < .001$), Management Support for Patient Safety ($\rho = .529, p < .001$), and Teamwork Across Units ($\rho = .513, p < .001$). Feedback & Communication About Error ($\rho = .458, p < .001$), Teamwork Within Units ($\rho = .484, p < .001$), and Frequency of Events Reported ($\rho = .513, p < .001$) also had strong positive relationships.

Moderate positive associations were found for Overall Perceptions of Patient Safety ($\rho = .447, p < .001$), Communication Openness ($\rho = .471, p < .001$), Handoffs & Transitions ($\rho = .366, p < .001$), and Supervisor/Manager Expectations & Actions Promoting Patient Safety ($\rho = .234, p = .008$).

By contrast, Staffing was negatively associated with patient safety grade ($\rho = -.289, p < .001$). Nonpunitive Response to Error was not significantly associated ($\rho = .027, p = .764$).

Most composites revealed negative associations with the number of events reported. Significant negative correlations were observed for Overall Perceptions of Patient Safety ($\rho = -.321, p < .001$), Teamwork Across Units ($\rho = -.306, p < .001$), Teamwork Within Units ($\rho = -.293, p < .001$), Organizational Learning–Continuous Improvement ($\rho = -.290, p < .001$),

Management Support for Patient Safety ($\rho = -.279, p < .001$), and Handoffs & Transitions ($\rho = -.257, p = .003$). Smaller but significant negative associations were also found for Frequency of Events Reported ($\rho = -.273, p = .002$), Feedback & Communication About Error ($\rho = -.190, p = .031$), and Nonpunitive Response to Error ($\rho = -.182, p = .038$).

By contrast, Staffing was the only composite to show a positive correlation ($\rho = .319, p < .001$). Two composites, Supervisor/Manager Expectations & Actions Promoting Patient Safety ($\rho = -.012, p = .891$) and Communication Openness ($\rho = -.114, p = .198$), were not significantly associated with reporting.

Table 4*Integrated Correlation Table: Patient Safety Culture Composites and Outcomes (HSOPSC 1.0)*

Composite	Overall Perceptions of Patient Safety	Frequency of Events Reported	Patient Safety Grade	Number of Events Reported
	<i>r</i>	<i>r</i>	<i>P</i>	<i>ρ</i>
Teamwork Within Units	.417***	.368***	.484***	-.293***
Supervisor/ Manager Expectations & Actions Promoting Patient Safety	.377***	.037(ns)	.234**	-.012(ns)
Organizational Learning– Continuous Improvement	.440***	.339***	.550***	-.290***
Management Support for Patient Safety	.468***	.322***	.529***	-.279***
Feedback & Communication About Error	.377***	.340***	.458***	-.190*
Communication Openness	.446***	.238**	.471***	-.114(ns)
Teamwork Across Units	.552***	.251**	.513***	-.306***
Staffing	-.140(ns)	-.239**	-.289***	.319***
Handoffs & Transitions	.505***	.251**	.366***	-.257**
Nonpunitive Response to Error	.386***	.199*	.027(ns)	-.182*

Note. *r*: Pearson coefficient, *ρ*: Spearman coefficient.
Significance: **p* < .05, ***p* < .01, ****p* < .001. "ns" = not significant.

Regression Analyses

To extend beyond correlations and examine predictive effects, regression analyses were conducted. These models identify which patient safety culture composites uniquely contribute to the variance observed in key outcomes. The section reports HSOPSC 1.0 results, predicting overall perceptions of patient safety and frequency of events reported (Table 5), and patient safety grade and number of events reported (Table 6).

A multiple linear regression analysis was conducted to examine whether HSOPSC 1.0 composites predicted overall perceptions of patient safety (Table 5). The overall model was statistically significant, $F(10, 118) = 9.694, p < .001$, explaining approximately 45.1% of the variance in overall perceptions of patient safety ($R^2 = .451$, Adjusted $R^2 = .404$).

Of the predictors entered into the model, Nonpunitive Response to Error emerged as the only independent predictor of overall perceptions of patient safety. Specifically, a one-point increase on the Nonpunitive scale was associated with a 0.13-point rise in overall perceptions ($B = 0.130, t = 2.80, p = .006$). None of the other composites contributed significantly once Nonpunitive Response was accounted for.

A multiple linear regression analysis was conducted to examine whether HSOPSC 1.0 composites predicted frequency of events reported (Table 5). The overall model was statistically significant, $F(10, 118) = 4.285, p < .001$, explaining approximately 26.6% of the variance in frequency of events reported ($R^2 = .266$, Adjusted $R^2 = .204$).

Among the predictors, three composites emerged as statistically significant independent predictors. Teamwork Within Units was positively associated with event reporting ($B = 0.444, t = 2.020, p = .046$), such that a one-point increase in the teamwork scale predicted a 0.44-point rise in reporting frequency. Feedback and Communication About Error was also a significant

positive predictor ($B = 0.412$, $t = 2.676$, $p = .009$), with each one-point gain on the feedback scale corresponding to a 0.41-point increase in reported event frequency. Finally, Nonpunitive Response to Error significantly predicted event reporting ($B = 0.256$, $t = 2.179$, $p = .031$), indicating that a one-point improvement on the nonpunitive scale was associated with a 0.26-point increase in event reporting.

Other composites, including supervisor/manager expectations, organizational learning, communication openness, staffing, handoffs & transitions, and teamwork across units, did not make unique contributions to the model once these predictors were considered (all $p > .05$).

Table 5*Linear Regression Predicting Outcome Measures (HSOPSC 1.0)*

Predictor	Overall Perceptions of Patient Safety					Frequency of Events Reported				
	B	SE	95% CI		<i>p</i>	B	SE	95% CI		<i>p</i>
			LL	UL				LL	UL	
Teamwork Within Units	.123	.086	-.047	.293	.156	.444	.220	.008	.880	.046*
Supervisor/ Manager Expectations & Actions Promoting Patient Safety	.079	.062	-.044	.202	.205	-.124	.158	-.437	.189	.434
Organizational Learning–Continuous Improvement	.053	.087	-.119	.225	.545	.130	.221	-.308	.568	.588
Management Support for Patient Safety	-.001	.082	-.163	.161	.993	.216	.209	-.198	.630	.303
Feedback & Communication About Error	.053	.060	-.066	.172	.380	.412	.154	.107	.717	.009*
Communication Openness	.035	.074	-.112	.182	.636	-.277	.189	-.651	.097	.146
Teamwork Across Units	.137	.084	-.029	.303	.106	-.296	.214	-.720	.128	.169
Staffing	-.008	.061	-.129	.113	.897	-.284	.154	-.589	.021	.068
Handoffs & Transitions	.092	.058	-.023	.207	.115	.193	.147	-.098	.484	.193
Nonpunitive Response to Error	.130	.046	.039	.221	.006**	.256	.118	.022	.490	.031*
Note. $R^2 = .451$, Adjusted $R^2 = .404$, $F(10,118) = 9.694$.						$R^2 = .266$, Adjusted $R^2 = .204$, $F(10,118) = 4.285$.				
*** $p < .001$, ** $p < .01$, * $p < .05$										

The ordinal regression model for HSOPSC 1.0 composites was statistically significant, $\chi^2(10) = 77.51, p < .001$, explaining approximately 50.2% of the variance in patient safety grade (Nagelkerke $R^2 = .502$) (Table 6). Two predictors were significant. Management Support for Patient Safety predicted higher safety grades (OR = 2.94, 95% CI [1.17, 7.36], $p = .022$), indicating that a one-unit increase on this scale nearly tripled the odds of reporting a higher patient safety grade. Similarly, Feedback and Communication About Error significantly predicted patient safety grade (OR = 2.30, 95% CI [1.17, 4.52], $p = .016$), with a one-unit increase more than doubling the odds of a higher patient safety grade. Other composites did not contribute significantly to the model.

The ordinal regression model for HSOPSC 1.0 composites was statistically significant, $\chi^2(10) = 32.80, p < .001$, explaining approximately 25.3% of the variance in the number of patient safety events reported (Nagelkerke $R^2 = .253$) (Table 6). Three predictors were significant.

Communication Openness predicted higher event reporting (OR = 2.81, 95% CI [1.23, 6.41], $p = .014$), such that a one-unit increase on this scale was associated with nearly three times greater odds of nurses reporting a higher number of events. Similarly, Staffing was a significant predictor (OR = 2.52, 95% CI [1.27, 4.99], $p = .008$), where a one-unit increase on the staffing scale corresponded to approximately 2.5 times greater odds of reporting a larger number of events. In contrast, Nonpunitive Response to Error showed a negative association (OR = 0.51, 95% CI [0.30, 0.88], $p = .015$). Other composites did not contribute significantly to the model once these variables were included.

Table 6*Ordinal Regression Predicting Outcome Measures (HSOPSC 1.0)*

Predictor	Patient Safety Grade			Number of Events Reported		
	OR	95% CI for OR	<i>p</i>	OR	95% CI for OR	<i>p</i>
Teamwork Within Units	2.21	.86 – 5.16	.101	.72	.28 – 1.74	.489
Supervisor/ Manager Expectations & Actions Promoting Patient Safety	1.08	.49 – 1.77	.827	1.73	.61 – 3.61	.141
Organizational Learning–Continuous Improvement	2.03	.77 – 4.67	.150	.56	.21 – 1.34	.214
Management Support for Patient Safety	2.94	1.17 – 7.36	.022*	.94	.38 – 1.32	.885
Feedback & Communication About Error	2.30	1.17 – 4.52	.016*	.79	.39 – 1.54	.486
Communication Openness	1.51	.66 – 2.54	.334	2.81	1.23 – 6.41	.014*
Teamwork Across Units	1.78	.69 – 3.15	.244	.80	.31 – 2.05	.638
Staffing	.96	.38 – 1.63	.901	2.52	1.27 – 4.99	.008*
Handoffs & Transitions	.68	.26 – 1.26	.240	.63	.26 – 1.26	.140
Nonpunitive Response to Error	.84	.35 – 1.35	.521	.51	.30 – .88	.015*
Note. Model fit. $\chi^2 (10) = 77.51, p < .001$; Nagelkerke $R^2 = .502$.				Model fit. $\chi^2 (10) = 32.80, p < .001$; Nagelkerke $R^2 = .253$.		
*** $p < .001$, ** $p < .01$, * $p < .05$						

Discussion

Nurses' Perceptions of Patient Safety Culture: HSOPSC 1.0 Findings

This subsection discusses nurses' perceptions of patient safety culture at Hail General Hospital using HSOPSC 1.0 and compares the findings with Saudi, GCC, and international nursing studies. Overall, the results reveal a pattern of strong intra-unit collaboration and learning-oriented practices, coexisting with persistent structural and cultural weaknesses, particularly in staffing, handoffs, and nonpunitive response to error.

Strong Composites

Teamwork Within Units emerged as the strongest composite in the present study (92.44%), exceeding benchmarks reported in Saudi Arabia's Eastern (Aboufour & Subbarayalu, 2022), Central (Alquwez et al., 2023), and Western regions (Wazqar & Attallah, 2024), as well as GCC countries such as Qatar (Abdulla et al., 2023) and Kuwait (Alsaleh et al., 2025). Internationally, similarly high teamwork scores were reported in Nigeria (Kaware et al., 2022), Palestine (Zabin et al., 2022), Vietnam (Ha et al., 2023), Portugal (Oliveira et al., 2024), Spain (Sosa-Palanca et al., 2022), and Jordan (Oweidat et al., 2024). This consistency suggests that intra-unit teamwork is a resilient component of nursing safety culture across diverse health systems.

Organizational Learning–Continuous Improvement also scored highly (81.40%), aligning with findings from Saudi Arabia (Alquwez et al., 2023; Rawas & Abou Hashish, 2023; Wazqar & Attallah, 2024), Qatar (Abdulla et al., 2023), Kuwait (Alsaleh et al., 2025), Oman (Al Ma'mari et al., 2019), Nigeria (Kaware et al., 2022), Laos (Sodeno et al., 2025), and Vietnam (Ha et al., 2023). These results indicate that nurses perceive errors as catalysts for improvement rather than isolated failures, reflecting a learning-oriented process dimension.

Feedback and Communication About Error (76.74%) further reinforced this positive process-oriented culture. Comparable or slightly upper scores were reported in Saudi Arabia (Rawas & Abou Hashish, 2023; Wazqar & Attallah, 2024), Jordan (Oweidat et al., 2024), and Vietnam (Ha et al., 2023), suggesting that mechanisms for discussing errors are relatively well established among nursing staff.

Moderately Rated Composites

Several composites fell within the 50–75% range, indicating moderate levels or partial implementation of patient safety culture principles in Hail General Hospital. Management Support for Patient Safety (64.60%) aligned with Saudi Western and Central Region hospitals (Alquwez et al., 2023; Rawas & Abou Hashish, 2023; Wazqar & Attallah, 2024) and Oman (Al Ma'mari et al., 2019) but exceeded Laos (Sodeno et al., 2025), Turkey (Yavuz et al., 2023), Spain (Sosa-Palanca et al., 2022), Sweden (Granel-Giménez et al., 2022), and Portugal (Oliveira et al., 2024). This suggests that perceived managerial support in Saudi and GCC contexts may be better than in several international settings, possibly reflecting centralized governance structures.

Supervisor/Manager Expectations and Actions Promoting Patient Safety (58.72%) were comparable to Western Saudi Arabia (Rawas & Abou Hashish, 2023) and Oman (Al Ma'mari et al., 2019) but lower than Eastern Saudi Arabia (Aboufour & Subbarayalu, 2022). Similar moderate scores were observed internationally in Iran (Sadeghi et al., 2025), Jordan (Oweidat et al., 2024), and Laos (Sodeno et al., 2025), highlighting persistent gaps in frontline leadership engagement.

Teamwork Across Units (51.74%) reflected moderate interdepartmental collaboration, aligned with Central Saudi Arabia (Alquwez et al., 2023) and Oman (Al Ma'mari et al., 2019), but was lower than Western and Western Saudi Arabia (Aboufour & Subbarayalu, 2022; Rawas

& Abou Hashish, 2023; Wazqar & Attallah, 2024), Qatar (Abdulla et al., 2023), and Kuwait (Alsaleh et al., 2025). Internationally, comparable moderate levels were observed in Iran (Sadeghi et al., 2025), while higher scores were reported in Vietnam (Ha et al., 2023) and Jordan (Oweidat et al., 2024). These findings indicate that while intradepartmental teamwork may be strong, systemic barriers, such as fragmented workflows and inadequate handoff structures, continue to impede seamless collaboration across hospital units.

Overall Perceptions of Patient Safety (50.58%) in Hail General Hospital reflected a borderline moderate appraisal of safety comparable to Western Saudi Arabia (Rawas & Abou Hashish, 2023) and lower than Eastern Saudi Arabia (Aboufour & Subbarayalu, 2022) and Oman (Al Ma'mari et al., 2019), yet aligned with findings from Qatar (Abdulla et al., 2023) and Kuwait (Alsaleh et al., 2025). Internationally, similar moderate perceptions were reported in Iran (Sadeghi et al., 2025), Turkey (Yavuz et al., 2023), and Nigeria (Kaware et al., 2022), whereas higher scores were observed in Vietnam (Ha et al., 2023). These findings suggest that while nurses recognize some foundational safety practices, confidence in overall system reliability remains fragile, potentially influenced by staffing pressures and limited non-punitive climates.

Frequency of Events Reported (50.39%) indicated moderate engagement with incident reporting systems at Hail General Hospital. This score was closely aligned to Central and Eastern Saudi Arabia (Aboufour & Subbarayalu, 2022; Alquwez et al., 2023), Kuwait (Alsaleh et al., 2025), and Oman (Al Ma'mari et al., 2019), but lower than Western Saudi Arabia (Rawas & Abou Hashish, 2023; Wazqar & Attallah, 2024) and Qatar (Abdulla et al., 2023). Internationally, similar moderate reporting frequencies were observed in Jordan (Kaware et al., 2022) and Iran (Oliveira et al., 2024), whereas Laos (Sodeno et al., 2025), Spain (Sosa-Palanca et al., 2022), Turkey (Yavuz et al., 2023), Sweden (Granel-Giménez et al., 2022), and Portugal (Oliveira et al.,

2024) demonstrated substantially lower reporting levels. These patterns suggest that reporting behaviours remain constrained by fear of blame and limited feedback loops globally, despite the presence of formal reporting mechanisms (Ha et al., 2023).

Communication Openness (50.13%) also emerged as a moderately rated composite, indicating partial willingness among nurses to speak up about concerns. This score was consistent with Western Saudi Arabia (Rawas & Abou Hashish, 2023) and closely aligned with Kuwait (Alsaleh et al., 2025), but notably lower than Eastern Saudi Arabia (Aboufour & Subbarayalu, 2022). International comparisons revealed comparable moderate levels in Iran (Sadeghi et al., 2025), Laos (Sodeno et al., 2025), and Sweden (Granel-Giménez et al., 2022), while Jordan reported higher openness (Oweidat et al., 2024). Persistently moderate communication openness across diverse contexts underscores the enduring influence of hierarchical norms and fear of reprisal, which may limit nurses' psychological safety.

Weak Composites and Areas in Need of Improvement

Three composites in Hail General Hospital scored below 50%, signalling critical areas for intervention: Staffing (41.28%), Handoffs & Transitions (47.67%), and Nonpunitive Response to Error (17.05%).

The extremely low score for Nonpunitive Response to Error mirrors findings from Central and Western Saudi Arabia (Alquwez et al., 2023; Wazqar & Attallah, 2024), Qatar (Abdulla et al., 2023), Kuwait (Alsaleh et al., 2025), and international studies in Laos (Sodeno et al., 2025), Turkey (Yavuz et al., 2023), Croatia (Granel-Giménez et al., 2022), Portugal (Oliveira et al., 2024), and Spain (Sosa-Palanca et al., 2022). This persistent pattern suggests that blame-oriented responses to error are deeply entrenched in healthcare cultures globally. This finding may reflect persistent concerns regarding punitive consequences, the presence of a blame-and-

shame culture, and perceived risks to future career advancement associated with error reporting (Alshammari et al., 2026; Azyabi et al., 2022; He et al., 2023).

Similarly, staffing deficits were consistently reported across Saudi Arabia (Alquwez et al., 2023; Rawas & Abou Hashish, 2023; Wazqar & Attallah, 2024), GCC countries (Abdulla et al., 2023; Alsaleh et al., 2025), and international studies, such as in Laos (Sodeno et al., 2025), Nigeria, Turkey (Yavuz et al., 2023), Spain (Sosa-Palanca et al., 2022), Sweden (Granel-Giménez et al., 2022), and Portugal (Oliveira et al., 2024), highlighting chronic workforce shortages and workload pressures. These factors, in addition to extended working hours and night shifts, contribute to poorer care quality and adverse patient safety outcomes (Alrabae et al., 2021; He et al., 2023). Handoffs & Transitions also remained problematic in Saudi Arabia, Oman and worldwide, reflecting systemic communication gaps at unit interfaces (Aboufour & Subbarayalu, 2022; Al Ma'mari et al., 2019; Alquwez et al., 2023; Rawas & Abou Hashish, 2023; Oliveira et al., 2024; Sodeno et al., 2025; Sosa-Palanca et al., 2022). These results reflect system-level resource and workflow challenges that extend beyond individual hospitals.

Internal Consistency Reliability

Internal consistency reliability was assessed using Cronbach's coefficient alpha (α) for HSOPSC 1.0 composites. The Cronbach's α values for the 12 composites ranged from 0.10 to 0.88. The overall internal consistency for the full scale was satisfactory, with a Cronbach's α of 0.87 for the 44 items of HSOPSC 1.0.

According to the HSOPSC User's Guide, a Cronbach's α of 0.60 or above is considered acceptable for composite-level analyses (Sorra & Nieva, 2004). Other methodological researchers suggest that values of 0.50 or higher may indicate adequate internal consistency, particularly in applied health research contexts where complex psychological and organizational

constructs are assessed (Bowling, 1997; Jenkinson et al., 1994). In light of these thresholds, the total scale reliability for HSOPSC 1.0 in the present study can be considered acceptable to good. However, examination at the composite level revealed substantial variability, with several subscales demonstrating weak internal consistency.

Such findings are consistent with both local and international validation studies of the HSOPSC. In Saudi-based studies, wide ranges of Cronbach's α have been reported, including values from 0.10 to 0.92 (Aljaffary et al., 2021), 0.21 to 0.90 (Alswat et al., 2017), and 0.15 to 0.76 (Aboshaiqah, 2010). Internationally, similar variability has been documented, with reported composite reliabilities ranging from as low as 0.02 to as high as 0.93 (Bodur & Filiz, 2009), 0.26 to 0.89 (Shu et al., 2015), and 0.33 to 0.92 (Stoyanova et al., 2018). These findings indicate that low composite reliability is a recurring phenomenon in HSOPSC applications across diverse healthcare systems and cultural contexts, rather than an anomaly specific to the present study.

Importantly, the presence of lower Cronbach's α values does not necessarily indicate deficiencies in the instrument itself. HSOPSC measures complex psychological and organizational constructs, such as teamwork, communication openness, and perceptions of management support, which are inherently multifaceted and context dependent. As noted by Field (2013), lower reliability coefficients are expected when assessing diverse psychological constructs, particularly in applied organizational research. Furthermore, Cronbach's α is sensitive to the number of items within a scale, inter-item correlations, and sample heterogeneity, all of which may contribute to reduced values (Tavakol & Dennick, 2011; Streiner, 2003).

In the present study, subgroup analyses by nationality revealed pronounced variability in internal consistency estimates, suggesting that participant background and contextual interpretation played a significant role. For example, the Staffing composite demonstrated

acceptable reliability among Indian nurses ($\alpha = 0.61$), whereas markedly lower values were observed among Saudi ($\alpha = 0.26$) and Filipino nurses ($\alpha = 0.14$). Similarly, for the Teamwork Across Units composite, although the overall reliability was acceptable ($\alpha = 0.72$), Indian nurses showed very low internal consistency ($\alpha = 0.14$), while Filipino ($\alpha = 0.72$) and Saudi nurses ($\alpha = 0.79$) demonstrated substantially stronger coherence among items.

Comparable subgroup discrepancies were evident in other composites. The Supervisor/Manager Expectations and Actions Promoting Patient Safety composite showed an overall α of 0.48, with acceptable reliability in MMW ($\alpha = 0.76$) and IU ($\alpha = 0.77$), but weaker values in FMW ($\alpha = 0.44$) and extremely poor reliability in the OR ($\alpha = -0.04$). Likewise, the Handoffs & Transitions composite exhibited acceptable overall reliability ($\alpha = 0.73$), yet varied notably across departments, ranging from 0.46 in MMW to 0.93 in FMW.

These findings suggest that cultural, linguistic, and professional-contextual factors may influence how respondents interpret and respond to HSOPSC items, particularly those addressing abstract constructs such as staffing adequacy, teamwork, communication, and managerial support. This interpretation is especially relevant in Saudi Arabia, where the nursing workforce is highly multinational, comprising professionals trained in diverse healthcare systems with differing norms regarding hierarchy, communication, and patient safety practices (Alluhidan et al., 2020). Such heterogeneity can attenuate inter-item correlations when responses are aggregated across groups, thereby reducing composite-level reliability.

An additional methodological factor influencing reliability estimates in the present study was item wording direction. Several composites demonstrated notable improvements in internal consistency when oppositely worded items were removed. For example, the Management Support for Patient Safety composite increased from an overall α of 0.49 to 0.82 after removal of

a negatively worded item. This pattern aligns with existing evidence that mixed item wording can introduce cognitive burden, misunderstanding, or acquiescence bias, particularly in multilingual or multicultural samples, thereby weakening internal consistency (Tavakol & Dennick, 2011; Streiner, 2003).

Overall, while the total-scale reliability of HSOPSC 1.0 was acceptable, the observed variability at the composite and subgroup levels underscores the importance of cautious interpretation of subscale scores in multicultural healthcare settings. The findings support the view that low reliability in certain composites likely reflects contextual heterogeneity, differential item interpretation, and wording effects rather than fundamental flaws in the HSOPSC instrument. Future research should consider measurement invariance testing, culturally sensitive adaptation, and careful evaluation of item wording when applying HSOPSC in multinational workforces.

Relationships Between Patient Safety Culture Composites and Outcome Measures

This study examined the relationships between nurses' perceptions of patient safety culture and selected patient safety outcome measures at Hail General Hospital using HSOPSC 1.0 (Sorra & Nieva, 2004). To address the study objectives, correlation analyses were first used to explore associations between safety culture composites and outcomes, followed by regression analyses to identify composites that independently predicted outcome measures.

Correlation Analyses

Correlation analyses based on HSOPSC 1.0 demonstrated that several patient safety culture composites were significantly associated with patient safety outcomes, including overall perceptions of patient safety, patient safety grade, frequency of events reported, and number of events reported. Positive associations were observed for composites reflecting teamwork within

units, organizational learning–continuous improvement, management support for patient safety, feedback and communication about error, and communication openness, indicating that more favourable perceptions of these processes were linked to better perceived safety outcomes. In contrast, several patient safety culture composites were negatively associated with a single outcome measure, most notably the number of events reported, highlighting the complexity of interpreting reporting-related outcomes in patient safety research.

These findings are consistent with Saudi studies using HSOPSC 1.0, including Rawas and Abou Hashish's study, which reported significant correlations between organizational learning, management support, communication about error, teamwork composites, and multiple safety outcomes. Similar correlation patterns have been documented in other local studies, where leadership support, organizational learning, and communication processes were positively associated with perceived safety and reporting behaviours (Alshammari et al., 2024; El-Jardali et al., 2014; Rawas & Abou Hashish, 2023). International HSOPSC 1.0 studies likewise report broad associative relationships between safety culture processes and outcome measures, particularly for communication- and leadership-related composites (Saleh et al., 2015; Zhang et al., 2024). Negative associations between several safety culture composites, and the number of events reported have also been reported in both local and international studies (Rawas & Abou Hashish, 2023; Saleh et al., 2015).

Regression Analyses

Regression analyses based on HSOPSC 1.0 identified a subset of patient safety culture composites that independently predicted patient safety outcomes. Nonpunitive response to error emerged as a significant predictor of overall perceptions of patient safety, while feedback and communication about error, teamwork within units, and nonpunitive response to error were

significant predictors of frequency of events reported. For patient safety grade, management support for patient safety and feedback and communication about error remained significant predictors. Additionally, communication openness, staffing, and nonpunitive response to error were associated with the number of events reported.

These findings are consistent with HSOPSC 1.0 regression-based studies conducted in Saudi Arabia and the region. Previous research has similarly identified feedback and communication about error and management support for patient safety, and nonpunitive response to error as key predictors of overall patient safety perceptions (Al-Surimi et al., 2021; Alswat et al., 2017; El-Jardali et al., 2011) and reporting-related outcomes (Al Ma'mari et al., 2022; Rawas & Abou Hashish, 2023; Zabin et al., 2022). This pattern is consistent with evidence suggesting that constructive feedback, leadership support, and nonpunitive approaches are associated with more supportive working environments, which are linked to stronger patient safety culture (Brubakk et al., 2021; Ha et al., 2023). The association between staffing and the number of events reported has also been documented in prior HSOPSC 1.0 studies (Al-Surimi et al., 2021; Al-Swat et al., 2017; El-Jardali et al., 2014). This association may reflect the role of adequate staffing in enabling reporting behaviours, whereby lower workload and sufficient staffing provide nurses with the time and capacity required to identify, document, and report safety events (Pearson et al., 2010; Rawas & Abou Hashish, 2023). In contrast, the negative association observed between nonpunitive response to error and the number of events reported diverges from most published findings, which typically report positive effects of nonpunitive climates on reporting (El-Jardali et al., 2014; Rawas & Abou Hashish, 2023). This pattern suggests that lower reporting may not reflect safer clinical practice or endorsement of punitive approaches, but rather limitations in reporting norms and encouragement. Previous research indicates that nurses

may receive insufficient managerial support to actively disclose errors and may perceive incident reporting as necessary only when patient harm has occurred, leading to underreporting of near misses and potential safety threats (Rawas & Abou Hashish, 2023). Establishing a consistently supportive and blame-free reporting culture is therefore essential to promote the disclosure of all incidents and potential risks that could compromise patient safety (Zabin et al., 2022).

Implications of the Findings

Implications for Practice

The findings of this HSOPSC 1.0 study suggest that patient safety improvement efforts at Hail General Hospital should prioritize organizational processes associated with communication openness, leadership support, staffing, and nonpunitive approaches to error management. The strong predictive relationships identified for feedback and communication about error, teamwork within units, management support for patient safety, and nonpunitive response to error indicate that strengthening these domains may improve nurses' perceptions of safety and increase engagement with event reporting systems. Given the persistently low scores observed for staffing, handoffs & transitions, and nonpunitive response to error, practical interventions should include workload management strategies, structured handoff procedures, and leadership practices that promote nonpunitive and safe reporting environments. The findings also highlight the importance of considering multicultural workforce dynamics when implementing patient safety initiatives, as subgroup reliability analyses demonstrated substantial variability across nationality and departmental groups.

Implications for Policy

At the policy level, the study reinforces the importance of fostering learning-oriented and nonpunitive patient safety systems within Saudi healthcare organizations. The associations

identified between HSOPSC 1.0 composites and patient safety outcomes support policies emphasizing leadership accountability, transparent communication, and supportive reporting cultures rather than punitive responses to error. The substantial multinational composition of the nursing workforce further suggests that healthcare policies should incorporate culturally sensitive communication training, leadership development, and standardized safety practices that support diverse professional backgrounds. Additionally, the findings support continued use of HSOPSC 1.0 for benchmarking and longitudinal patient safety monitoring within Saudi and GCC healthcare systems.

Contributions to Knowledge

This study contributes to the patient safety culture literature by providing contemporary evidence on nurses' perceptions of patient safety culture in Hail General Hospital, a setting that has received limited attention in previous Saudi patient safety culture research. Using HSOPSC Version 1.0, the study identified a pattern of strong teamwork and organizational learning alongside persistent weaknesses in staffing, handoffs & transitions, and nonpunitive response to error, adding to the growing body of evidence regarding patient safety culture challenges within Saudi and Gulf healthcare systems.

The study also contributes psychometric evidence regarding the performance of HSOPSC 1.0 in a multicultural nursing workforce. The variability observed in reliability estimates across departmental and nationality groups highlights the potential influence of workforce diversity on the measurement of patient safety culture and underscores the importance of continued evaluation of patient safety culture instruments in multinational healthcare environments.

Finally, the study extends existing research by examining predictors of patient safety outcomes rather than relying solely on descriptive composite scores. The findings demonstrated

that nonpunitive response to error, feedback and communication about error, teamwork within units, management support for patient safety, communication openness, and staffing were significant predictors of key patient safety outcomes, providing empirical evidence regarding the patient safety culture dimensions most closely associated with patient safety perceptions and reporting behaviours in this Saudi hospital context.

Limitations

Several limitations should be considered when interpreting the findings of this HSOPSC 1.0 study. First, the cross-sectional design limits the ability to establish causal relationships between patient safety culture composites and outcome measures. Second, the study was conducted within a single hospital, which may reduce the generalizability of findings to other healthcare settings. Third, the use of self-reported survey data may introduce response bias, including social desirability and subjective interpretation of questionnaire items. Fourth, notable variability in internal consistency estimates across composites and subgroups suggests that cultural, linguistic, and contextual factors may have influenced responses, particularly within the multinational nursing workforce. Additionally, the small sample sizes in some departments may have affected the stability of reliability estimates, contributing to negative Cronbach's alpha coefficients. Finally, several composites demonstrated weak reliability estimates, indicating the need for cautious interpretation of some subscale findings and highlighting the importance of further psychometric evaluation of HSOPSC 1.0 within multicultural healthcare environments.

Conclusion

This study examined nurses' perceptions of patient safety culture at Hail General Hospital using HSOPSC Version 1.0 and demonstrated that several patient safety culture composites were significantly associated with patient safety outcomes. Stronger perceptions of

teamwork within units, organizational learning, feedback and communication about error, and management support for patient safety were associated with more positive safety outcomes, whereas staffing limitations, handoff challenges, and punitive perceptions of error management remained important areas requiring improvement. Regression analyses further demonstrated that communication-related composites, nonpunitive response to error, teamwork, and leadership support independently predicted several patient safety outcome measures. Although the overall reliability of HSOPSC 1.0 was acceptable, substantial variability across composites and subgroups highlighted important contextual and psychometric considerations when applying the instrument within multicultural healthcare settings. Overall, the findings contribute to understanding patient safety culture within the Saudi healthcare context and support the importance of strengthening communication, leadership support, staffing adequacy, and nonpunitive safe reporting environments to improve patient safety practices. These findings are also consistent with the objectives of Saudi Vision 2030, which emphasizes healthcare quality improvement, patient safety enhancement, workforce development, and the delivery of safer, more efficient healthcare services across the Kingdom.

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**Chapter 5: A Cross-sectional Study of Nurses' Patient Safety Culture Perceptions in a
Saudi Hospital Using the Hospital Survey on Patient Safety Culture version 2.0**

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Abstract

Background

Patient safety culture is a fundamental component of healthcare quality and organizational performance. Nurses play a critical role in promoting patient safety because of their continuous involvement in patient care and their ability to identify safety risks and adverse events. The Hospital Survey on Patient Safety Culture (HSOPSC) Version 2.0 was developed to improve the conceptual clarity and psychometric performance of the original instrument. This study examined nurses' perceptions of patient safety culture at Hail General Hospital, Saudi Arabia, using HSOPSC Version 2.0.

Methods

A quantitative cross-sectional study was conducted among frontline nurses at Hail General Hospital using HSOPSC Version 2.0. Nurses employed at the hospital for at least six months were eligible to participate. Data collection occurred between February and April 2025. Composite percent-positive scores were computed to identify strengths and areas requiring improvement in patient safety culture. Internal consistency reliability was evaluated using Cronbach's alpha coefficients. Correlation and regression analyses were conducted to examine relationships between patient safety culture composites and patient safety outcomes, including Reporting Patient Safety Events, Patient Safety Rating, and Number of Events Reported.

Results

From the 144 questionnaires distributed, 129 valid responses were received and analyzed (response rate = 91.7%). The average composite positive score was 57.1%. Communication About Error (77.8%) and Teamwork (74.7%) were identified as the strongest patient safety culture dimensions. Organizational Learning–Continuous Improvement (66.4%), Supervisor,

Manager, or Clinical Leader Support for Patient Safety (59.4%), Hospital Management Support for Patient Safety (58.1%), Handoffs and Information Exchange (55.3%), Communication Openness (53.3%), and Reporting Patient Safety Events (50.8%) demonstrated moderate performance. Staffing and Work Pace (40.7%) and Response to Error (34.7%) were identified as areas requiring improvement. The overall HSOPSC 2.0 scale demonstrated satisfactory reliability (Cronbach's $\alpha = .83$), although reliability varied considerably across composites and participant subgroups. Correlation analyses revealed significant associations between several patient safety culture composites and patient safety outcomes. Regression analyses identified Communication About Error and Organizational Learning–Continuous Improvement as significant predictors of Reporting Patient Safety Events. Teamwork, Organizational Learning–Continuous Improvement, Response to Error, and Communication About Error significantly predicted Patient Safety Rating. Staffing and Work Pace was the only significant predictor of the Number of Events Reported.

Conclusions

Patient safety culture at Hail General Hospital demonstrates strengths in teamwork and communication about error but continues to face challenges related to staffing, workload pressures, and responses to error. The findings highlight the importance of communication, organizational learning, and supportive safety practices in shaping nurses' perceptions of patient safety and reporting behaviours. Strengthening staffing adequacy, promoting nonpunitive responses to error, and fostering learning-oriented safety environments may improve patient safety outcomes. The findings contribute to the growing body of evidence on the performance of HSOPSC Version 2.0 in Saudi healthcare settings and offer insights into its application among multinational nursing workforces.

Keywords

Patient safety culture; Hospital Survey on Patient Safety Culture; HSOPSC 2.0; Hospital;
Nurses; Patient safety outcomes; Event reporting; Saudi Arabia

A Cross-sectional Study of Nurses' Patient Safety Culture Perceptions in a Saudi Hospital Using the Hospital Survey on Patient Safety Culture version 2.0

Patient safety has been extensively acknowledged as a core element of healthcare quality and a major indicator of both clinical effectiveness and organizational performance across healthcare systems globally (Alshammari et al., 2026; Soden et al., 2025). Foundational studies examining medical error, such as Beecher and Todd's (1954) investigation of anesthesia-related mortality and Brennan et al.'s (1991) analysis of preventable adverse events among hospitalized patients, drew attention to the widespread impact of preventable harm within healthcare organizations. The growing emphasis on patient safety subsequently contributed to the development of systems-based safety approaches and revisions to organizational patient safety strategies aimed at reducing preventable harm and improving healthcare quality (Donaldson et al., 2000; Reason, 1992; Wachter, 2012). Despite substantial advances in patient safety research and policy, unsafe care continues to contribute to millions of preventable injuries and deaths annually and imposes considerable economic burdens on healthcare systems worldwide (Slawomirski et al., 2025; World Health Organization [WHO], 2024, 2025a). These ongoing challenges emphasize the importance of continuously refining patient safety measurement approaches and strengthening organizational patient safety practices within hospital settings.

Conceptualizing Patient Safety and Patient Safety Culture

Patient safety refers to the reduction of preventable harm and the effective management of healthcare-related risks to acceptable levels through proactive organizational strategies, evidence-based practices, and systems capable of identifying and learning from errors (Ilan & Fowler, 2005; Lestari et al., 2023; WHO, 2023). Increasing attention has been directed toward patient safety culture as an essential component of healthcare quality, encompassing the

collective values, attitudes, norms, and behaviours that shape how safety is perceived, communicated, and implemented within healthcare organizations (Agency for Healthcare Research and Quality [AHRQ], 2024; Haque et al., 2024). Derived from principles established in high-reliability industries, patient safety culture in healthcare emphasizes teamwork, open communication, mutual trust, and non-punitive responses to adverse events and errors (Fontenele Lima de Carvalho & Bates, 2025; Kim et al., 2023). A positive patient safety culture has been associated with improved clinical outcomes, lower rates of healthcare errors, stronger staff engagement, and higher patient satisfaction (Alanazi et al., 2022; Lee & Quinn, 2020). In contrast, punitive organizational environments may discourage incident reporting, conceal underlying system problems, and contribute to the continuation of unsafe practices (AHRQ, 2024; Swift et al., 2025). Consequently, routine evaluation of patient safety culture is increasingly recommended as a strategy to identify organizational strengths and deficiencies while promoting transparent, learning-oriented healthcare environments that support reporting behaviours and continuous safety improvement (Abdurabuh et al., 2024; Hanifa & Dhamanti, 2021; Kyriakeli et al., 2025).

Measuring Patient Safety Culture

A variety of instruments are available to assess patient safety culture in healthcare organizations, including the Safety Attitudes Questionnaire (SAQ), Manchester Patient Safety Framework (MaPSaF), and Safety Climate Survey (Bartonickova et al., 2021; Hanifa & Dhamanti, 2021). Among these tools, the Hospital Survey on Patient Safety Culture (HSOPSC), developed by the AHRQ, is one of the most frequently used hospital-based patient safety culture instruments internationally (AHRQ, 2023; Haque et al., 2024). To address advances in patient safety research and feedback regarding the original instrument, AHRQ introduced HSOPSC

Version 2.0, which revised the original survey structure to improve conceptual clarity, reduce redundancy, and strengthen measurement performance (Sorra et al., 2018, 2021). The revised version reduced the number of composites, modified item wording, introduced new items, and removed items considered less informative or repetitive. These modifications were intended to improve the instrument's psychometric properties, usability, and alignment with contemporary patient safety culture concepts (AHRQ, 2019). HSOPSC 2.0 evaluates dimensions related to teamwork, communication about error, communication openness, organizational learning, leadership support, response to error, staffing and work pace, and event reporting. Initial psychometric evaluations of HSOPSC 2.0 have demonstrated acceptable internal consistency and supported its applicability in different healthcare settings (AHRQ, 2019; Aileen et al., 2024; Reis et al., 2023). Recent studies within Gulf Cooperation Council (GCC) healthcare settings have also utilized HSOPSC Version 2.0 to examine nurses' perceptions of patient safety culture and identify areas requiring improvement (Al Muharraq et al., 2024; Innab et al., 2026).

The Role of Nurses in Advancing Patient Safety Culture

Nurses represent nearly half of the worldwide healthcare workforce and maintain continuous direct contact with patients and families across healthcare settings. Their ongoing involvement in clinical care places them in a central position to recognize patient deterioration, identify potential safety risks, and initiate preventive interventions aimed at reducing harm (Babaei et al., 2022; WHO, 2025b; Zaitoun et al., 2023). Because nurses function across multiple dimensions of healthcare delivery, including bedside care, interdisciplinary collaboration, and organizational coordination, they are uniquely positioned to observe how patient safety policies and procedures are implemented within daily clinical practice (Glarcher & Vaismoradi, 2025; Hajizadeh et al., 2025; White et al., 2025).

As patient safety culture frameworks and measurement approaches continue to evolve, nurses' perspectives remain essential for evaluating how organizational safety processes function in practice. Supportive and non-punitive work environments encourage nurses to report incidents, engage in organizational learning activities, and maintain safe clinical behaviours (Mahsoon & Dolansky, 2021; Yan et al., 2021). Accordingly, nurses' perceptions of patient safety culture provide important insight into organizational safety performance and healthcare quality (Glarcher & Vaismoradi, 2025; Yilmaz et al., 2025).

Purpose of the Study

In Saudi Arabia, particularly in Hail City, no prior study has specifically examined nurses' perceptions of patient safety culture using the HSOPSC version 2.0 at Hail General Hospital. Evaluating patient safety culture using the updated HSOPSC version 2.0 instrument is important to assess contemporary dimensions of patient safety culture and determine the applicability of the revised survey within the context of Hail General Hospital. The findings of this study could support hospital leadership and nursing management in identifying current patient safety challenges, align with national recommendations for continuous monitoring of patient safety culture (Alshammari et al., 2026), and contribute to future benchmarking efforts using the revised HSOPSC framework. The findings may further inform evidence-based strategies to strengthen patient safety culture and guide future adoption of HSOPSC version 2.0 in Saudi hospitals.

HSOPSC 2.0

The original HSOPSC (Version 1.0), introduced in 2004, was developed to assess organizational dimensions affecting patient safety at both unit and hospital levels. Previous psychometric evaluations demonstrated acceptable reliability of the instrument, with Cronbach's

alpha coefficients ranging from 0.62 to 0.85 across the safety culture composites, reflecting moderate to high internal consistency (Sorra & Dyer, 2010).

To align the instrument with advances in patient safety research and user feedback, AHRQ introduced the HSOPSC Version 2.0. This updated version includes 10 composites revised to enhance conceptual clarity and "Overall Perceptions of Patient Safety" and "Teamwork Across Units" were removed (Sorra et al., 2018, 2021). The revision included adding 10 new items, rewording 9 items for clarity, substantially revising 9 items, and removing 20 items deemed redundant or less informative. Psychometric testing of HSOPSC 2.0 demonstrated improved internal consistency, with Cronbach's alpha coefficients ranging from 0.67 to 0.89 (AHRQ, 2019). Within GCC healthcare settings, HSOPSC Version 2.0 has been increasingly used to examine nurses' perceptions of patient safety culture and identify areas requiring improvement (Al Muharraq et al., 2024; Innab et al., 2026).

The HSOPSC 2.0 evaluates the composites: "Teamwork"; "Hospital Management Support for Patient Safety"; "Communication About Error"; "Handoffs and Information Exchange"; "Communication Openness"; "Organizational Learning–Continuous Improvement"; "Response to Error"; "Reporting Patient Safety Events"; "Supervisor, Manager, or Clinical Leader Support for Patient Safety"; and "Staffing and Work Pace" (Sorra et al., 2021). These updates reduced respondent burden, improved data quality, and enhanced alignment with contemporary patient safety culture constructs. In this study, we administered both versions of the HSOPSC to determine the applicability of the composites to the clinical context at Hail General Hospital.

Research Questions

Q1: Within the current Saudi Arabian healthcare context, how do nurses working at Hail General Hospital evaluate patient safety culture across their clinical areas using HSOPSC Version 2.0?

Q2: What are the psychometric properties of the HSOPSC 2.0 composites at the overall sample level and across subgroups defined by department and nationality?

Q3: What is the relationship between patient safety culture composites and the outcome variables in HSOPSC 2.0, including Reporting Patient Safety Events, Patient Safety Rating, and Number of Events Reported?

Q4: Which patient safety culture composites predict the outcome variables in HSOPSC 2.0, including Reporting Patient Safety Events, Patient Safety Rating, and Number of Events Reported?

Methodology

Study Design

A quantitative cross-sectional survey was applied to examine nurses' perceptions of patient safety culture at Hail General Hospital in Saudi Arabia using HSOPSC Version 2.0. Cross-sectional survey designs are commonly utilized in healthcare research to evaluate participants' perceptions, attitudes, and experiences at a specific point in time (Creswell, 2009).

Setting and Sampling

This study utilized convenience sampling to recruit frontline nurses employed at Hail General Hospital in Saudi Arabia. Eligible participants were registered nurses of any nationality who had completed at least six months of employment at the hospital, were actively working in direct clinical care settings during the data collection period, and were able to read, write, and

understand English, which is the primary professional language used in Saudi healthcare institutions (Alhamami, 2020). Nurses with less than six months of work experience at the hospital were excluded because limited exposure to organizational routines and safety practices may affect the accuracy of their patient safety culture perceptions (Alquwez et al., 2018).

Measurement Instrument and Data Collection

Data were collected using the self-administered Hospital Survey on Patient Safety Culture, HSOPSC 2.0. In addition to the patient safety culture composites, participants completed demographic and professional information, including clinical department, nationality, educational qualification, age, years of clinical experience, and average weekly working hours. HSOPSC 2.0 uses a five-point Likert response scale ranging from 1 (strongly disagree, never, or failing) to 5 (strongly agree, always, or excellent) to evaluate perceptions and frequencies of safety-related practices and behaviours.

English-language paper questionnaires were distributed across participating clinical units because English is the standard communication language used among healthcare professionals within Saudi hospitals. Paper-based survey administration was selected because previous evidence suggests it may improve participation rates compared with electronic survey formats (Sorra et al., 2018). Between February and April 2025, a total of 144 questionnaires were distributed to eligible nurses. Of these, 132 questionnaires were returned, and 3 were excluded because of incomplete responses, resulting in 129 valid questionnaires and a final response rate of 91.7%.

Data Analysis

Survey data were initially coded and organized using Microsoft Excel before being transferred to the Statistical Package for the Social Sciences (SPSS) for statistical analysis.

Descriptive statistics were calculated to summarize participant demographic and occupational characteristics.

Consistent with HSOPSC user recommendations, positive responses were calculated for individual survey items to determine item-level positive response percentages. Composite scores were subsequently calculated by averaging the positive response percentages of items included within each composite. In accordance with recommended HSOPSC analytical guidelines, composites receiving positive scores of 75% or greater were interpreted as strengths, whereas composites scoring 50% or lower were classified as areas requiring improvement (Westat et al., 2014). Cronbach's α coefficients were calculated to evaluate internal consistency reliability for each composite overall and across departmental and nationality subgroups.

To examine associations between patient safety culture composites and patient safety outcome measures, Pearson's or Spearman's correlation analyses were conducted. Multiple regression analyses were subsequently performed to identify the patient safety culture composites significantly associated with the study outcome variables.

Ethical Considerations

Approval to conduct this study was granted by the University of Ottawa Research Ethics Board (REB: H-11-24-10989) and the Institutional Review Board of the Saudi Ministry of Health, Hail Health Cluster (IRB Log Number: 2024-113). Measures to preserve participant confidentiality and anonymity were implemented across all phases of the research. Identifying information was not obtained from participants, and all collected data were stored securely to maintain privacy and safeguard confidential information.

Results

Findings related to nurses' perceptions of patient safety culture at Hail General Hospital, including participant demographics, percent-positive composite results, composite reliability findings, and relationships between HSOPSC composites and patient safety outcomes, are presented in this section. Initially, demographic characteristics of the participants are outlined, including department, nationality, educational background, age, years of experience, and working hours. Subsequently, percent-positive composite results for HSOPSC 2.0 are presented to identify areas of strength and areas requiring improvement in patient safety culture perceptions. Composite reliability analyses are then reported at both the overall level and across subgroups categorized by department and nationality. In addition, associations between HSOPSC 2.0 composites and patient safety outcome measures are examined, including reporting patient safety events, patient safety rating, and number of events reported. Finally, regression analyses are presented to determine predictors of the major outcome measures. Specifically, HSOPSC 2.0 composites are examined as predictors of reporting patient safety events, patient safety rating, and number of events reported.

Demographic Characteristics

Participant demographic characteristics included nationality, educational level, age, clinical department, years of experience, and weekly working hours (Table 1).

A total of 129 frontline nurses participated in the study. Saudi nurses represented slightly more than half of the sample ($n = 65$, 50.4%), while Filipino nurses accounted for 24.0% ($n = 31$) and Indian nurses comprised 18.6% ($n = 24$). Nine participants (7.0%) identified as having other nationalities.

Regarding educational attainment, most participants reported holding a bachelor's degree ($n = 92$, 71.3%). Diploma qualifications were reported by 23 nurses (17.8%), whereas 14 participants (10.9%) had completed graduate-level education with a master's degree.

The sample was predominantly composed of nurses in early and middle career stages. Most participants were between 24 and 34 years old ($n = 80$, 62%), followed by nurses aged 35–44 years ($n = 42$, 32.6%). Seven nurses (5.4%) were aged 45 years or older.

With respect to the clinical area, the Emergency Department represented the largest subgroup (ED; $n = 30$, 23.3%), followed by the Neonatal Intensive Care Unit (NICU; $n = 17$, 13.2%) and the Intensive Care Unit (ICU; $n = 15$, 11.6%). Additional participants were distributed across the Female Medical Ward (FMW; $n = 11$, 8.5%), Obstetrics and Gynecology Department (OGD; $n = 8$, 6.2%), Operating Room (OR; $n = 8$, 6.2%), Male Medical Ward (MMW; $n = 6$, 4.7%), Delivery Room (DR; $n = 6$, 4.7%), Outpatient Department (OPD; $n = 4$, 3.1%), Isolation Unit (IU; $n = 4$, 3.1%), and Day Surgery Ward (DSW; $n = 3$, 2.3%). Seventeen respondents (13.2%) did not specify their department and were therefore categorized as “Unknown” for analysis purposes.

Professional experience was primarily concentrated among nurses with relatively early-to-mid career tenure. The largest proportion of participants reported six to ten years of experience ($n = 53$, 41.1%), followed by one to five years of experience ($n = 35$, 27.1%). Forty-one nurses (31.8%) reported having worked for eleven years or longer.

In terms of workload, most participants reported working beyond the conventional full-time weekly schedule. Twenty-eight nurses (21.7%) reported working between 30 and 40 hours per week, whereas the majority of the sample ($n = 101$, 78.3%) reported working more than 40 hours weekly.

Table 1*Demographic Characteristics of Participants at Hail General Hospital*

Demographic Characteristics	<i>n</i>	%
Nationality		
Indian	24	18.6
Filipino	31	24.0
Saudi	65	50.4
Other	9	7.0
Education		
Diploma	23	17.8
Bachelor's Degree	92	71.3
Master's Degree	14	10.9
Age		
24 to 34 Years	80	62
35 to 44 Years	42	32.6
45 or more Years	7	5.4
Department		
(ICU) Intensive Care Unit	15	11.6
(ED) Emergency Department	30	23.3
(MMW) Male Medical Ward	6	4.7
(FMW) Female Medical Ward	11	8.5
(DSW) Day Surgical Ward	3	2.3
(IU) Isolation Unit	4	3.1
(DR) Delivery Room	6	4.7
(OGD) Obstetrics and Gynecology	8	6.2
Department		
(NICU) Neonatal Intensive Care Unit	17	13.2
(OPD) Outpatient Department	4	3.1
(OR) Operating Room	8	6.2
(UK) Unknown	17	13.2
Experience		
Less than 5 Years	35	27.1
6 to 10 Years	53	41.1
11 or more Years	41	31.8
Hours worked per week		
30 to 40 Hours per Week	28	21.7
More Than 40 Hours per Week	101	78.3

Note. *N* = 129 (*n* = number of participants for each condition). (%: percentage of each condition).

Percent Positive Composite Scores

Across the ten HSOPSC 2.0 composites, nurses' average ratings ranged from 34.7% to 77.8%, delineating areas of strength alongside opportunities for improvement (Table 2). Two

composites, Communication About Error (77.8%) and Teamwork (74.7%), approached or exceeded the 75% threshold typically regarded as strengths.

Scores between 50% and 75% signaled moderate performance and potential areas for improvement. Six composites fell within this range: Organizational Learning–Continuous Improvement (66.4%), Supervisor, Manager, or Clinical Leader Support for Patient Safety (59.4%), Communication Openness (53.3%), Reporting Patient Safety Events (50.8%), Hospital Management Support for Patient Safety (58.1%), and Handoffs and Information Exchange (55.3%). While these composites demonstrate progress, they remain below the established strength benchmark. Finally, two composites scored below 50%, representing the most critical areas for intervention: Staffing and Work Pace (40.7%) and Response to Error (34.7%).

Table 2

Percent Positive Response Scores for Patient Safety Culture Composites (HSOPSC 2.0)

Composite	Percent Positive Score	SD
HSOPSC 2.0		
Teamwork	74.68	21.96
Staffing and Work Pace	40.70	27.96
Organizational Learning–Continuous Improvement	66.41	29.90
Response to Error	34.69	28.86
Supervisor, Manager, or Clinical Leader Support for Patient Safety	59.43	30.04
Communication About Error	77.78	32.63
Communication Openness	53.29	32.08
Reporting Patient Safety Events	50.78	44.63
Hospital Management Support for Patient Safety	58.14	28.04
Handoffs and Information Exchange	55.30	38.53
Average Composite Percent Positive Score of HSOPSC 2.0	57.12	—

Note. SD: Standard Deviation.

Reliability Analyses

The reliability analysis for HSOPSC 2.0 revealed notable variation, with some composites demonstrating strong internal consistency while others showed considerable instability (Table 3). Cronbach's α values ranged from 0.10 to 0.85. The overall internal consistency for the full scale was satisfactory, with a Cronbach's α of 0.83 for the 32 items of HSOPSC 2.0.

Teamwork demonstrated low reliability overall ($\alpha = .481$). Item-level analyses indicated weak corrected item–total correlations, and reliability estimates varied considerably across subgroups. While some departments (e.g., IU = .750; FMW = .685) reported stronger consistency, others (e.g., ICU = $-.028$; DR = .053) showed very poor reliability. Similarly, nationality-based reliabilities were uneven, ranging from relatively high values among the “Other” group ($\alpha = .697$) to much lower values among Filipinos ($\alpha = .172$).

Staffing and Work Pace yielded very poor reliability ($\alpha = .285$). Several items exhibited weak or negative correlations with the overall scale, undermining internal consistency. Subgroup results showed the same instability: IU produced relatively stronger estimates ($\alpha = .745$), whereas departments such as OR ($\alpha = -1.467$) and OGD ($\alpha = -4.731$) demonstrated highly problematic values. Across nationalities, Indian respondents indicated moderate reliability ($\alpha = .626$), while Saudi ($\alpha = .019$) and Filipino ($\alpha = .209$) groups showed negligible consistency.

Organizational Learning–Continuous Improvement produced moderate reliability ($\alpha = .576$). While some departments (e.g., MMW = .796; ICU = .660) indicated acceptable estimates, others (e.g., DR = $-.250$; OGD = .338) showed instability. By nationality, reliabilities ranged from weaker values among Indians ($\alpha = .441$) to stronger consistency among respondents in the “Other” group ($\alpha = .822$).

Response to Error showed moderate but borderline reliability ($\alpha = .585$). Item-level inspection indicated that one item, “When staff make errors, this unit focuses on learning rather than blaming individuals “, performed poorly, dragging down the overall alpha. Departmental results ranged widely, from DSW ($\alpha = -1.333$) and OPD ($\alpha = -1.382$) negative estimates, to FMW ($\alpha = .896$) and OR ($\alpha = .875$), which achieved strong reliability. Nationally, Filipinos ($\alpha = .725$) reported higher reliability, whereas Saudis ($\alpha = .139$) showed much weaker consistency.

Supervisor/Manager or Clinical Leader Support for Patient Safety had the lowest reliability of all composites ($\alpha = .096$). Corrected item–total correlations were near zero or negative, and the inclusion of the negatively worded item, “My supervisor, manager, or clinical leader wants us to work faster during busy times, even if it means taking shortcuts “, further depressed consistency. Reliability values were unstable across subgroups, with some departments producing negative or near-zero values. By nationality, results ranged from ($\alpha = -3.750$) among Other to only ($\alpha = .446$) among Indians.

Communication About Error demonstrated excellent reliability ($\alpha = .847$), with high corrected item–total correlations across all items. Subgroup results were consistently strong, particularly in the UK ($\alpha = .926$), ED ($\alpha = .912$), and NICU ($\alpha = .819$). Nationality estimates were also robust, ranging from Filipino nurses ($\alpha = .682$) to Indians ($\alpha = .885$).

Communication Openness, in contrast, displayed very weak reliability ($\alpha = .342$). Several items had weak or negative correlations, particularly the negatively worded item “In this unit, staff are afraid to ask questions when something does not seem right”. Across departments, reliabilities were inconsistent, ranging from high in MMW ($\alpha = .814$) and IU ($\alpha = .889$) to near zero or negative in ICU ($\alpha = -.056$) and OPD ($\alpha = -3.556$). Nationality results showed similar

divergence, with Indians reporting near-zero reliability ($\alpha = .172$) and Saudis ($\alpha = .133$), while Filipinos ($\alpha = .337$) and the “Other” group ($\alpha = .744$) displayed stronger internal consistency.

Reporting Patient Safety Events showed good reliability ($\alpha = .753$). Item-total correlations were satisfactory, and departmental reliabilities were generally stable. By nationality, reliability ranged from ($\alpha = .477$) among Filipinos to ($\alpha = .873$) among the group of Other.

Hospital Management Support for Patient Safety yielded low reliability ($\alpha = .374$). Several items showed weak or negative correlations, with departmental reliabilities ranging from NICU ($\alpha = .808$) and OPD ($\alpha = .750$) to strongly negative estimates (e.g., DSW = -1.500). By nationality, reliabilities ranged from a negative estimate among ‘Other’ ($\alpha = -.514$) and near-zero among Filipinos ($\alpha = .155$) to modest values for Saudis ($\alpha = .385$) and Indians ($\alpha = .572$).

Handoffs and Information Exchange produced acceptable reliability ($\alpha = .634$). While item-total correlations varied, most departments demonstrated moderate to strong reliabilities (e.g., OR = $.788$; FMW = $.783$), though some units such as DSW ($\alpha = -3.000$) and OGD ($\alpha = -2.679$) were unstable. Nationality estimates ranged from ($\alpha = .579$) among Saudis and ($\alpha = .592$) among Others to ($\alpha = .638$) among Indians and ($\alpha = .710$) among Filipinos.

Table 3*Reliability of Patient Safety Culture Composites (HSOPSC 2.0)*

Composite	Cronbach's α (Overall)	Range by Department Lowest — Highest	Range by Nationality Lowest — Highest
HSOPSC 2.0			
Teamwork	.481	-.028 (ICU) — .750 (IU)	.172 (Filipino) — .697 (Other)
Staffing and Work Pace	.285	-4.731 (OGD) — .745 (IU)	.019 (Saudi) — .626 (Indian)
Organizational Learning— Continuous Improvement	.576	-.250 (DR) — .796 (MMW)	.441 (Indian) — .822 (Other)
Response to Error	.585	-1.382 (UK) — .896 (FMW)	.139 (Saudi) — .725 (Filipino)
Supervisor, Manager, or Clinical Leader Support for Patient Safety	.096	-2.000 (OPD) — .547 (ICU)	-3.750 (Other) — .446 (Indian)
Communication About Error	.847	.068 (IU) — .926 (UK)	.682 (Filipino) — .885 (Indian)
Communication Openness	.342	-3.556 (OPD) — .889 (IU)	.133 (Saudi) — .744 (Other)
Reporting Patient Safety Events	.753	.186 (OR) — .981 (IU)	.477 (Filipino) — .873 (Other)
Hospital Management Support for Patient Safety	.374	-1.500 (DSW) — .808 (NICU)	-.514 (Other) — .572 (Indian)
Handoffs and Information Exchange	.634	-3.000 (DSW) — .788 (OR)	.579 (Saudi) — .710 (Filipino)
Total Scale (32 items)	.825	—	—

Note. (ICU) Intensive Care Unit, (ED) Emergency Department, (MMW) Male Medical Ward, (FMW) Female Medical Ward, (DSW) Day Surgical Ward, (IU) Isolation Unit, (DR) Delivery Room, (OGD) Obstetrics and Gynecology Department, (NICU) Neonatal Intensive Care Unit, (OPD) Outpatient Department, (OR) Operating Room, (UK) Unknown.

Correlation Analyses

Correlation analyses were performed to examine the relationships between HSOPSC 2.0 composite scores and patient safety outcome measures. Correlation coefficients were used to assess both the magnitude and direction of these relationships and to identify which patient safety culture composites were associated with patient safety outcomes.

The correlation analyses of HSOPSC 2.0 demonstrated meaningful associations with reporting patient safety events, patient safety rating, and number of events reported (Table 4).

Several HSOPSC 2.0 composites showed significant positive associations with reporting patient safety events, with the strongest observed for Communication About Error ($r = .438, p < .001$). Organizational Learning–Continuous Improvement ($r = .333, p < .001$) and Hospital Management Support for Patient Safety ($r = .313, p < .001$) also demonstrated strong positive correlations. Handoffs & Information Exchange ($r = .275, p = .002$) and Teamwork ($r = .254, p = .004$) showed moderate positive associations.

By contrast, Staffing & Work Pace was negatively associated with reporting ($r = -.168, p = .057$), though not significantly. Response to Error ($r = .133, p = .133$), Supervisor, Manager, or Clinical Leader Support for Patient Safety ($r = -.117, p = .186$), and Communication Openness ($r = -.103, p = .247$) were also not significant.

Significant positive correlations emerged between Patient Safety Rating and multiple HSOPSC V2 composites. The strongest associations were for Organizational Learning–Continuous Improvement ($\rho = .542, p < .001$), Communication About Error ($\rho = .539, p < .001$), and Hospital Management Support for Patient Safety ($\rho = .452, p < .001$). Reporting Patient Safety Events ($\rho = .490, p < .001$) was also strongly linked.

Moderate positive associations were found for Teamwork ($\rho = .427, p < .001$), Handoffs & Information Exchange ($\rho = .331, p < .001$), Supervisor, Manager, or Clinical Leader Support for Patient Safety ($\rho = .306, p < .001$), and Communication Openness ($\rho = .200, p = .023$). In contrast, Staffing & Work Pace was negatively correlated with patient safety rating ($\rho = -.219, p = .013$). Response to Error did not show a significant relationship ($\rho = .133, p = .134$).

The analysis revealed a different pattern for the number of events reported. Staffing & Work Pace was positively correlated with reporting volume ($\rho = .347, p < .001$). In contrast, most other composites showed significant negative correlations.

Specifically, negative correlations were found for Organizational Learning–Continuous Improvement ($\rho = -.322, p < .001$), Teamwork ($\rho = -.288, p < .001$), Supervisor, Manager, or Clinical Leader Support for Patient Safety ($\rho = -.235, p = .007$), Hospital Management Support for Patient Safety ($\rho = -.192, p = .030$), Response to Error ($\rho = -.205, p = .020$), Communication About Error ($\rho = -.191, p = .031$), Handoffs & Information Exchange ($\rho = -.210, p = .017$), Reporting Patient Safety Events ($\rho = -.228, p = .009$), and Patient Safety Rating ($\rho = -.231, p = .008$). Communication Openness was not significantly associated ($\rho = -.059, p = .504$).

Table 4*Integrated Correlation Table: Patient Safety Culture Composites and Outcomes (HSOPSC 2.0)*

Composite	Reporting Patient Safety Events	Patient Safety Rating	Number of Events Reported
	<i>r</i>	<i>ρ</i>	<i>ρ</i>
Teamwork	.245**	.427***	-.288***
Staffing and Work Pace	.168(ns)	-.219*	.347***
Organizational Learning–Continuous Improvement	.333***	.542***	-.322***
Response to Error	.133(ns)	.133(ns)	-.205*
Supervisor, Manager, or Clinical Leader	.117(ns)	.306***	-.235**
Support for Patient Safety			
Communication About Error	.438***	.539***	-.191*
Communication Openness	.103(ns)	.200*	-.059(ns)
Hospital Management Support for Patient Safety	.313***	.452***	-.192*
Handoffs and Information Exchange	.275**	.331*	-.210*

Note. *r*: Pearson coefficient, *ρ*: Spearman coefficient.
Significance: **p* < .05, ***p* < .01, ****p* < .001. "ns" = not significant.

Regression Analyses

To further investigate predictive relationships beyond simple associations, regression analyses were performed. These analyses were used to determine which patient safety culture composites independently explained variability in the primary outcome measures. The following section presents regression findings for HSOPSC 2.0 composites associated with reporting patient safety events, patient safety rating, and number of events reported (Table 5).

The ordinal regression model for HSOPSC 2.0 composites was statistically significant, $\chi^2(9) = 42.42, p < .001$, explaining approximately 28.6% of the variance in reporting patient safety events (Nagelkerke $R^2 = .286$) (Table 5). Three predictors were significant. Staffing & Work Pace was negatively associated with reporting patient safety events (OR = 0.57, 95% CI [0.33, 0.98], $p = .041$), indicating a 43% decrease in the odds of reporting with each one-unit increase on this scale. Organizational Learning predicted higher reporting of patient safety events (OR = 2.28, 95% CI [1.02, 1.63], $p = .045$), corresponding to more than double the odds of reporting. The strongest effect was for Communication About Error (OR = 3.16, 95% CI [1.78, 5.62], $p < .001$), where a one-unit increase was associated with over a threefold increase in the odds of reporting more patient safety events. Other composites were not statistically significant once these predictors were included.

The ordinal regression model for HSOPSC 2.0 composites predicting Patient Safety Rating was statistically significant, $\chi^2(9) = 78.32, p < .001$, explaining approximately 50.6% of the variance in safety ratings (Nagelkerke $R^2 = .506$) (Table 5). Four predictors were significant. Teamwork (OR = 2.66, 95% CI [1.06, 6.66], $p = .037$) was associated with more than double the odds of reporting a higher safety rating. Organizational Learning (OR = 3.42, 95% CI [1.32, 8.83], $p = .011$) predicted higher patient safety ratings, corresponding to over a threefold increase

in the odds. Response to Error (OR = 0.38, 95% CI [0.16, 0.87], $p = .022$) showed a negative association, indicating a 62% decrease in the odds of a higher patient safety rating with each one-unit increase on this scale. The strongest effect was for Communication About Error (OR = 3.40, 95% CI [1.76, 6.59], $p < .001$), where a one-unit increase was associated with more than a threefold increase in the odds of reporting a higher patient safety rating. The remaining composites were not statistically significant (all $p > .05$).

The ordinal regression model for HSOPSC 2.0 composites predicting the Number of Events Reported was statistically significant, $\chi^2 (9) = 28.62$, $p < .001$, accounting for approximately 22.5% of the variance in reporting patient safety events (Nagelkerke $R^2 = .225$) (Table 5). Among the predictors, only Staffing & Work Pace emerged as significant. A one-unit increase on this composite was associated with over a threefold increase in the odds of reporting a higher number of patient safety events (OR = 3.11, 95% CI [1.64, 5.89], $p < .001$). None of the other predictors, including Teamwork, Organizational Learning, Response to Error, Supervisor/Manager Support, Communication About Error, Communication Openness, Hospital Management Support, or Handoffs & Information Exchange, showed significant associations with the outcome (all $p > .05$).

Table 5*Ordinal Regression Predicting Outcome Measures (HSOPSC 2.0)*

Predictor	Reporting Patient Safety Events			Patient Safety Rating			Number of Events Reported		
	OR	95% CI for OR	<i>P</i>	OR	95% CI for OR	<i>p</i>	OR	95% CI for OR	<i>p</i>
Teamwork	.97	.44 – 2.12	.943	2.66	1.06 – 6.66	.037*	.82	.26 – 2.05	.661
Staffing and Work Pace	.57	.33 – .98	.041*	.69	.37 – 1.29	.246	3.11	1.64 – 5.89	<.001***
Organizational Learning—Continuous Improvement	2.28	1.02 – 5.09	.045*	3.42	1.32 – 8.83	.011*	.49	.21 – 1.78	.116
Response to Error	1.14	.57 – 2.25	.716	.38	.16 – .87	.022*	1.44	.86 – 2.09	.363
Supervisor, Manager, or Clinical Leader Support for Patient Safety	.91	.45 – 1.85	.800	2.12	.91 – 4.93	.080	.83	.38 – 1.61	.656
Communication About Error	3.16	1.77 – 5.62	<.001***	3.40	1.79 – 6.59	<.001***	.89	.57 – 1.61	.708
Communication Openness	.69	.37 – 1.30	.257	.79	.38 – 1.66	.535	1.83	.89 – 3.74	.098
Hospital Management	.87	.43 – 1.77	.702	1.58	.69 – 3.65	.280	.99	.38 – 1.32	.988
Support for Patient Safety Handoffs and Information Exchange	1.17	.68 – 2.02	.579	1.07	.57 – 2.02	.827	.91	.50 – 1.72	.757
Note. Model fit. χ^2 (9) = 42.42, $p < .001$; Nagelkerke R^2 =.286.				Model fit. χ^2 (9) = 78.32, $p < .001$; Nagelkerke R^2 = .506.			Model fit: χ^2 (9) = 28.62, $p < .001$; Nagelkerke R^2 =.225.		
*** $p < .001$, ** $p < .01$, * $p < .05$									

Discussion

Nurses' Perceptions of Patient Safety Culture: HSOPSC 2.0 Findings

This subsection discusses nurses' perceptions of patient safety culture at Hail General Hospital using HSOPSC 2.0 and compares the findings with available Saudi and international nursing studies adopting the revised instrument. Overall, HSOPSC 2.0 findings demonstrate relatively strong teamwork and communication about error, moderate leadership and learning-oriented, and persistent weaknesses related to staffing and non-punitive responses to error.

Strong Composites

Communication About Error was the strongest composite rated by nurses at the Hail General Hospital (77.78%), exceeding scores reported in Saudi Arabia and the United States and aligning closely with high-performing international settings such as Kazakhstan and China (Aimoldina et al., 2025; Al Muharraq et al., 2024; Tyler et al., 2024; Wu et al., 2022). This consistency suggests that nurses increasingly perceive feedback mechanisms and discussions surrounding errors as constructive rather than punitive, reflecting a shift toward learning-focused safety practices emphasized in HSOPSC 2.0.

Teamwork also emerged as a strong composite in the present study (74.68%), closely aligning with findings from Saudi Arabia (Al Muharraq et al., 2024) and international nursing studies conducted in Kazakhstan (Aimoldina et al., 2025), Brazil (Reis et al., 2023), and the United States (Tyler et al., 2024). Even higher teamwork scores were reported in China (Wu et al., 2022). These findings indicate that collaborative intra-unit nursing practices remain a resilient feature across healthcare systems and persist despite differences in survey version, organizational structure, and national context.

Moderately Rated Composites

Organizational Learning–Continuous Improvement was moderately rated in the present study (66.41%), indicating partial but inconsistent integration of learning-oriented safety practices. This score was comparable to findings from Saudi Arabia (Al Muharraq et al., 2024), China (Wu et al., 2022) and the United States (Tyler et al., 2024), and aligned with moderate-to-high international results from Brazil (Reis et al., 2023) and Chile (Hurtado-Arenas et al., 2024). Although nurses perceive some organizational commitment to learning from errors, the score remains below the threshold for a strong safety culture, suggesting that continuous improvement has not yet been fully integrated into the organizational culture as a routine and shared professional norm.

Supervisor, Manager, or Clinical Leader Support for Patient Safety scored (59.43%), aligning closely with Saudi Arabia, Malaysia, Kazakhstan, and Korea, but remaining lower than other international nursing benchmarks reported in Chile, China, and the United States (Aimoldina et al., 2025; Al Muharraq et al., 2024; Hurtado-Arenas et al., 2024; Imran et al., 2024; Lee & Dahinten, 2021; Tyler et al., 2024; Wu et al., 2022). This pattern suggests that while immediate leadership support is perceived as present, it may lack the visibility and consistency required to foster strong safety climates, particularly within hierarchical healthcare systems.

Hospital Management Support for Patient Safety was rated moderately (58.14%), comparable to Saudi Arabia (Al-Muharraq et al., 2024) and the United States (Tyler et al., 2024), but notably lower than China (Wu et al., 2022) and Kazakhstan (Aimoldina et al., 2025), and higher than Korea (Lee & Dahinten, 2021) and Chile (Hurtado-Arenas et al., 2024). These findings may indicate that nurses perceive managerial commitment as symbolic rather than

operational, reinforcing concerns regarding top-down engagement of senior leadership in safety initiatives.

Handoffs and Information Exchange scored (55.30%), closely aligned with Saudi Arabia (Al-Muharraq et al., 2024), Korea (Lee & Dahinten, 2021), and the United States (Tyler et al., 2024) but lower than Kazakhstan (Aimoldina et al., 2025) and China (Wu et al., 2022). These results highlight ongoing communication challenges at unit interfaces, which could affect patient recovery and indicate systemic workflow fragmentation.

Communication Openness also fell within the moderate range (53.29%), closely aligning with Saudi Arabia and China, but lower than the United States, Chile, and Kazakhstan, and higher than Korea (Aimoldina et al., 2025; Al-Muharraq et al., 2024; Hurtado-Arenas et al., 2024; Lee & Dahinten, 2021; Tyler et al., 2024; Wu et al., 2022). Persistently moderate openness suggests that hierarchical norms and fear of speaking up remain influential, indicating a need for greater emphasis on staff psychological safety.

Reporting Patient Safety Events (50.78%) reflected moderate engagement with incident reporting systems. This score was similar to Saudi Arabia (Al-Muharraq et al., 2024) and Kazakhstan (Aimoldina et al., 2025) but notably lower than the United States (Tyler et al., 2024), Chile (Hurtado-Arenas et al., 2024), and Brazil (Reis et al., 2023) and higher than China (Wu et al., 2022), Korea (Lee & Dahinten, 2021). These findings suggest that while formal reporting structures exist, underreporting may persist due to limited feedback and lingering blame perceptions.

Weak Composites and Areas in Need of Improvement

Two composites emerged as critical weaknesses under HSOPSC 2.0: Staffing and Work Pace and Response to Error.

Staffing and Work Pace scored poorly (40.70%), mirroring findings from Saudi Arabia (Al-Muharraq et al., 2024) and Malaysia (Imran et al., 2024), falling below international benchmarks reported in Kazakhstan (Aimoldina et al., 2025) and Brazil (Reis et al., 2023), while remaining comparable to China (Wu et al., 2022) and the United States (Tyler et al., 2024) and substantially higher than Korea (Lee & Dahinten, 2021). This persistent deficit reflects chronic nursing shortages, workload pressures, and suboptimal staffing models, which appear resistant to change across many global healthcare systems and national contexts. Inadequate staffing may contribute to increased stress, burnout, and job dissatisfaction among nurses, negatively affecting patient safety culture and healthcare quality (Azyabi et al., 2022; Falcone et al., 2022; He et al., 2023). Extended working hours and demanding workloads may also contribute to fatigue and reduced attention, potentially compromising the quality and safety of patient care (Dall'Ora et al., 2023; Li et al., 2024; Li et al., 2025).

Response to Error remained the lowest-scoring domain (34.69%), aligning closely with Saudi Arabia (Al-Muharraq et al., 2024), Korea (Lee & Dahinten, 2021), and China (Wu et al., 2022), and remaining substantially lower than Kazakhstan, Brazil, and the United States (Aimoldina et al., 2025; Reis et al., 2023; Tyler et al., 2024). These findings indicate that punitive responses to error remain deeply embedded, undermining just culture principles and discouraging transparent reporting, despite the WHO's explicit emphasis on learning rather than blame (WHO, 2022). This pattern may reflect concerns regarding punitive consequences, blame-oriented organizational cultures, and perceived risks associated with error reporting (Azyabi et al., 2022; He et al., 2023). Establishing supportive leadership practices and nonpunitive reporting systems may therefore be essential to promoting incident disclosure and organizational learning (Zabin et al., 2022).

Internal Consistency Reliability

Internal consistency reliability was assessed using Cronbach's coefficient alpha (α) for HSOPSC 2.0 composites. For HSOPSC 2.0, Cronbach's α values for the 10 composites ranged from 0.10 to 0.85. The overall internal consistency for the full scale was satisfactory, with a Cronbach's α of 0.83 for the 32 items of HSOPSC 2.0.

Based on the HSOPSC User's Guide, Cronbach's α coefficients of 0.60 or higher are commonly considered acceptable for composite-level analyses in HSOPSC research (Sorra & Nieva, 2004). Additional methodological literature indicates that values exceeding 0.50 may still reflect reasonable internal consistency in applied healthcare research involving complex organizational and psychological constructs (Bowling, 1997; Jenkinson et al., 1994). Considering these criteria, the overall reliability of HSOPSC Version 2.0 in the current study may be interpreted as acceptable to good. Nevertheless, composite-level analyses demonstrated notable variability in reliability estimates, with several composites exhibiting relatively weak internal consistency.

Such findings are broadly consistent with emerging international validation studies of HSOPSC 2.0. Although psychometric evidence for HSOPSC 2.0 remains more limited than Version 1.0 because of its more recent introduction, international studies continue to demonstrate variability in composite reliability estimates. For example, reported Cronbach's α coefficients have ranged from 0.41 to 0.81 (Reis et al., 2023), 0.58 to 0.86 (Olsen et al., 2024), 0.27 to 0.81 (Asi et al., 2024), and 0.45 to 0.85 in another international study (Aileen et al., 2024). These findings suggest that variability in composite reliability remains evident across different healthcare systems, languages, and cultural contexts, despite the psychometric refinements introduced in HSOPSC 2.0.

Importantly, lower Cronbach's α coefficients should not automatically be interpreted as evidence of poor instrument quality. HSOPSC 2.0 assesses complex organizational and psychological constructs, including teamwork, communication openness, staffing and work pace, and perceptions of leadership support, which are inherently multidimensional and influenced by contextual factors. Field (2013) noted that lower reliability estimates are relatively common when measuring diverse psychological and organizational phenomena in applied research settings. In addition, Cronbach's α values may be affected by several methodological factors, including the number of items within a composite, inter-item correlations, and sample heterogeneity (Tavakol & Dennick, 2011; Streiner, 2003).

In the current study, subgroup analyses according to nationality demonstrated noticeable variability in internal consistency estimates, indicating that contextual interpretation and participant background may have influenced reliability patterns. For example, the Staffing and Work Pace composite yielded a low overall α of 0.29; however, Indian nurses again demonstrated relatively acceptable internal consistency ($\alpha = 0.63$), compared with Saudi ($\alpha = 0.10$) and Filipino nurses ($\alpha = 0.21$). For Reporting Patient Safety Events, the overall reliability was satisfactory ($\alpha = 0.75$), with strong internal consistency among Indian ($\alpha = 0.86$) and Saudi nurses ($\alpha = 0.78$), but lower reliability among Filipino nurses ($\alpha = 0.48$). The Communication Openness composite further illustrated contextual divergence, with a low overall α of 0.34, extremely weak reliability in the FMW ($\alpha = 0.06$), and strong consistency in the MMW ($\alpha = 0.81$) and IU ($\alpha = 0.89$).

These findings indicate that cultural background, language differences, and professional context may affect how participants understand and respond to HSOPSC 2.0 items, particularly composites addressing complex organizational concepts such as staffing and work pace,

teamwork, communication openness, and management support. This interpretation is particularly relevant within the Saudi healthcare context, where the nursing workforce is highly diverse and includes professionals educated and trained across multiple healthcare systems with varying perspectives on hierarchy, communication practices, and patient safety culture (Alluhidan et al., 2020). Such workforce diversity may weaken inter-item correlations when responses from heterogeneous groups are analyzed collectively, potentially contributing to lower composite-level reliability estimates.

Another methodological factor that appeared to influence reliability findings in the present study was the direction of item wording. Several HSOPSC 2.0 composites demonstrated improved internal consistency estimates following the removal of reverse-worded items. For example, the Response to Error composite improved from ($\alpha = 0.59$) to ($\alpha = 0.72$) following the removal of a positively worded item. This pattern is consistent with previous methodological evidence indicating that mixed or reverse item wording may increase cognitive complexity, misunderstanding, and acquiescence bias, particularly in multilingual and multicultural populations, which may subsequently reduce internal consistency estimates (Tavakol & Dennick, 2011; Streiner, 2003).

Overall, although the total reliability of HSOPSC 2.0 in the present study was considered acceptable, the variability observed across composites and participant subgroups highlights the need for careful interpretation of subscale reliability within multicultural healthcare environments. The current findings suggest that lower reliability estimates in some composites may be more closely related to contextual diversity, variations in item interpretation, and wording-related effects than to inherent weaknesses in the HSOPSC 2.0 instrument itself. Future studies should further examine measurement invariance, culturally responsive adaptation

processes, and the influence of item wording when applying HSOPSC 2.0 among multinational healthcare workforces.

Relationships Between Patient Safety Culture Composites and Outcome Measures

This study investigated the associations between nurses' perceptions of patient safety culture and selected patient safety outcome measures at Hail General Hospital using HSOPSC Version 2.0 (Sorra et al., 2021). To achieve the study objectives, correlation analyses were initially conducted to assess relationships between patient safety culture composites and outcome variables, followed by regression analyses to determine which composites independently predicted the outcome measures.

Correlation Analyses

Correlation analyses using HSOPSC 2.0 revealed a more focused pattern of associations between patient safety culture composites and outcome measures, including patient safety rating, reporting patient safety events, and number of events reported. Composites related to communication about error, organizational learning–continuous improvement, hospital management support for patient safety, handoffs, and teamwork were positively associated with favourable safety ratings and reporting behaviours. Conversely, several composites demonstrated negative associations with the number of events reported.

These findings align with emerging HSOPSC 2.0 evidence from Saudi Arabia and international contexts. Studies adopting HSOPSC 2.0 have similarly reported that communication-, learning-, handoffs-, and teamwork-related composites are consistently associated with patient safety ratings and reporting outcomes, while the number of events reported often shows weaker or negative associations (Alharbi, 2024; Olsen et al., 2024; Reis et al., 2023).

Regression Analyses

Regression analyses based on HSOPSC 2.0 identified a limited set of patient safety culture composites that independently predicted patient safety outcomes. For reporting patient safety events, organizational learning–continuous improvement and communication about error emerged as significant positive predictors, whereas staffing and work pace demonstrated a negative association. In relation to patient safety rating, teamwork, organizational learning–continuous improvement, and communication about error were significant positive predictors, while response to error showed a significant negative association. For the number of events reported, staffing and work pace was the only composite that demonstrated a significant positive association.

These findings partially align with emerging HSOPSC 2.0 evidence from Saudi Arabia and international contexts. Prior studies have similarly reported that organizational learning–continuous improvement and communication about error are positively associated with patient safety ratings and reporting-related outcomes, reflecting the central role of learning-oriented systems and sharing constructive feedback with frontline staff in shaping safety perceptions (Fekadu et al., 2025; Olsen et al., 2024; Reis et al., 2023). Likewise, teamwork has consistently been identified as a significant predictor of patient safety ratings in HSOPSC 2.0 studies, supporting its continued relevance across many health care systems (Alharbi, 2024; Liu et al., 2024; Olsen et al., 2024).

The positive association between staffing and work pace and the number of events reported observed in the present study is consistent with findings reported using the HSOPSC 2.0 (Alharbi, 2024; Liu et al., 2024). This relationship likely reflects the enabling role of adequate staffing and manageable workload in facilitating reporting processes, whereby nurses have

greater capacity, time, and cognitive resources to recognize, document, and report safety events (Pearson et al., 2010).

In contrast, the negative association observed between response to error and patient safety rating diverges from findings reported in other HSOPSC 2.0 studies, which have generally documented positive relationships between supportive responses to error and safety outcomes (Alharbi, 2024; Liu et al., 2024). This divergence may reflect the sensitivity of the response-to-error construct to contextual and operational conditions, particularly in settings where formal nonpunitive policies may not be fully translated into everyday practice.

A related divergence was observed for staffing and work pace in relation to reporting patient safety events. In the present study, staffing and work pace showed a negative association with reporting patient safety events, contrasting with evidence from some HSOPSC 2.0 studies that reported positive associations (Alharbi, 2024; Liu et al., 2024), while aligning with other findings where staffing-related dimensions were negatively associated with reporting outcomes (Olsen et al., 2024). Together, these mixed patterns highlight the context-dependent nature of HSOPSC 2.0 relationships and suggest that staffing and response-to-error constructs may be interpreted differently across healthcare settings.

Implications of the Findings

Implications for Practice

The findings of this HSOPSC 2.0 study highlight the importance of strengthening communication and nonpunitive, learning-focused safety within hospital settings. Communication about error, organizational learning–continuous improvement, and teamwork emerged as important predictors of patient safety outcomes, suggesting that healthcare organizations should prioritize strategies that encourage constructive feedback, collaborative

practice, and continuous organizational learning. At the same time, the persistently low scores observed for staffing and work pace and response to error indicate the need for interventions addressing workload pressures, staffing adequacy, and psychologically safe reporting environments. Because HSOPSC 2.0 was specifically revised to improve conceptual clarity and reduce redundancy, the findings also support the utility of the revised instrument for identifying focused organizational strengths and weaknesses related to patient safety culture within multicultural healthcare settings.

Implications for Policy

At the policy level, the findings reinforce the importance of organizational policies that support transparent communication, learning-oriented leadership, and nonpunitive approaches to error management. The significant relationships identified between communication about error, organizational learning, teamwork, and patient safety outcomes suggest that healthcare policies should prioritize leadership accountability, structured feedback systems, and staff engagement in patient safety initiatives. In addition, the variability observed across nationality and departmental subgroups highlights the importance of culturally responsive workforce policies within Saudi healthcare organizations, particularly in hospitals employing multinational nursing staff. The findings further support the application of HSOPSC 2.0 as a contemporary framework for monitoring patient safety culture and evaluating safety improvement initiatives across healthcare organizations.

Contribution to Knowledge

This study contributes to the growing body of patient safety culture research by providing evidence on nurses' perceptions of patient safety culture using the revised HSOPSC Version 2.0 within a Saudi hospital setting. As one of the few studies applying HSOPSC 2.0 in Saudi Arabia,

the findings extend current understanding of how the revised patient safety culture dimensions perform within contemporary healthcare environments and identify key strengths and areas requiring improvement, particularly in relation to communication about error, teamwork, staffing and work pace, and response to error.

The study further advances understanding of the measurement properties of HSOPSC 2.0 within a culturally diverse nursing workforce. Although the overall reliability of the instrument was acceptable, substantial variability in reliability estimates across composites, departments, and nationality groups highlights the potential influence of cultural, linguistic, and contextual factors on the measurement of patient safety culture. These findings contribute to ongoing discussions regarding the application and evaluation of HSOPSC 2.0 in diverse healthcare settings.

Finally, the study extends existing HSOPSC 2.0 research by examining the predictive relationships between patient safety culture composites and patient safety outcomes. Communication about error and organizational learning–continuous improvement emerged as consistent predictors of reporting patient safety events and patient safety rating, while staffing and work pace demonstrated significant associations with reporting-related outcomes. These findings provide empirical evidence regarding the patient safety culture, identifying the dimensions most strongly associated with patient safety perceptions and reporting-related outcomes.

Limitations

Several limitations should be considered when interpreting the findings of this HSOPSC 2.0 study. First, the cross-sectional design limits the ability to determine causal relationships between patient safety culture composites and patient safety outcomes. Second, the study was

conducted in a single hospital setting, which may restrict the generalizability of the findings to other healthcare organizations. Third, reliance on self-reported survey responses may introduce response bias and variability in how participants interpreted questionnaire items. Fourth, several HSOPSC 2.0 composites demonstrated weak or inconsistent internal reliability estimates across nationality and departmental subgroups, suggesting that contextual, linguistic, and cultural factors may have influenced responses. Further, small departmental sample sizes may have contributed to unstable reliability estimates, including negative Cronbach's alpha coefficients. Finally, although HSOPSC 2.0 was designed to improve the psychometric performance of the original instrument, the variability observed across some composites indicates that further psychometric evaluation and contextual adaptation may still be necessary when applying the instrument within multinational healthcare environments.

Conclusion

This study explored nurses' perceptions of patient safety culture at Hail General Hospital using HSOPSC Version 2.0 and demonstrated that several revised patient safety culture composites were significantly associated with patient safety outcomes. Communication about error, organizational learning–continuous improvement, and teamwork emerged as important predictors of patient safety ratings and reporting-related outcomes, whereas staffing and work pace and response to error remained important areas requiring improvement. The findings further highlight the continued importance of communication, leadership support, and organizational learning processes in shaping nurses' perceptions of patient safety culture within hospital settings. Although the overall reliability of HSOPSC 2.0 was acceptable, variability across several composites and participant subgroups highlights the continuing influence of contextual and multicultural factors on instrument performance. Overall, the study contributes to the

growing evidence regarding the applicability of HSOPSC 2.0 within Saudi healthcare settings and supports ongoing efforts to strengthen communication, leadership support, staffing practices, and nonpunitive safety cultures to improve patient safety outcomes. These findings further align with the goals of Saudi Vision 2030, particularly ongoing national efforts to enhance healthcare quality, strengthen patient safety systems, optimize workforce performance, and improve the overall efficiency and safety of healthcare delivery across Saudi Arabia.

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**Chapter 6: Patient Safety Culture Among Nurses in Gulf Cooperation Council Hospitals: A
Systematic Review and Meta-analysis Study**

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Abstract

Background

Patient safety is a global priority, and nurses play a central role in its implementation and monitoring. Understanding nurses' perceptions of patient safety culture provides valuable insights for healthcare quality improvement and evidence-informed policymaking. Although a recent systematic review synthesized evidence on patient safety culture among nurses in Gulf Cooperation Council (GCC) countries, quantitative pooled estimates of Hospital Survey on Patient Safety Culture (HSOPSC) composites remain unavailable. Therefore, this study aimed to quantitatively synthesize nurses' perceptions of patient safety culture and provide regional benchmarks for patient safety culture composites among nurses in GCC healthcare settings using HSOPSC versions 1.0 and 2.0.

Methods

This systematic review and meta-analysis was registered with PROSPERO and conducted in accordance with the PRISMA guidelines. CINAHL, MEDLINE, EMBASE, Web of Science, and Scopus were searched from inception to February 2026. Studies reporting nurses' HSOPSC results in GCC countries were eligible for inclusion. Data extraction and quality appraisal were independently conducted by reviewers. Random-effects meta-analyses were performed in R to generate pooled positive response scores and 95% confidence intervals (CIs) for HSOPSC composites.

Results

Fourteen studies involving 4,002 nurses met the inclusion criteria. Eleven studies used HSOPSC version 1.0 (n = 3,454), and three studies used HSOPSC version 2.0 (n = 648). For HSOPSC 1.0,

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the highest pooled positive response scores were observed for Organizational Learning–Continuous Improvement (76.8%; 95% CI: 68.4–84.4) and Teamwork Within Units (75.0%; 95% CI: 64.6–84.1). Moderate scores were identified for Feedback and Communication About Error (65.6%), Frequency of Events Reported (59.1%), Management Support for Patient Safety (58.6%), Overall Perceptions of Patient Safety (57.4%), Supervisor/Manager Expectations and Actions Promoting Patient Safety (57.0%), and Teamwork Across Units (57.0%). The lowest scores were observed for Communication Openness (44.6%; 95% CI: 36.8–52.6), Handoffs & Transitions (42.7%; 95% CI: 32.3–53.4), Staffing (39.1%; 95% CI: 26.5–52.5), and Nonpunitive Response to Error (32.2%; 95% CI: 23.0–42.2). For HSOPSC 2.0, Teamwork (70.0%; 95% CI: 57.6–81.1), Communication About Error (69.0%; 95% CI: 59.9–77.4), and Organizational Learning–Continuous Improvement (63.5%; 95% CI: 50.0–76.0) demonstrated the highest scores, whereas Response to Staffing and Work Pace (39.5%; 95% CI: 30.2–49.2) and Error (37.8%; 95% CI: 34.1–41.6) demonstrated the lowest scores.

Conclusions

Patient safety culture among nurses in GCC healthcare settings demonstrates strengths in teamwork and organizational learning but persistent weaknesses in staffing, nonpunitive response to error, communication openness, and care transitions. These findings highlight the need for healthcare organizations and policymakers to strengthen workforce capacity, promote nonpunitive reporting environments, implement standardized handoff tools and structured communication strategies, and support leadership initiatives that foster patient safety culture.

Keywords

Patient safety, Patient safety culture, Hospital survey on patient safety culture, Nurses, Hospitals, Gulf Cooperation Council, Meta-analysis, Systematic review

**Patient Safety Culture Among Nurses in Gulf Cooperation Council Hospitals: A
Systematic Review and Meta-analysis Study**

Patient safety remains a fundamental global health priority, with international initiatives emphasizing the need to reduce preventable harm and strengthen healthcare systems (Freitas et al., 2025; World Health Organization [WHO], 2021). Despite sustained efforts since the landmark *To Err Is Human* report (Donaldson et al., 2000), adverse events continue to affect a substantial proportion of patients worldwide (Slawomirski & Klazinga, 2022), highlighting persistent gaps in safety practices and system performance (Bates et al., 2023; Slawomirski & Klazinga, 2022). In this context, patient safety culture, defined as the shared values, beliefs, and behaviours that shape safety practices within healthcare organizations (Agency for Healthcare Research and Quality [AHRQ], 2024), has emerged as a critical determinant of healthcare quality and patient outcomes (Alshammari et al., 2026).

Assessing patient safety culture is essential for identifying organizational strengths and weaknesses, guiding targeted interventions, and supporting continuous quality improvement (AHRQ, 2024; Camacho-Rodríguez et al., 2022). Evidence indicates that strong safety cultures are associated with reduced adverse events, improved patient satisfaction, and enhanced workforce outcomes, whereas poor safety cultures contribute to errors, underreporting, and compromised care delivery (Alanazi et al., 2022; Chen et al., 2025; Mistri et al., 2023). Consequently, healthcare organizations are increasingly encouraged to conduct regular patient safety culture assessments as a performance indicator that informs policy and practice and enables benchmarking across systems (Li et al., 2025b; WHO, 2021).

Among healthcare professionals, nurses play a central role in patient safety culture, as they represent the largest segment of the healthcare workforce and are directly involved in

patient care delivery (Alshammari et al., 2026; WHO, 2025). Their continuous presence at the bedside, combined with their involvement in clinical processes and interdisciplinary communication, provides them with a unique perspective on safety culture within healthcare settings. Nurses are often the first to identify safety risks, deviations from protocols, and system-level challenges, making their perceptions particularly valuable for improving safety practices and informing organizational change (Glarcher & Vaismoradi, 2024; Hajizadeh et al., 2025).

The Gulf Cooperation Council (GCC) region, comprising Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates, presents a distinct context for examining patient safety culture. These countries share similar cultural, economic, and healthcare system characteristics, including comparable organizational structures and regulatory environments (Alkhamis et al., 2014; Secretariat General of the Gulf Cooperation Council, 2024; WHO, 2020). Notably, the nursing workforce in the GCC is predominantly expatriate, introducing cultural and linguistic diversity that may influence communication, teamwork, and safety practices (Alshammari et al., 2026). Previous research has identified strengths, such as teamwork and organizational learning, and persistent challenges, including staffing issues, nonpunitive response to error, and care transitions within GCC healthcare settings (Albalawi et al., 2020; Alshammari et al., 2026).

To assess PSC, several instruments have been developed, including the Safety Attitudes Questionnaire, the Manchester Patient Safety Framework, and the Safety Organizing Scale; however, the Hospital Survey on Patient Safety Culture (HSOPSC) remains the most widely used tool globally for hospital-based assessments (Azyabi et al., 2021; Freitas et al., 2025; Vikan et al., 2023). Developed by the Agency for Healthcare Research and Quality, the HSOPSC is a validated, multidimensional instrument that evaluates key domains of safety culture at both unit

and organizational levels (Sorra & Dyer, 2010; AHRQ, 2023). The original version, HSOPSC 1.0, includes 12 composites, while the updated version, HSOPSC 2.0, refines these into 10 composites to enhance clarity, relevance, and psychometric performance (Sorra et al., 2019). Although various tools exist, the HSOPSC is the most used instrument within the GCC region, and there is a limited number of studies that specifically examine nurses' perceptions of patient safety culture in this context (Azyabi et al., 2021; Alshammari et al., 2026).

Although the systematic review by Alshammari et al. (2026) synthesized evidence on nurses' perceptions of patient safety culture in the GCC region, the absence of quantitative synthesis highlight the need for further investigation; therefore, this meta-analysis aims to build upon this prior work by quantitatively synthesizing studies using both HSOPSC versions 1 and 2 to generate pooled estimates and regional benchmarks for patient safety culture composites among nurses in GCC healthcare settings.

Methods

This study updates a previously published systematic review (Alshammari et al., 2026) and includes a meta-analysis of included studies that is conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (PRISMA, 2021), with registration in PROSPERO (Registration ID: CRD42024596704).

Literature Search Strategy

A comprehensive search was conducted in February 2026 across the electronic databases CINAHL, MEDLINE, EMBASE, Web of Science, and Scopus. The search strategy incorporated keywords including "Nurs*," "health professional," "health provider," "health practitioner," "patient safety," "patient safety culture," "Bahrain," "Kuwait," "Oman," "Qatar," "Saudi

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Arabia,” “Kingdom of Saudi Arabia,” “United Arab Emirates,” “Hospital Survey on Patient Safety Culture,” and “HSOPSC.” Boolean operators (AND, OR) were applied to combine search terms effectively (Supplementary Table 1). Two studies conducted by our team that met the inclusion criteria were added (Alshammari, Beogo, et al., Chapter 4; Alshammari, Tyerman, et al., Chapter 5).

The search timeframe spanned from 2004 to 2026, corresponding to the period following the development of the HSOPSC. This updates our previous systematic review, which reported on literature from 2004 to 2024. Given that healthcare systems in the GCC region predominantly operate in English, the search was limited to studies published in English.

Eligibility Criteria

The inclusion and exclusion criteria were established using the Population, Intervention, Comparison, and Outcomes (PICO) framework (Supplementary Table 2) (Schardt et al., 2007). Studies were eligible if they were conducted in acute care settings, published in peer-reviewed journals, and met the following criteria: (1) included nurses or mixed healthcare professional samples with nurses’ data reported separately; (2) were carried out exclusively within GCC countries; and (3) employed quantitative designs using the HSOPSC, or mixed-methods designs that reported quantitative HSOPSC data for nurses.

Studies were excluded if they did not include nurses or report nurses’ data separately, were conducted outside the GCC region, or used instruments other than HSOPSC to assess patient safety culture. Mixed-methods studies were also excluded if they did not report quantitative HSOPSC data that could be attributed to nurses. Although mixed-methods studies were considered eligible when relevant quantitative data were available, none met the inclusion criteria. Consequently, all included studies were quantitative in design. In addition to the studies

identified through the database search, two studies arising from the present cross-sectional study were included because they provided relevant HSOPSC 1.0 and HSOPSC 2.0 data for the updated review and meta-analysis. The two studies were based on the same sample of nurses but reported findings from the two HSOPSC versions separately; therefore, they were included only in their respective version-specific analyses.

Review Process

A systematic and structured screening process was used to identify eligible studies. Two reviewers independently conducted title, abstract, and full-text screening. The initial database search yielded 114 articles across five electronic databases: EMBASE ($n = 22$), MEDLINE ($n = 24$), CINAHL ($n = 15$), Web of Science ($n = 24$), and Scopus ($n = 29$). After removing 75 duplicates, 39 articles remained for further assessment.

During abstract screening, five studies were excluded based on predefined inclusion and exclusion criteria. Full-text review of the remaining 34 articles led to the exclusion of an additional 22 studies, including 12 that did not report nurses' data separately and 10 that did not provide complete percentage scores for the HSOPSC composites. Ultimately, 12 studies were included in the final synthesis. Of these, 11 were quantitative studies focusing exclusively on nurses, while one was a quantitative study that reported nurses' data separately. Then we added our two studies (Alshammari, Beogo, et al., Chapter 4; Alshammari, Tyerman, et al., Chapter 5). A total of 14 studies are included for review and meta-analysis.

Discrepancies at each stage of the screening process were resolved through discussion between two reviewers (MA and JCP) until consensus was reached. Covidence systematic review software (Veritas Health Innovation, Melbourne, Australia) was used to manage articles,

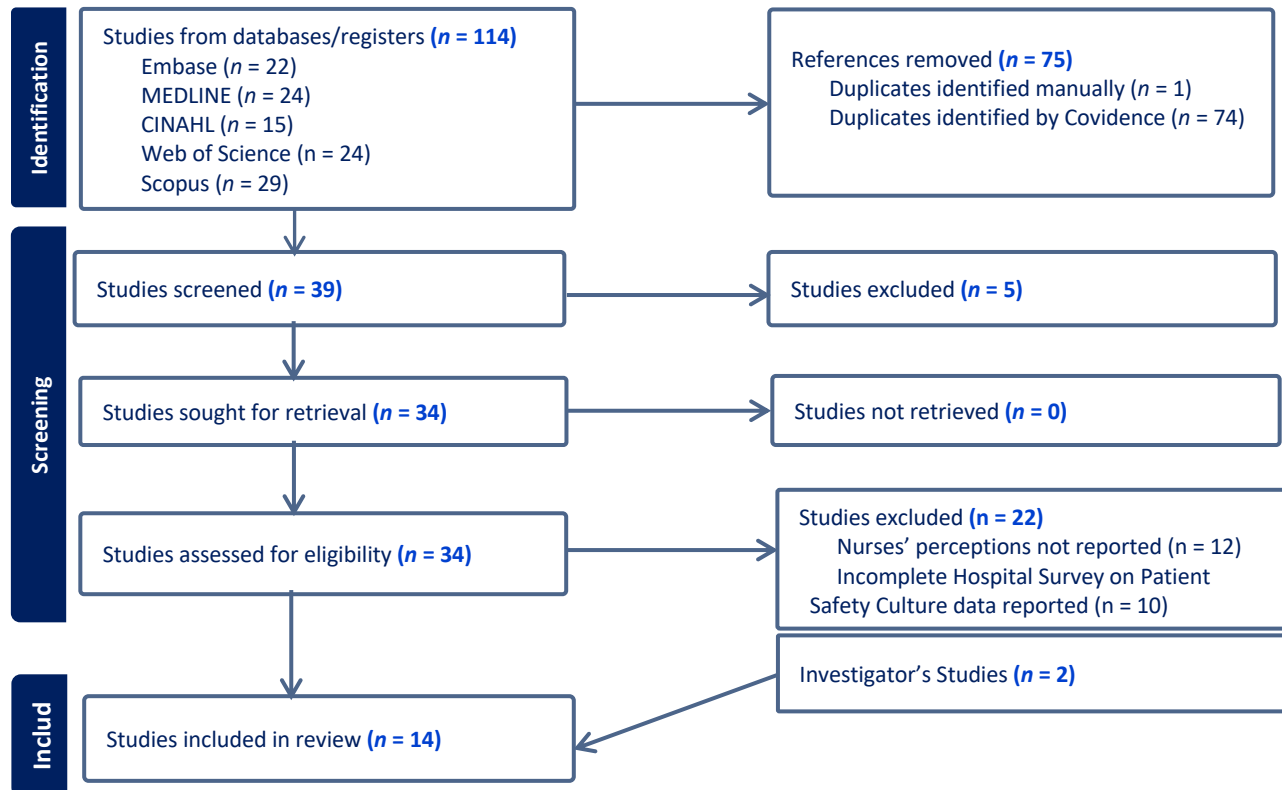
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remove duplicates, and facilitate study selection, ensuring a transparent and reproducible process

(Figure 1).

Figure 1

Eligibility Flowchart of Patient Safety Culture in the Gulf Cooperation Council region



Note. Flowchart adapted from the PRISMA guidelines, based on study selection data generated in Covidence systematic review software (PRISMA, 2021; Veritas Health Innovation, n.d.)

Quality Assessment

The quality of the included studies was independently evaluated by two reviewers (MA and JCP) using the eight criteria of the Joanna Briggs Institute (JBI) Checklist for Analytical Cross-Sectional Studies (2020). To ensure alignment with the study objectives, selected criteria were adapted following careful consideration, including assessment of the validity and reliability of patient safety culture measures, use of standardized criteria, and clarity of the HSOPSC (Supplementary Table 3). The checklist also assessed whether study findings were accurately reported and reflected the collected data, thereby ensuring both relevance and methodological

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rigour. Quality assessment results are presented in Table 1. Although studies scoring below 50% (fewer than 4 out of 8 criteria) were intended to be excluded, all included studies exceeded the threshold, with none scoring below five. Any disagreements during the quality appraisal process were resolved through discussion between two reviewers (MA and JCP) until consensus was reached, ensuring reliability and objectivity. Both quality assessment and data extraction were conducted using Covidence.

Table 1

Quality Evaluation of Studies: Total Scores (Max = 8)

Study author (Year)	Total Score (out of 8)
Aboshaiqah (2010)	8
Al-Awa (2012)	6
AL-Dossary (2023)	7
Ammouri (2015)	5
Alquwez (2023)	7
Alquwez (2018)	7
AlMa'mari (2019)	6
SalehAboufour (2022)	8
Innab (2026)	6
Alshammari, Beogo et al., (Chapter 4)	8
Alshammari, Tyerman et al., (Chapter 5)	8
Rawas (2023)	8
Wazqar (2024)	7
AlMuharraq (2024)	8

Source: Adapted from the Joanna Briggs Institute (2020).

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Data Extraction

Following quality appraisal, data were independently extracted from the fourteen eligible studies by two reviewers (MA and JCP). Extracted information included author and publication year, country of study, participant characteristics, sample size, and patient safety culture composite scores. Any discrepancies between reviewers were resolved through discussion; if consensus could not be reached, two additional reviewers (JT and IB) were available for consultation. All disagreements were resolved by the primary reviewers without the need for further consultation.

Statistical Analysis

Data extracted from eligible studies were organized using a Microsoft Excel spreadsheet and subsequently analyzed using R software (R Foundation for Statistical Computing, Vienna, Austria). A meta-analysis of proportions was conducted to estimate pooled positive response rates for each HSOPSC composite. A random-effects model was applied to account for variability across studies. Pooled estimates and corresponding 95% confidence intervals (CIs) were calculated for each composite. Statistical heterogeneity was assessed using the I^2 statistic, with higher values indicating greater variability between studies. Separate analyses were conducted for HSOPSC 1.0 and 2.0 due to differences in composite structures. The results are presented as pooled positive response percentages with 95% CIs and illustrated using forest plots.

Results

Characteristics of Samples Studied

This review and meta-analysis synthesizes studies examining nurses' perceptions of patient safety culture across GCC countries, incorporating both previously identified studies and newly included investigations (Supplementary Table 4). The included studies identified through a literature search covering 2004 to 2024 and were predominantly conducted in Saudi Arabia ($n = 12$) and Oman ($n = 2$). Across studies, sample sizes varied considerably, reflecting both single-site and multi-site hospital-based investigations.

A prominent feature across the included studies was the multinational composition of the nursing workforce, with a substantial proportion of expatriate nurses. Several studies reported a predominance of non-national or non-Arabic-speaking nurses, particularly from the Philippines and India. For example, Aboshaiqah (2010) reported that 87% of participants were non-Arabic speakers, while Al-Awa et al. (2012) identified a diversity in the nurses' workforce composed of Indian (44.5%), Filipino (41.0%), and other cultural groups. Similarly, Alquwez et al. (2018) and Alquwez (2023) reported high proportions of Filipino (43.3% and 24.5%, respectively) and Indian nurses (38.7% and 41.4%, respectively). Studies conducted in Oman also reflected this pattern, with AlMa'mari et al. (2019) reporting 81.5% non-Omani nurses. More recent studies demonstrated variability in national composition; Rawas and Abou Hashish (2023) reported 81% non-Saudi nurses, whereas AlMuharraq et al. (2024) reported a predominantly Saudi sample (86.8%). The study by Innaib (2026) similarly reported a majority Saudi sample (75.2%), while Alshammari, Beogo et al. (Chapter 4) and Alshammari, Tyerman et al. (Chapter 5) continued to reflect a multinational workforce, with Saudi (50.4%), Filipino (31.24%) and Indian (24.18%) nurses comprising substantial proportions of the samples studied.

Gender distribution was consistently skewed toward female nurses across all studies. Female representation ranged from 60.4% (Wazqar & Attallah, 2024) to over 90% in several studies, including Alquwez et al. (2018) (91.5%) and Ammouri et al. (2015) (89.6%). Similarly, Aboshaiqah (2010) reported 87.4% female participants, and AlMa'mari et al. (2019) reported 85.9%. Although most studies reflected this predominance, some variation was observed, with Wazqar and Attallah (2024) reporting a relatively higher proportion of male nurses (39.6%) compared to other studies. Recent studies, including Innaib (2026) and AlMuharraq et al. (2024), continued to demonstrate a predominantly female workforce.

The mean age of nurses across studies was relatively consistent, generally falling within early to mid-adulthood. Reported mean ages ranged from 28.63 years (Alquwez et al., 2018) to approximately 35 years (Aboshaiqah, 2010; Ammouri et al., 2015). Several studies reported mean ages in the early 30s, including AlMa'mari et al. (2019) (33.06 years), Rawas and Abou Hashish (2023) (approximately 32.5 years), Wazqar and Attallah (2024) (31 years), and AlMuharraq et al. (2024) (30.8 years). Innaib (2026) reported a slightly higher mean age (35.37 years), while Alshammari, Beogo et al. (Chapter 4) and Alshammari, Tyerman et al. (Chapter 5) reported a broad age distribution, with the most participants between 25 and 44 years old.

In terms of clinical roles and unit distribution, most participants were staff nurses, reflecting the frontline nature of patient safety culture assessment. For example, Aboshaiqah (2010) reported that 83.8% of participants were staff nurses, while Al-Dossary (2023) reported 78% staff nurses. Similarly, Alquwez (2023) reported 85.4% staff nurses. Participants were drawn from a variety of clinical settings, including medical, surgical, intensive care, paediatric, obstetric, and emergency units. AlMa'mari et al. (2019) and Alquwez et al. (2018) observed broad representation across multiple departments, while Wazqar and Attallah (2024) and Rawas

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and Abou Hashish (2023) included nurses from specialized areas such as oncology and critical care. The studies by Alshammari, Beogo et al. (Chapter 4) and Alshammari, Tyerman et al. (Chapter 5) similarly included nurses from diverse units, including intensive care, emergency, medical wards, and obstetrics and gynecology.

Length of professional experience varied across studies, reflecting heterogeneous samples in terms of clinical seniority. Aboshaiqah (2010) and Al-Dossary (2023) reported distributions across multiple experience categories, with most nurses having between 3 and 15 years of experience. Ammouri et al. (2015), Rawas and Abou Hashish (2023), and Innaib (2026) indicated relatively experienced samples, exceeding 10 years of experience. In contrast, Alquwez et al. (2018) reported a predominantly early-career workforce, with most nurses having 1-5 years of experience. Wazqar and Attallah (2024) found that the majority had 6–10 years of experience, while AlMuharraq et al. (2024) reported that most nurses had less than 10 years of experience. Alshammari, Beogo et al. (Chapter 4) and Alshammari, Tyerman et al. (Chapter 5) showed a broader distribution, with nurses represented across both mid- and higher-experience categories. Overall, these findings indicate variability in experience levels across studies.

Regarding educational qualifications, most nurses across studies held a baccalaureate degree. For instance, Aboshaiqah (2010) reported 85.4% baccalaureate -prepared nurses, while Alquwez et al. (2018) and Rawas and Abou Hashish (2023) reported 88.9% and 90.8%, respectively. However, diploma-level education remained notable in several studies, particularly in Oman and some Saudi Arabian settings. Ammouri et al. (2015) reported 65.4% diploma holders, while AlMa'mari et al. (2019) reported 33.3%. More recent studies, including Wazqar and Attallah (2024), continued to show a predominance of baccalaureate-level education (84.2%), with smaller proportions holding master's or doctoral degrees. Similarly, Alshammari,

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Beogo et al. (Chapter 4) and Alshammari, Tyerman et al. (Chapter 5) reported 71.3% baccalaureate -prepared nurses, with 17.8% holding diplomas and 10.9% holding postgraduate degrees.

Finally, working hour patterns varied across studies but generally reflected demanding workloads. Although a proportion of nurses reported working fewer than 40 hours per week (89.7% in Alquwez et al., 2023; 63.3% in (Al-Dossary, 2023)), several studies indicated that most nurses worked between 40 and 59 hours or more per week. For example, Alquwez et al. (2018) reported that 82.1% of nurses worked 40–59 hours weekly. Similarly, Rawas and Abou Hashish (2023) found that most participants worked more than 40 hours per week, while Wazqar and Attallah (2024) reported extended working hours among most nurses. Alshammari, Beogo et al. (Chapter 4) and Alshammari, Tyerman et al. (Chapter 5) also reported that 78.3% of nurses worked more than 40 hours weekly, further highlighting the workload intensity across GCC healthcare settings.

Patient safety culture composite scores from included studies

Two versions of the Hospital Survey on Patient Safety Culture, HSOPSC 1.0 and 2.0, were used to evaluate nurses' perceptions of patient safety culture across the included studies. The findings are presented separately for each version to maintain methodological consistency. Results are reported as pooled positive response percentages with 95% confidence intervals and illustrated using forest plots (HSOPSC 1.0, Figure 2; HSOPSC 2.0, Figure 3).

HSOPSC 1.0

The meta-analysis of studies using the HSOPSC 1.0 included 11 studies, with sample sizes ranging from 101 to 605, and a total of 3,454 nurses across the GCC region (Table 2). The

pooled composite scores demonstrated considerable variability across dimensions, with consistently high levels of heterogeneity (I^2 ranging from 90.7% to 98.5%).

Teamwork Within Units emerged as one of the highest-rated composites, with a pooled positive response of 75.0% (95% CI: 64.6–84.1), indicating generally favourable perceptions of collaboration within clinical units. Similarly, Organizational Learning–Continuous Improvement demonstrated the highest pooled score of 76.8% (95% CI: 68.4–84.4), reflecting strong perceptions of ongoing improvement efforts within healthcare settings.

Moderate scores were observed across several composites. Feedback and Communication About Error was moderately rated at 65.6% (95% CI: 58.0–72.9), indicating relatively positive perceptions of communication surrounding errors. Supervisor/Manager Expectations and Actions Promoting Patient Safety yielded a pooled score of 57% (95% CI: 51.4–62.5), while Patient Safety showed a comparable pooled estimate of 58.6% (95% CI: 44.9–71.5), suggesting variability in leadership engagement across institutions. Similarly, Frequency of Events Reported had a pooled score of 59.1% (95% CI: 50.2–67.8), and Teamwork Across Units scored 57% (95% CI: 49.9–64.0), reflecting moderate levels of cross-unit collaboration and reporting practices. Overall Perceptions of Patient Safety yielded a pooled score of 57.4% (95% CI: 50.0–64.6).

In contrast, several composites were consistently rated lower. Communication Openness had a pooled score of 44.6% (95% CI: 36.8–52.6), indicating ongoing challenges in fostering open communication. Staffing was also rated poorly, with a pooled estimate of 39.1% (95% CI: 26.5–52.5), highlighting concerns related to workforce adequacy and workload. Handoffs & Transitions demonstrated similarly low scores at 42.7% (95% CI: 32.3–53.4), suggesting persistent issues in care continuity. The lowest-rated composite was Nonpunitive Response to

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Error, with a pooled score of 32.2% (95% CI: 23.0–42.2), indicating that nurses may perceive a prevailing culture of blame or fear of repercussions when reporting errors.

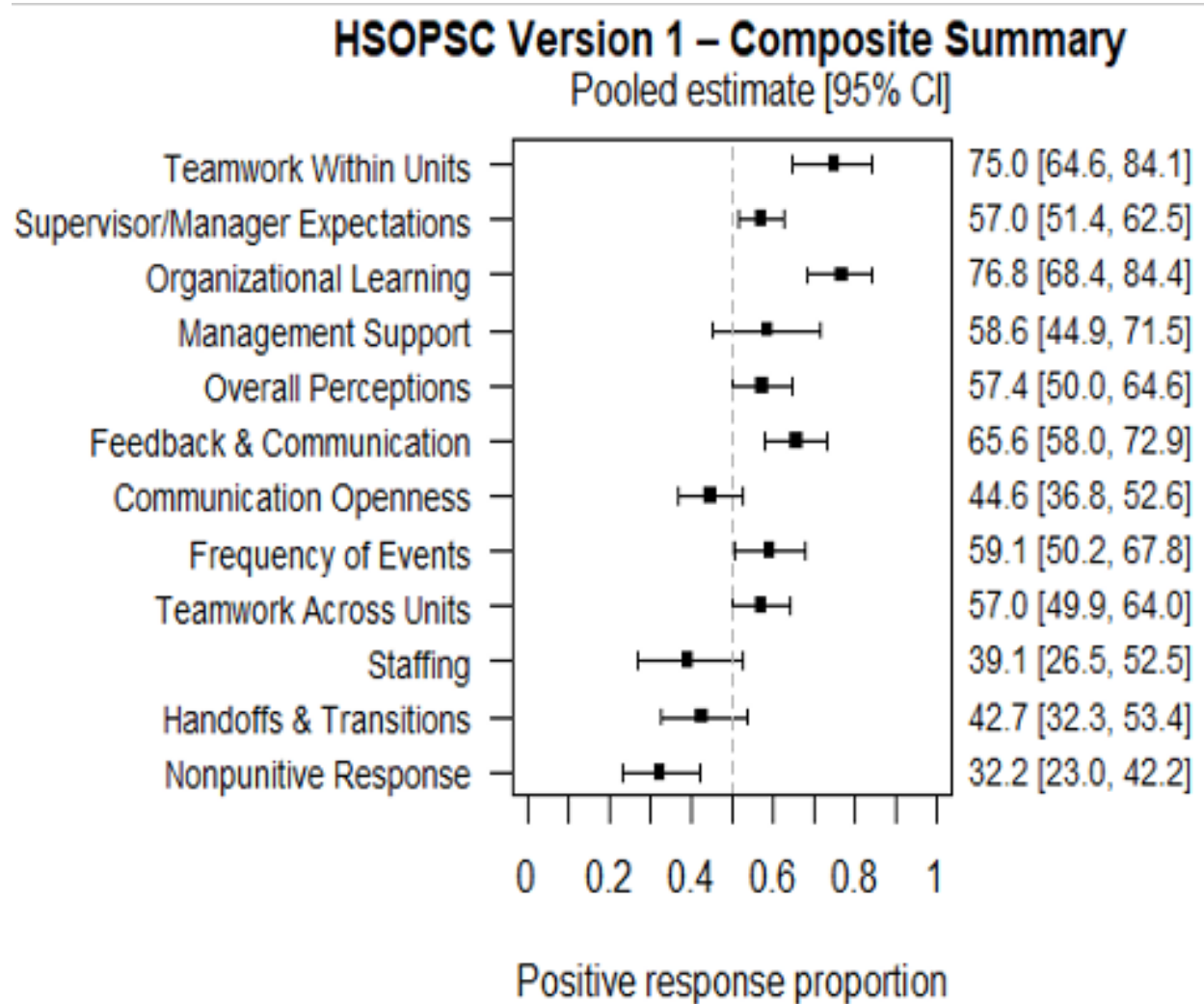
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Table 2*Pooled Positive Response Scores for HSOPSC 1.0 (N = 3454)*

Composite	Positive Response (%) [95% CI]	I^2 (%)
Teamwork Within Units	75.0 (64.6–84.1)	97.7
Supervisor /Manager Expectations & Actions Promoting Patient Safety	57.0 (51.4–62.5)	90.7
Organizational Learning-Continuous Improvement	76.8 (68.4–84.4)	96.8
Management Support for Patient Safety	58.6 (44.9–71.5)	98.5
Feedback & Communication About Error	65.6 (58.0–72.9)	95.3
Communication Openness	44.6 (36.8–52.6)	95.5
Frequency of Events Reported	59.1 (50.2–67.8)	96.4
Teamwork Across Units	57.0 (49.9–64.0)	94.3
Staffing	39.1 (26.5–52.5)	98.4
Handoffs & Transitions	42.7 (32.3–53.4)	97.5
Nonpunitive Response to Error	32.2 (23.0–42.2)	97.3
Overall Perceptions of Patient Safety	57.4 (50.0–64.6)	94.7
Note. CI = confidence interval; I^2 = heterogeneity statistic. Positive response scores represent pooled proportions of positive responses across included studies.		

Figure 2

HSOPSC 1.0 Forest Plot of Pooled Positive Response Scores Across Composites



Forest plot illustrating pooled positive response percentages with 95% confidence intervals for each HSOPSC 1.0 composite across included studies. Estimates are derived using a random-effects meta-analysis model.

HSOPSC 2.0

The meta-analysis of studies of the HSOPSC 2.0 included 3 studies, with sample sizes ranging from 117 to 402, and a total of 648 nurses across the GCC region (Table 3). Compared with Version 1, heterogeneity levels varied across composites, with I^2 values ranging from 0.0% to 90.1%.

Teamwork remained one of the highest-rated composites, with a pooled positive response of 70.0% (95% CI: 57.6–81.1), indicating favourable perceptions of collaboration among healthcare staff. Communication About Error also demonstrated a relatively high score of 69% (95% CI: 59.9–77.4), suggesting improved practices in discussing and addressing errors.

Moderate scores were observed across several composites. Organizational Learning–Continuous Improvement yielded a pooled score of 63.5% (95% CI: 50.0–76.0), while Supervisor, Manager, or Clinical Leader Support for Patient Safety scored 55.4% (95% CI: 46.9–63.7). Hospital Management Support for Patient Safety demonstrated a similar pooled estimate of 56.4% (95% CI: 48.7–64.0), indicating moderate perceptions of leadership engagement. Reporting Patient Safety Events was rated at 53.3% (95% CI: 45.3–61.2), while Communication Openness scored 51% (95% CI: 43.0–59.0). Handoffs and Information Exchange yielded a pooled score of 50.1% (95% CI: 37.1–63.0), reflecting moderate perceptions of care transitions.

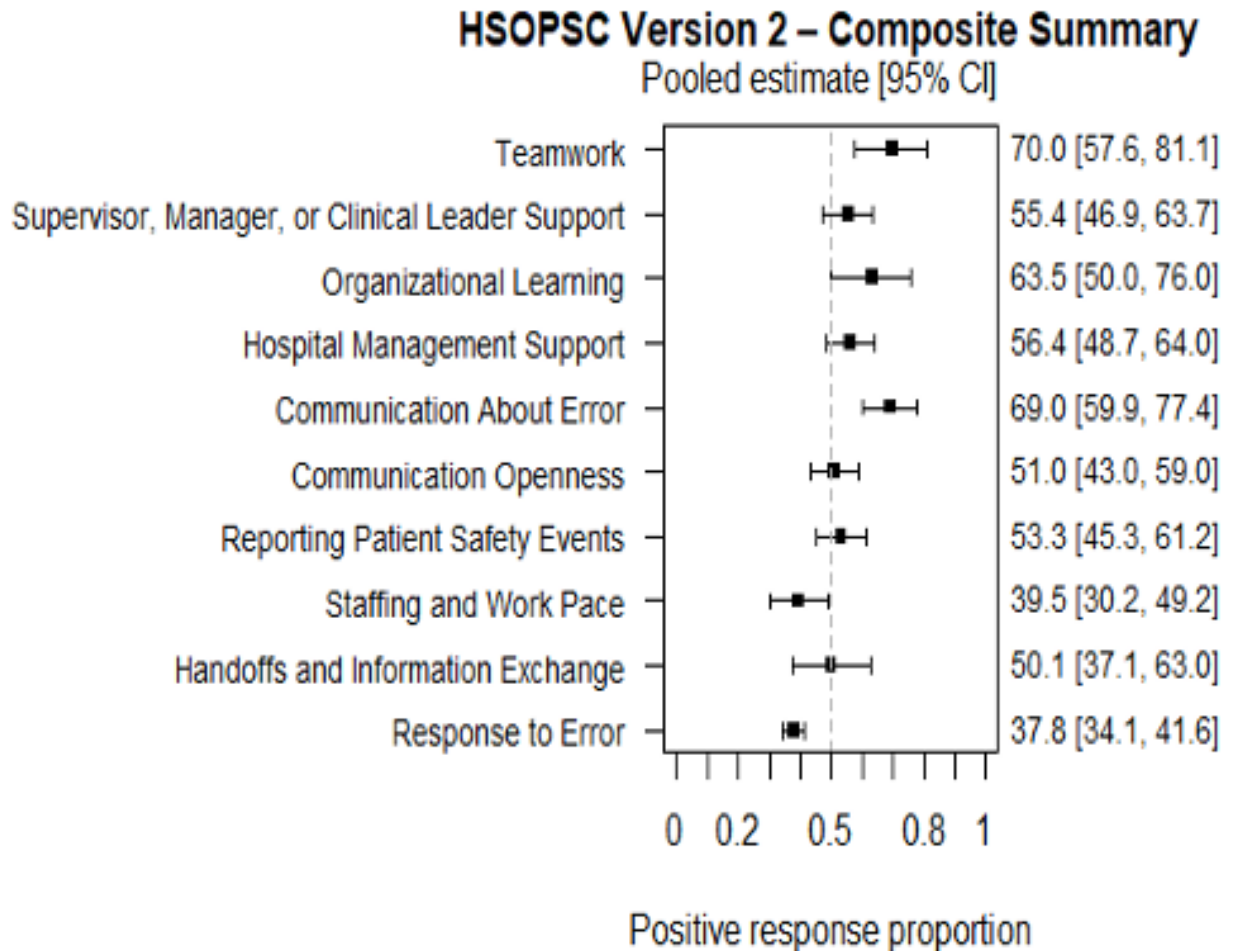
Lower scores were observed for Staffing and Work Pace, which had a pooled estimate of 39.5% (95% CI: 30.2–49.2), indicating continued concerns regarding workload and staffing adequacy. Response to Error was also among the lowest-rated composites, with a pooled score of 37.8% (95% CI: 34.1–41.6), with no observed heterogeneity across studies ($I^2 = 0.0\%$).

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Table 3*Pooled Positive Response Scores for HSOPSC 2.0 (N = 648)*

Composite	Positive Response (%) [95% CI]	I^2 (%)
Teamwork	70.0 (57.6–81.1)	88.9
Staffing and Work Pace	39.5 (30.2–49.2)	80.6
Organizational Learning-Continuous Improvement	63.5 (50.0–76.0)	90.1
Response to Error	37.8 (34.1–41.6)	0.0
Supervisor, Manager, or Clinical Leader Support for Patient Safety	55.4 (46.9–63.7)	74.2
Communication About Error	69.0 (59.9–77.4)	79.6
Communication Openness	51.0 (43.0–59.0)	71.3
Reporting Patient Safety Events	53.3 (45.3–61.2)	71.0
Hospital Management Support for Patient Safety	56.4 (48.7–64.0)	69.3
Handoffs and Information Exchange	50.1 (37.1–63.0)	89.1
Note. CI = confidence interval; I^2 = heterogeneity statistic. Positive response scores represent pooled proportions of positive responses across included studies.		

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Figure 3*HSOPSC 2.0 Forest Plot of Pooled Positive Response Scores Across Composites*

Forest plot illustrating pooled positive response percentages with 95% confidence intervals for each HSOPSC 2.0 composite across included studies. Estimates are derived using a random-effects meta-analysis model.

Discussion

This meta-analysis provides an updated synthesis of nurses' perceptions of patient safety culture in GCC countries (Alshammari et al., 2026). The included studies collectively reflect a workforce that is predominantly female, multinational, and largely composed of staff nurses working in demanding clinical environments. Nurses were primarily within the early to mid-career range, with varying levels of experience and a predominance of bacalaureate-level education. A notable feature of the GCC healthcare workforce is its heavy reliance on expatriate nurses, particularly from the Philippines and India, which has been consistently reported in GCC regional studies (Alshammari et al., 2026).

This multinational composition of participants may contribute positively to teamwork and adaptability, as diverse professional backgrounds can foster collaborative problem-solving and shared learning practices. This could partly explain the relatively high scores observed in teamwork and organizational learning. However, cultural diversity may also introduce communication challenges, particularly in hierarchical environments where language barriers and differences in professional norms may limit open communication and error reporting (Alshammari et al., 2026; Canadian Institute for Health Information, 2024).

Workload characteristics further contextualize the findings. Many studies reported extended working hours (> 40 hours per week) and high patient loads, which are known to negatively affect patient safety outcomes. High workload has been associated with reduced reporting of incidents, increased fatigue, and diminished engagement in safety practices (Li et al., 2025a; Rawas & Abou Hashish, 2023). Therefore, the sociodemographic profile of the

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workforce provides a critical lens through which both strengths and weaknesses in patient safety culture can be understood.

HSOPSC 1.0

The meta-analysis identified organizational learning, continuous improvement, and teamwork within units as the highest-performing composites. These findings are consistent with international studies. For example, high teamwork scores were similarly reported in Nigeria (Kaware et al., 2022), Vietnam (Ha et al., 2023), Portugal (Oliveira et al., 2024), and Sweden (Granel-Giménez et al., 2022), indicating that intra-unit collaboration is a consistently strong component of patient safety culture across diverse settings.

Although organizational learning–continuous improvement demonstrated relatively high scores, its performance varied when compared with international studies. While it aligned with findings from Laos (Sodeno et al., 2025), Vietnam (Ha et al., 2023), and Nigeria (Kaware et al., 2022), it exceeded scores reported in Spain (Sosa-Palanca et al., 2022), Iran (Sadeghi et al., 2025), Turkey (Yavuz et al., 2023), Portugal (Oliveira et al., 2024), and Sweden (Granel-Giménez et al., 2022).

The strong performance of teamwork within units in the GCC context may be attributed to the collaborative nature of nursing practice and the necessity of close coordination in high-acuity environments (Kalisch et al., 2009; Manser, 2009). Similarly, the high score for organizational learning–continuous improvement may reflect the increasing emphasis on quality improvement initiatives and accreditation standards within the region, which promote continuous evaluation and system-level improvements (Alshammari et al., 2026; Alquwez et al., 2023).

Several composites, including management support for patient safety, supervisor/manager expectations and actions promoting patient safety, feedback and

communication about error, frequency of events reported, teamwork across units, and overall perceptions of patient safety, were rated at moderate levels (Westat et al., 2014). These findings suggest partial implementation of patient safety culture practices across GCC healthcare settings.

Perceptions of management support for patient safety were comparable to those reported in Iran (Sadeghi et al., 2025) and higher than those observed in Portugal (Oliveira et al., 2024), Turkey (Yavuz et al., 2023), Spain (Sosa-Palanca et al., 2022), Laos (Sodeno et al., 2025), and Sweden, and Croatia (Granel-Giménez et al., 2022), but remained lower than those reported in Jordan (Oweidat et al., 2024), Vietnam (Ha et al., 2023), and Nigeria (Kaware et al., 2022).

Similarly, supervisor/manager expectations and actions promoting patient safety demonstrated moderate scores, aligning with findings from Iran (Sadeghi et al., 2025), Laos (Sodeno et al., 2025), Jordan (Oweidat et al., 2024), and Sweden and Croatia (Granel-Giménez et al., 2022). This perception may reflect the need to strengthen supervisory and managerial safety initiatives at the frontline level, where leadership plays a critical role in reinforcing patient safety practices. Previous studies in GCC settings have also highlighted gaps in perceived management support across some hospitals (Alaska & Alkutbe, 2023).

The composite feedback and communication about error also fell within the moderate range, consistent with findings from Turkey (Yavuz et al., 2023), Iran (Sadeghi et al., 2025), and Sweden (Granel-Giménez et al., 2022), and higher than those reported in Spain (Sosa-Palanca et al., 2022), Laos (Sodeno et al., 2025), Croatia (Granel-Giménez et al., 2022), and Portugal (Oliveira et al., 2024), but lower than Nigeria (Kaware et al., 2022), Jordan (Oweidat et al., 2024), and Vietnam (Ha et al., 2023). This suggests that mechanisms for discussing and learning from errors are present but may not be fully optimized in the GCC region and may be influenced

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by limited structured feedback processes and an underlying culture of blame (Abdurabuh et al., 2024; Kaud et al., 2022).

Similarly, frequency of events reported demonstrated moderate performance, aligning with results from Vietnam (Ha et al., 2023), Iran (Sadeghi et al., 2025), and Jordan (Oweidat et al., 2024), and exceeding those reported in Turkey (Yavuz et al., 2023), Laos (Sodeno et al., 2025), Portugal (Oliveira et al., 2024), Nigeria (Kaware et al., 2022), Spain (Sosa-Palanca et al., 2022), and Sweden and Croatia (Granel-Giménez et al., 2022). This pattern may reflect a broader issue of underreporting of incidents globally despite the availability of reporting systems, potentially reflecting concerns about blame and limited trust in reporting mechanisms.

The moderate score for teamwork across units highlights challenges in interdepartmental coordination, despite strong intra-unit teamwork. Similar findings have been reported in Spain (Sosa-Palanca et al., 2022), Turkey (Yavuz et al., 2023), Portugal (Oliveira et al., 2024), and Sweden and Croatia (Granel-Giménez et al., 2022). This pattern is not unique to the GCC region, as comparable discrepancies between intra-unit and inter-unit teamwork have been observed internationally. This may be attributed to the inherent complexity of inter-unit coordination compared with intra-unit collaboration, where teamwork within units typically involves established teams with shared responsibilities, whereas coordination across units is more complex and prone to communication gaps and workflow fragmentation.

Finally, overall perceptions of patient safety were moderate, reflecting a cautious level of confidence in the safety of care delivery. Similar patterns were observed in Iran (Sadeghi et al., 2025), Turkey (Yavuz et al., 2023), Nigeria (Kaware et al., 2022), Jordan (Oweidat et al., 2024), and Vietnam (Ha et al., 2023). These findings suggest that although safety practices are present, nurses' confidence in the overall patient safety in GCC healthcare settings remains limited.

The lowest-performing composites were nonpunitive response to error, staffing, handoffs & transitions, and communication openness, indicating critical and persistent challenges within GCC healthcare systems.

The low score for nonpunitive response to error reflects a culture in which mistakes may be associated with blame rather than viewed as opportunities for organization or system-level learning. This finding is consistent across international studies, including Portugal (Oliveira et al., 2024), Spain (Sosa-Palanca et al., 2022), Croatia (Granel-Giménez et al., 2022), Laos (Sodeno et al., 2025), Nigeria (Kaware et al., 2022), and Turkey (Yavuz et al., 2023). The consistency of this pattern suggests that blame-oriented cultures remain a widespread issue. In the GCC context, this may be further influenced by the multinational composition of the nursing workforce and concerns about professional consequences, which may discourage error reporting (Al Harmali et al., 2024; Alshammari et al., 2026).

Staffing also demonstrated low performance, consistent with findings from Laos (Sodeno et al., 2025), Turkey (Yavuz et al., 2023), Portugal (Oliveira et al., 2024), Nigeria (Kaware et al., 2022), Spain (Sosa-Palanca et al., 2022), and Sweden and Croatia (Granel-Giménez et al., 2022). These results can be linked to the workload conditions identified in the included studies, where nurses frequently reported extended working hours and high patient loads. Such conditions may contribute to fatigue, reduced attention, and limited engagement in safety practices, ultimately compromising patient safety (Dall'Ora et al., 2023; Li et al., 2024).

Similarly, handoffs & transitions were rated poorly, indicating ongoing communication gaps during patient transfers. Comparable findings were reported in Spain (Sosa-Palanca et al., 2022), Portugal (Oliveira et al., 2024), and Laos (Sodeno et al., 2025), but lower than those observed in Iran (Sadeghi et al., 2025), Vietnam (Ha et al., 2023), Jordan (Oweidat et al., 2024),

Turkey (Yavuz et al., 2023), Nigeria (Kaware et al., 2022), and Sweden and Croatia (Granel-Giménez et al., 2022). These findings suggest that breakdowns in communication at care interfaces represent a critical challenge within GCC healthcare institutions. This may be attributed to the lack of standardized handoff procedures and time constraints (Alshammari et al., 2026; Saporito & Mrad Georgis, 2026). Additionally, the complexity of coordination among a multicultural and multinational workforce may further complicate effective communication, requiring structured and standardized handoff processes in GCC healthcare settings.

Importantly, communication openness also demonstrated low scores, indicating that nurses may feel hesitant to speak up about patient safety concerns. This finding aligns with studies from Portugal (Oliveira et al., 2024), Turkey (Yavuz et al., 2023), and Spain (Sosa-Palanca et al., 2022), where similar limitations in open communication were observed. Such conditions may discourage open dialogue and reporting of safety issues, highlighting the need for targeted interventions to strengthen communication practices, particularly in multilingual and multicultural healthcare environments such as those in the GCC (Alshammari et al., 2026).

HSOPSC 2.0

The meta-analysis did not identify any composites reaching high performance levels ($\geq 75\%$), indicating that none of the patient safety culture composites in HSOPSC 2.0 achieved optimal performance across GCC healthcare settings (Westat et al., 2014). Instead, most composites fell within the moderate range, suggesting partial implementation of patient safety culture practices.

The highest-performing composites, although still within the moderate range, were teamwork, communication about error, and organizational learning–continuous improvement. These findings are consistent with findings reported in other international studies. For example,

relatively higher teamwork scores were reported in Brazil (Reis et al., 2023), Kazakhstan (Aimoldina et al., 2025), China (Wu et al., 2022), and the United States (Tyler et al., 2024), indicating that teamwork remains a comparatively strong component of patient safety culture across diverse healthcare systems.

Similarly, organizational learning—continuous improvement demonstrated moderate performance, aligning with findings from India (Aileen et al., 2024), Malaysia (Imran et al., 2024), and Brazil (Reis et al., 2023), but exceeding those reported in Korea (Lee et al., 2021) and China (Wu et al., 2022). Communication about error also fell within the moderate range, consistent with findings from the United States (Tyler et al., 2024) and Brazil (Reis et al., 2023), and higher than those reported in Korea (Lee et al., 2021) and Malaysia (Imran et al., 2024).

The highest-performing composites, although still within the moderate range, were teamwork, communication about error, and organizational learning—continuous improvement. These findings are consistent with findings reported in international studies from other regions. For example, relatively higher teamwork scores were similarly reported in Brazil (Reis et al., 2023), Kazakhstan (Aimoldina et al., 2025), China (Wu et al., 2022), and the United States (Tyler et al., 2024), indicating that teamwork remains a comparatively strong component of patient safety culture across diverse healthcare systems.

Similarly, organizational learning—continuous improvement demonstrated moderate performance, aligning with findings from India (Aileen et al., 2024), Malaysia (Imran et al., 2024), and Brazil (Reis et al., 2023), but exceeding those reported in Korea (Lee et al., 2021) and China (Wu et al., 2022). Communication about error also fell within the moderate range, consistent with findings from the United States (Tyler et al., 2024) and Brazil (Reis et al., 2023), and higher than those reported in Korea (Lee et al., 2021) and Malaysia (Imran et al., 2024). This

may suggest relatively favourable practices in addressing errors within GCC healthcare settings, which could be attributed to the presence of structured continuing education programs and institutional support for staff learning and development, as many hospitals in the region maintain dedicated units that promote education and continuous improvement (Alkhazim et al., 2015; Alshammari et al., 2026).

Several composites, including supervisor/manager or clinical leader support, hospital management support, reporting patient safety events, communication openness, and handoffs and information exchange, were rated at moderate levels (Westat et al., 2014). These findings suggest that while elements of patient safety culture are present, they are not yet fully embedded in routine clinical practices.

Perceptions of supervisor/manager or clinical leader support were somewhat comparable to those reported in Malaysia (Imran et al., 2024) and Korea (Lee et al., 2021), and lower than those observed in Kazakhstan (Aimoldina et al., 2025), China (Wu et al., 2022) and Brazil (Reis et al., 2023). Similarly, hospital management support for patient safety demonstrated moderate performance, aligning with findings from Malaysia (Imran et al., 2024) and the United States (Tyler et al., 2024), but lower than those reported in Kazakhstan (Aimoldina et al., 2025) and China (Wu et al., 2022). These findings may reflect a gap between managerial commitment and frontline perception of support, which has been previously observed in GCC healthcare settings. This may suggest that structured leadership approaches, as observed in Chinese hospitals, could offer useful insights for enhancing hospital and managerial support for patient safety culture in GCC healthcare settings (Alshammari et al., 2026).

Reporting patient safety events also demonstrated moderate performance, aligning with findings from India (Aileen et al., 2024) and Kazakhstan (Aimoldina et al., 2025), but lower than

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those reported in Brazil (Reis et al., 2023) and the United States (Tyler et al., 2024), and higher than those observed in Korea (Lee et al., 2021) and Malaysia (Imran et al., 2024). This pattern may indicate persistent underreporting of incidents despite the presence of reporting systems, potentially reflecting concerns related to blame, limited perceived value of reporting, and time constraints associated with high workload.

Communication openness also fell within the moderate range, aligning with findings from India (Aileen et al., 2024), Malaysia (Imran et al., 2024), and China (Wu et al., 2022), but lower than those reported in Kazakhstan (Aimoldina et al., 2025) and the United States (Tyler et al., 2024), and higher than those observed in Korea (Lee et al., 2021). Similarly, handoffs and information exchange demonstrated moderate performance, consistent with findings from Brazil (Reis et al., 2023) and Korea (Lee et al., 2021), and higher than those reported in Malaysia (Imran et al., 2024), but lower than those observed in Kazakhstan (Aimoldina et al., 2025) and China (Wu et al., 2022). These findings highlight ongoing challenges in the processes of care transitions and the effectiveness of communication channels across healthcare settings, both of which remain recognized sources of patient safety risks. Given the reliance on a multinational and multicultural workforce in GCC healthcare settings, targeted and structured interventions such as structured handoff tools and communication training are essential to strengthen patient safety culture in the region (Alshammari et al., 2026).

The lowest-performing composites were staffing and work pace and response to error, indicating critical and persistent challenges within GCC healthcare settings. Staffing and work pace demonstrated low performance, consistent with findings from India (Aileen et al., 2024) and Malaysia (Imran et al., 2024), but lower than those reported in Kazakhstan (Aimoldina et al., 2025) and Brazil (Reis et al., 2023). Other international studies, such as those conducted in the

United States (Tyler et al., 2024) and China (Wu et al., 2022), reported scores close to the moderate threshold, whereas Korea (Lee et al., 2021) demonstrated exceptionally low scores. These findings reflect ongoing global workforce-related challenges, including high workload and staffing shortages, which may negatively affect nurses' ability to maintain safe care practices (Alshammari et al., 2026; Dall'Ora et al., 2022).

Similarly, response to error demonstrated low performance, consistent with findings from Malaysia (Imran et al., 2024), Korea (Lee et al., 2021), and China (Wu et al., 2022), but lower than those reported in Brazil (Reis et al., 2023) and Kazakhstan (Aimoldina et al., 2025). These findings suggest that nonpunitive approaches to error reporting remain insufficiently developed, and that fear of blame may continue to limit transparent reporting of incidents (Yusof & Razali, 2024). This pattern is consistent with findings from our previous systematic review, which identified response to error as a persistently weak domain within GCC healthcare settings (Alshammari et al., 2026).

Implications

This updated systematic review and meta-analysis provides a comprehensive quantitative synthesis of nurses' perceptions of patient safety culture across GCC healthcare settings using both versions of the HSOPSC. By pooling findings across studies and analyzing HSOPSC 1.0 and 2.0 separately, this study offers a more precise estimation of patient safety culture composites than individual studies alone and highlights consistent strengths and weaknesses across GCC healthcare institutions.

The findings have several important implications for policy, practice, and healthcare leadership within the GCC region. First, the consistently low scores observed for nonpunitive response to error and response to error, staffing and work pace, communication openness, and

handoffs & transitions/information exchange indicate persistent structural and organizational vulnerabilities requiring urgent attention. These composites reflect critical dimensions of patient safety culture associated with safe staffing, communication, and learning from errors.

Second, the findings highlight the importance of strengthening leadership engagement and organizational support for patient safety. Although moderate scores were observed for hospital management support and supervisor or manager support, the results suggest that leadership commitment may not yet be fully translated into frontline practice. GCC healthcare organizations may benefit from structured leadership development initiatives that emphasize supportive supervision, psychological safety, and learning-oriented approaches to incident management.

Third, the multinational and multicultural composition of the GCC nursing workforce has important implications for communication and teamwork practices. While teamwork within units emerged as a relative strength, lower scores for communication openness and handoffs suggest that communication barriers may still exist across multidisciplinary and multicultural clinical environments. Previous regional evidence has identified language diversity, cultural differences, and hierarchical communication structures as potential contributors to patient safety challenges within GCC healthcare settings (Al-Yateem et al., 2022; Alshammari et al., 2026). Accordingly, targeted and structured interventions, including standardized handoff tools, communication training, simulation-based teamwork programs, and multicultural support systems, may improve communication effectiveness and patient safety practices.

Fourth, the findings emphasize the need to strengthen nonpunitive and learning-oriented safety cultures within GCC healthcare institutions. Fear of blame and concerns regarding professional consequences may discourage transparent reporting of incidents and limit

opportunities for organizational learning. Therefore, healthcare leaders should prioritize confidential reporting systems, constructive feedback mechanisms, and organizational policies that encourage individual- and system-level learning from errors rather than punishment.

The findings of this meta-analysis are also relevant to ongoing healthcare transformation agendas across GCC countries. Improving patient safety culture aligns closely with national healthcare visions, including Bahrain Vision 2030 (Ministry of Health, 2025), Kuwait Vision 2035 (Ministry of Foreign Affairs, 2025), Oman Vision 2040 (Ministry of Health, 2025), Saudi Vision 2030 (Vision 2030, 2025), Qatar Vision 2030 (Ashghal, 2025), and the UAE Vision 2031 (We the UAE 2031), all of which emphasize healthcare quality, patient-centred care, workforce development, and system modernization (Alshammari et al., 2026). Routine assessment of patient safety culture using standardized tools such as HSOPSC may support monitoring of healthcare transformation initiatives and guide targeted quality improvement strategies across the GCC region and internationally.

Finally, future research should extend beyond cross-sectional assessments to examine longitudinal changes in patient safety culture following organizational and national patient safety initiatives. Additional studies are needed across underrepresented GCC countries, particularly Bahrain, Kuwait, Qatar, and the United Arab Emirates. Future investigations should also explore the influence of nationality, language, professional hierarchy, and multicultural workforce dynamics on patient safety culture perceptions within GCC healthcare systems.

Limitations

Several limitations should be considered when interpreting the findings of this meta-analysis. First, although this study represents an updated synthesis of available evidence, the number of eligible studies remained limited, particularly for HSOPSC 2.0, which included only

three studies. This limitation may affect the stability and generalizability of pooled estimates for some composites.

Second, all included studies employed quantitative self-reported survey measures, which may be subject to response bias and social desirability bias. Nurses' perceptions of patient safety culture may therefore not fully reflect actual organizational practices or patient safety outcomes.

Third, substantial heterogeneity was observed across most pooled analyses, particularly for HSOPSC 1.0 composites. Although a random-effects model was used to account for variability between studies, the high heterogeneity suggests differences in organizational contexts, hospital settings, workforce composition, and study methodologies across included studies.

Fourth, the included evidence was geographically concentrated, with most studies conducted in Saudi Arabia and only limited representation from Oman. No eligible studies were identified from Bahrain, Kuwait, Qatar, or the United Arab Emirates during the review period. Furthermore, although a comprehensive search strategy was employed across multiple databases, relevant studies indexed elsewhere, unpublished studies, or grey literature may not have been identified. Therefore, the findings may not fully represent patient safety culture across all GCC healthcare systems.

Fifth, the multinational composition of the nursing workforce was a consistent characteristic across included studies; however, most primary studies did not stratify HSOPSC findings according to nationality, language background, or country of training. As a result, the influence of multicultural workforce dynamics on patient safety culture perceptions could not be fully examined.

Sixth, this meta-analysis included studies using both HSOPSC 1.0 and HSOPSC 2.0. Although findings were analyzed separately to maintain methodological consistency, differences in composite structure and terminology between the two instrument versions limit direct comparability across versions.

Finally, all included studies, including the two studies conducted by the research team, were assessed using the same JBI quality appraisal criteria. Because the primary investigator was also an author of these two studies and participated in the quality assessment, the potential for reviewer bias is acknowledged as a limitation.

Conclusion

This updated systematic review and meta-analysis provides comprehensive evidence regarding nurses' perceptions of patient safety culture across GCC healthcare settings using both HSOPSC 1.0 and HSOPSC 2.0. The findings demonstrate that patient safety culture within the GCC region remains characterized by both strengths and persistent organizational challenges.

Across both HSOPSC versions, teamwork and organizational learning–continuous improvement emerged as relatively stronger composites, suggesting the presence of collaborative practices and ongoing quality improvement efforts within GCC healthcare institutions. However, several composites consistently demonstrated weaker performance, particularly nonpunitive response to error/response to error, staffing and work pace, communication openness, and handoffs & transitions/information exchange. These findings indicate continuing challenges related to workload pressures, communication practices, incident reporting culture, and care coordination processes.

The results further highlight the importance of strengthening leadership engagement, promoting psychologically safe reporting environments, and implementing structured communication and handoff strategies within multicultural healthcare settings. Given the multinational composition of the GCC nursing workforce, culturally responsive and communication-focused interventions may play a critical role in improving patient safety culture across the GCC region.

Importantly, the findings support ongoing GCC healthcare transformation agendas aimed at improving healthcare quality and patient-centered care. Strengthening patient safety culture should remain a strategic priority for healthcare organizations and policymakers, particularly through initiatives targeting staffing adequacy, learning-oriented safety cultures, communication effectiveness, and leadership support for patient safety.

Future research should expand representation across all GCC countries, incorporate longitudinal designs, and examine how multicultural workforce dynamics influence patient safety culture perceptions. Additionally, there is a need to explore whether regionally and culturally tailored patient safety culture instruments may provide more contextually relevant assessments within GCC healthcare systems.

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ANALYSIS STUDY

Chapter 6: Supplementary Table 1; Literature Search Strategy

Covidence – Patient Safety Culture in GCC – February 24, 2026

September 19, 2024: importation by databases

Total records: 54

Medline = 24

CINAHL = 15

Embase = 22

Web of Science = 24

Scopus = 29

Database: Ovid MEDLINE(R) ALL <1946 to February 24, 2026>

Search Strategy:

-
- 1 (Nurs* or "Health professional*" or "Health Provider*" or "Health practitioner*").mp. [mp=title, book title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms, population supplementary concept word, anatomy supplementary concept word] (967105)
 - 2 ("Patient safety" or "Patient safety culture").mp. [mp=title, book title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms, population supplementary concept word, anatomy supplementary concept word] (69767)
 - 3 (Bahrain or Kuwait or Oman or Qatar or "Saudi Arabia" or "Kingdom of Saudi Arabia" or "United Arab Emirates").mp. [mp=title, book title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms, population supplementary concept word, anatomy supplementary concept word] (62111)
 - 4 ("Hospital survey on patient safety culture" or "Hospital survey of patient safety culture" or HSOPSC).mp. [mp=title, book title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms, population supplementary concept word, anatomy supplementary concept word] (513)
 - 5 1 and 2 and 3 and 4 (24)
- *****

Database: CINAHL ALL <1946 to February 24, 2026>

ANALYSIS STUDY

Search Strategy:

 (Nurs* OR "Health professional*" OR "Health Provider*" OR "Health practitioner*") AND ("Patient safety" OR "Patient safety culture") AND (Bahrain OR Kuwait OR Oman OR Qatar OR "Saudi Arabia" OR "Kingdom of Saudi Arabia" OR "United Arab Emirates") AND ("Hospital survey on patient safety culture" OR "Hospital survey of patient safety culture" OR HSOPSC)

Database: Embase <1974 to February 24, 2026>

Search Strategy:

- 1 (Nurs* or "Health professional*" or "Health Provider*" or "Health practitioner*").mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (1143667)
 2 ("Patient safety" or "Patient safety culture").mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (212062)
 3 (Bahrain or Kuwait or Oman or Qatar or "Saudi Arabia" or "Kingdom of Saudi Arabia" or "United Arab Emirates").mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (74435)
 4 ("Hospital survey on patient safety culture" or "Hospital survey of patient safety culture" or HSOPSC).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (536)
 5 1 and 2 and 3 and 4 (22)

Database: Web of Science <until February 24, 2026>

Search Strategy:

 Search: Nurs* OR "Health professional*" OR "Health Provider*" OR "Health practitioner*" (Topic) AND "Patient safety" OR "Patient safety culture" (Topic) AND Bahrain OR Kuwait OR Oman OR Qatar OR "Saudi Arabia" OR "Kingdom of Saudi Arabia" OR "United Arab Emirates" (Topic) AND "Hospital survey on patient safety culture" OR "Hospital survey of patient safety culture" OR HSOPSC (Topic)

Date Run: Tue Feb 24 2026 14:20:37 GMT-0500 (Eastern Standard Time)

Results: 24

Database: Scopus <until February 24, 2026>

Search Strategy:

ANALYSIS STUDY

(TITLE-ABS-KEY (Nurs* OR "Health professional*" OR "Health Provider*" OR "Health practitioner*"))

AND

(TITLE-ABS-KEY ("Patient safety" OR "Patient safety culture"))

AND

(TITLE-ABS-KEY (Bahrain OR Kuwait OR Oman OR Qatar OR "Saudi Arabia" OR "Kingdom of Saudi Arabia" OR "United Arab Emirates"))

AND

(TITLE-ABS-KEY ("Hospital survey on patient safety culture" OR "Hospital survey of patient safety culture" OR HSOPSC))

Results: 29

ANALYSIS STUDY

Chapter 6: Supplementary Table 2*Eligibility Criteria*

PICO	Inclusion Criteria	Exclusion Criteria
Population	- Articles that surveyed nurses. - Articles that surveyed others, but detailed nurses' perceptions separately.	- Articles that do not survey nurses - Articles that do not detail nurses' perceptions separately.
Intervention	--	Articles that do not focus on patient safety culture.
Comparison	Studies that only have been conducted in a country or countries of the GCC region	Studies from all other countries and regions of the world will be excluded
Outcomes	- Quantitative studies that used Hospital survey on patient safety culture (HSOPSC) to survey nurses. - Mixed methods studies that used HSOPSC will be included if the HSOPSC quantitative data is reported	- Other instruments used to measure patient safety culture in quantitative studies will be excluded. - Mixed methods studies that did not use HSOPSC or the HSOPSC quantitative data is not reported will be excluded.

Schardt, C., Adams, M. B., Owens, T., Keitz, S., & Fontelo, P. (2007). Utilization of the PICO

framework to improve searching PubMed for clinical questions. *BMC Medical*

Informatics and Decision Making, 7, 16. <https://doi.org/10.1186/1472-6947-7-16>

ANALYSIS STUDY

Chapter 6: Supplementary Table 3*Quality assessment*

Question	Adjusted to
Were the criteria for inclusion in the sample clearly defined?	N/A
Were the study subjects and the setting described in detail?	N/A
Was the exposure measured in a valid and reliable way?	Was the patient safety culture assessed in a valid and reliable way?
Were objective, standard criteria used for measurement of the condition?	Were objective, standard criteria used for the measurement of patient safety culture?
Were confounding factors identified?	Was the survey tool clearly described and appropriately adapted for the study context?
Were strategies to deal with confounding factors stated?	Were the findings appropriately summarized and reflective of the data collected?
Were the outcomes measured validly and reliably?	N/A
Was appropriate statistical analysis used?	N/A

Source: Adapted from the Joanna Briggs Institute (2020).

Joanna Briggs Institute. (2020). Checklist for Analytical Cross-Sectional Studies. Retrieved from

<https://jbi.global/critical-appraisal-tools>

Chapter 6: Supplementary Table 4*Sociodemographic Characteristics of Samples Studied*

Author/ Year/ Country	Aboshaiqa h 2010 KSA	Al-Awa 2012 KSA	AL- Dossary 2023 KSA	Ammouri 2015 Oman	Alquwez 2023 KSA	Alquwez 2018 KSA	AlMa'm ari 2019 Oman	SalehA boufou r 2022 KSA	Innab 2026 KSA	Rawas 2023 KSA	Wazqar 2024 KSA	AlMuh arraq 2024 KSA	Alshamm ari Chapter 4 & 5 KSA
NATIONALITY STATUS OR LANGUAGE OR MARITAL STATUS	Arabic speaking: Yes (n = 58, 13%); No (387, 87%)	Indian (44.5%); Filipino (41.0%); Arabic cultures (11.73%); 78.6% of which are Saudi nationals); Western and other Asian cultures (2.74%)	Marital status: Single= 109, 23.0%, Married= 348, 73.6%, Widowed/divorced= 16, 3.4%	————	Saudi= 89, 34.1%, Filipino= 64, 24.5%, Indian= 108, 41.4%	Saudi: 63 (17.9%)/ Indian: 136 (38.7%)/ Filipino: 152 (43.3%)	Omani: 50 (18.5%)/ Non-Omani: 220 (81.5%)	————	Saudi= 88 (75.2 %), Non-Saudi= 29 (24.8 %).	Saudi (n = 35, 19 %); Non-Saudi (n = 149, 81%)	Single: 28(27.7) / Married : 71 (70.3%)/ Separated/divorced: 2 (2.0%)	Saudi = 349(86.8%); Non-Saudi = 53 (13.2%)	Saudi (n = 65, 50.4%); Filipino (n= 31, 24%); Indian (n= 24, 18.6%); Other (n= 9, 7%)
GENDER DISTRIBUTION	Male: 55 (12.4%)/ Female: 389 (87.4%)	————	Male=139, 29.4%, Female= 334, 70.6%)	Male: 10.4%/ Female: 89.6%	Male= 31, 11.9%, Female= 230, 88.1%	Male: 30 (8.5%)/ Female: 321 (91.5%)	Male:38 (14.1%)/ Female: 232 (85.9%)	————	Male = 37 (31.6 %), Female= 80 (68.4 %).	Male: 32 (17.4%)/ Female: 152 (82.6%)	Male: 40 (39.6%)/ Female: 61 (60.4%)	M = 64(15.9 %); F = 338 (84.1%)	

MEAN AGE (YEARS) ± SD	20-30 years: 141 (31.7%)/ 31-40 years: 182 (40.9%)/ 41-50 years: 76 (17.1%)/ 51-60 years: 46 (10.3%) M ≈ 35.11	_____	(20-29= 255, 53.9%), (30-39= 136, 28.8%), 40-49= 73, 15.4%), (50-59= 9, 1.9%)	Mean= 35 years/ SD= 8.25	The respondents were aged between 20 and 61 years (mean [M] = 32.89	Mean= 28.63/ SD= 4.77	Mean: 33.06/ SD: 5.82	_____	The average age was 35.37 years (SD = ± 5.43),	20-29: 71(38.6 %)/ 30-39: 86 (46.7%)/ 40-49: 22 (12.0%)/ 50 and more: 5 (2.7%) M ≈ 32.5	Mean: 31 years/ SD: (2.35%)	18-30 = 220 (54.7%); 31-45 = 172 (42.8%); >46 = 10 (2.5%) M ≈ 30.8	Under 25 Years = 1, (0.8%); 25 to 34= 79, (61.2%); 35 to 44 = 42 (32.6%); 45 or more= 7, (5.4%)
NURSES' CLASSIFICATION OR UNITS	Staff nurse: 373 (83.8%)/ charge nurse: 44 (9.9%)/ head nurse: 10 (2.2)/ educator: 13 (2.9%)/ other: 3(0.7%)	_____	Nurse manager= 104, 22.0%, Staff nurse= 369, 78.0%	surgical wards (30%), intensive care units (29%), medical wards (16.7%), obstetrics units (13%, paediatric wards (6.3%) and non-specific units (5.1%)	Staff nurse= 223, 85.4%, Nursing administration= 38, 14.6%	Staff nurse (n = 323, 92%); Nurse with administrative functions (n = 28, 8%)& Different units: 28 (8.0%)/ Medicine: 60 (17.1%)/ Surgery: 70 (19.9%)/ Obstetrics : 65 (18.5%)/ Paediatrics: 42 (12.0%)/ Emergency	Paediatric ICU: 55 (20.4%)/ NICU:45 (16.7%)/ Adult ICU: 134 (49.6%)/ Cardiac ICU: 8 (3%)/ CCU: 28 (10.4%)	Nurses (n = 221, 28.3%)	_____	Medical (n = 52, 28.3%); Surgical (n = 52, 28.3%); Obstetrics (n = 12, 6.5%); Pediatrics (n = 15, 8.2%); Oncology (n = 9, 4.9%); ICU (n = 44, 23.9)	Oncology working area: Medical (n = 33, 32.7%); Hematology (n = 19, 18.8%); Surgical (n = 5, 5%); Palliative (n = 20, 19.8%); Chemotherapy (n = 24, 23.7%)	_____	Intensive Care Unit=15 (11.6%); Emergency Department=30 (23.3); Male Medical Ward =6 (4.7%); Female Medical Ward =11 (8.5); Day Surgical Ward =3 (2.3%); Isolation Unit =4 (3.1); Delivery Room =6 (4.7%); Obstetrics

						departme nt: 38 (10.8%)/ ICU: 34 (13.7%)							and Gynecolog y Departme nt =8 (6.2%); Neonatal Intensive Care Unit =17 (13.2%); Outpatien t Departme nt =4 (3.1%), Operating Room =8 (6.2%); Unknown =17 (13.2%)
LENGTH OF EXPERIEN CE	Years in Nursing profession 1-5 years (n = 85, 19.1%); 6- 10 years (n = 139, 31.2%); 11- 15 years (n = 107, 24%); 16-20 years (n = 51, 11.5%); 21 years or more (n = 62, 13.9%). Length of time working at	_____	(1-2= 49, 10.4%), (3-6= 201, 42.5%), (7-10= 129, 27.3%), >10= 94, 19.9%)	In nursing profession Mean= 12.6 years/ SD= 8.03	The average years of experie nce are as follows: Dimensio ns total years (M = 10.28, SD = 7.81), experie nce in Saudi Arabia (M = 7.96, SD = 7.21), experie nce in the current hospital	Years in current hospital <1 (n = 87, 24.8%); 1- 5 (n = 181, 51.6%); 6- 10 (n = 60, 17.1%); >= 11 (n = 23, 6.6%). Years current area/unit: <1 (n = 93, 26.5%); 1- 5 (n = 202, 57.5%); 6- 10 (n = 44,	experie nce in your unit: Mean= 7.01/ SD= 5.05	_____	the averag e years of experie nce in nursin g was 11.9 years (SD = ± 6.9).	In nursing professi on >1 year: 23 (12.5%)/ 1-5: 82 (44.6%)/ 6-10: 45 (24.5%)/ 11-15: 24 (13.0%)/ 16-20: 6 (3.3%)/ 21 or more:4 (2.2%)	Professi onal experie nce: </= 5 (n = 36, 35.6%); 6-15 (n = 62, 61.4%); >15 (n = 3, 3%). Unit experie nce: less than 1 year (n = 3, 3%); 1-5 years (n	0-10 = 295 (73.4%); 11-25 = 104 (25.9%); >25 = 3(0.7%)	Less than 1 Year=0; 1 to 5 Years= 35 (27.1%); 6 to 10 Years= 53 (41.1%); 11 or more Years= 41 (31.8%)

	current hospital: Less than 1 year (n = 7, 1.6%); More than one year to two years (n = 109, 24.5%); More than two years to five years (n = 240, 53.9%); More than five years (n = 89, 20%)				(M = 6.69, SD = 6.61) and hospital unit (M = 5.52, SD = 5.46).	12.5%); >= 11 (n = 12, 3.4%). Years in profession : <1: 53 (15.1%)/ 1-5: 200 (57.0%)/ 6-10: 74(21.1%) / 11 or more: 24 (6.8%)					= 31, 30.7%); 6-10 years (n = 61, 60.4%); 11-15 years (n = 4, 4%); 16-20 years (n = 2, 2%)		
LEVEL OF EDUCATION	Associates degree: 38 (8.5%)/ Bachelor degree: 380 (85.4%)/ Master degree: 14 (3.1%)/ Doctoral degree: 1 (0.2%)	_____	Diploma= 226, 47.8%, Bachelor's = 136, 28.8%, Master's= 83, 17.5%, Doctoral degree= 6, 1.3%, Other= 22, 4.7%	Diploma (65.4%); Baccalaureate (34.6%)	Diploma= 52, 19.9% Bachelor's = 209, 80.1%	Diploma: 24 (6.8%)/ Bachelor: 312 (88.9%)/ Master: 15 (4.3%)	Diploma : 90 (33.3%)/ Bachelor: 169 (62.6%)/ Postgraduate: 11 (4.1%)	_____	_____	Diploma : 14 (7.6%)/ Bachelor: 167 (90.8%) / Master: 3 (1.6%)	Diploma : 5 (4.9%)/ Bachelor: 85 (84.2%)/ Master, PhD: 11 (10.9%)	Diploma = 138 (34.3%); Bachelor = 241 (60%); Master = 23 (5.7%)	Diploma = 23 (17.8%); Bachelor = 92 (71.3%); Master = 14 (10.9%)
SHIFT TIME OR WORK HOURS	Day: 209 (47%)/ Night: 37 (8.3%)/ Day/Night: 196 (44%)	_____	Working hours per week: <10= 14, 3.0%, 11-20= 62, 13.1%, 21-40= 223, 47.1%, >40= 174, 36.8%	_____	working 21-40 h weekly (n = 234, 89.7%)	Work hours per week: <40 hours: 22 (6.3%)/ 40-59: 288 (82.1%)/ 60 or more: 41 (11.7%)	Working hours: Mean= 36.84/ SD= 3.19	_____	_____	Working hours per week: 20 - 39 (n = 10, 5.4%); 40 to 59 (n = 124, 67.4%)/	Weekly work time (h): <= 40 (n = 21 (20.8%); > 40 (n = 80, 79.2%)	_____	30 to 40 Hours per Week= 28 (21.7%); More Than 40 Hours per Week= 101 (78.3)

										60 - 79 (n = 50, 27.1%)			
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Chapter 7: Integrated Discussion

This dissertation explored nurses' perceptions of patient safety culture within the healthcare context of Saudi Arabia and the Gulf Cooperation Council (GCC) region using a multi-method research design that includes a systematic review, a cross-sectional survey reported in three manuscripts, and an updated systematic review with a meta-analysis. Although patient safety culture has become a central priority in healthcare quality improvement initiatives internationally (World Health Organization [WHO], 2023, 2024), evidence from Saudi Arabia and the broader GCC region remains limited and fragmented (Al Harbi et al., 2022; Alshammari et al., 2026; Wazqar & Attallah, 2024). Existing primary studies conducted within GCC healthcare settings have reported varied findings regarding nurses' perceptions of patient safety culture (AL-Dossary, 2023; Al Ma'mari et al. 2019; Alshammari et al., 2026), with inconsistencies across patient safety culture composites and hospital settings (AlMuharraq et al., 2024; Innab et al., 2026; Saleh Aboufour & Subbarayalu, 2022).

Prior to this dissertation, no systematic review or meta-analysis had been conducted to comprehensively synthesize nurses' perceptions of patient safety culture within the GCC region, which includes Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates. Furthermore, limited research has examined the applicability and comparative performance of both versions of the Hospital Survey on Patient Safety Culture (HSOPSC 1.0 and HSOPSC 2.0; (Alenezi et al., 2019; Alharbi, 2024; Rawas & Abou Hashish, 2023) within Saudi healthcare settings.

To address these gaps, this dissertation incorporated a systematic review, framework-guided analyses informed by Donabedian's Quality Framework (Donabedian, 2005), cross-sectional quantitative investigations using HSOPSC versions 1.0 and 2.0 (Sorra & Nieva, 2004;

Sorra et al., 2021), a comparative analysis of HSOPSC versions 1.0 and 2.0 composites, and a meta-analysis of patient safety culture studies conducted across GCC countries. Together, these studies provided a comprehensive examination of nurses' perceptions of patient safety culture at local, national, and regional levels. The systematic review synthesized existing evidence regarding patient safety culture in GCC healthcare settings, while the empirical studies conducted at Hail General Hospital, in Saudi Arabia, examined nurses' perceptions using both versions of the HSOPSC instrument and explored the relationships between patient safety culture composites and patient safety outcomes. In addition, the comparative analysis chapter examined the conceptual and composite differences between HSOPSC versions 1.0 and 2.0 within the Saudi healthcare context. The meta-analysis further strengthened the evidence base through quantitative synthesis and pooled estimation of patient safety culture composites across GCC countries.

In this integrated discussion chapter, I synthesize the findings across all dissertation components to develop a broader understanding of patient safety culture within Saudi Arabia and the GCC region. Rather than discussing each study independently, the chapter critically integrates the findings across all dissertation components, highlights converging and diverging patterns across studies, and situates the results within the broader international patient safety literature. In this chapter, I also discuss implications of this study's findings for nursing practice, healthcare leadership, policy development, and future research, while considering the methodological and contextual contributions of the dissertation to the field of patient safety culture research.

Summary of Study Elements

Systematic Review of Patient Safety Culture in the Gulf Cooperation Council Region

In the systematic review, I synthesized evidence regarding nurses' perceptions of patient safety culture in GCC healthcare settings using both versions of the HSOPSC 1.0 and 2.0. The review included studies from Saudi Arabia and Oman identified through a literature search covering 2004 to 2024. It represented one of the first comprehensive syntheses of patient safety culture research focused specifically on nurses within the GCC region. The review examined variations in patient safety culture composites, identified strengths and weaknesses across healthcare settings, and explored broader workforce and organizational factors influencing safety culture perceptions.

Overall, the findings demonstrated considerable variability across patient safety culture composites and hospital settings. Teamwork Within Units and Organizational Learning–Continuous Improvement consistently emerged as relative strengths across studies. In contrast, Staffing, Nonpunitive Response to Error, Communication Openness, and Handoffs & Transitions were consistently identified as areas of concern. Management Support for Patient Safety and Frequency of Events Reported demonstrated moderate performance but varied substantially across healthcare settings.

In the review, I also highlighted important contextual characteristics of the GCC nursing workforce, including the predominance of expatriate nurses and multilingual clinical environments. Furthermore, the review demonstrated that many of the challenges identified within GCC healthcare settings were consistent with international patient safety culture literature, particularly regarding staffing shortages and punitive responses to error.

Framework-Guided Analysis of Patient Safety Culture and Comparison of HSOPSC

Versions 1.0 and 2.0

In the framework-guided and comparative analysis chapter, I examined nurses' perceptions of patient safety culture at Hail General Hospital using both HSOPSC versions 1.0 and 2.0 within the context of Structure–Process–Outcome dimensions of Donabedian's Quality Framework (Donabedian, 2005). The chapter explored the relationships between process-level patient safety culture composites and patient safety outcomes, while also comparing conceptual and statistical differences between the two HSOPSC versions. Donabedian's quality framework provided the theoretical foundation for interpreting how organizational safety culture processes influence patient safety perceptions and reporting behaviours within healthcare settings.

The comparative analyses provided evidence of both continuity and variation across HSOPSC versions 1.0 and 2.0. Several composites showed statistically significant differences between versions. Nonpunitive Response to Error and Handoffs & Transitions demonstrated significant improvements in HSOPSC 2.0. In contrast, Teamwork Within Units, Organizational Learning–Continuous Improvement, and Hospital Management Support for Patient Safety demonstrated significantly lower scores in HSOPSC 2.0. Other composites, including Communication Openness, Feedback and Communication About Error, Reporting Patient Safety Events, and Supervisor/Manager Expectations and Actions Promoting Patient Safety, remained relatively stable across versions.

In the chapter, I also presented evidence that process-level patient safety culture composites consistently influenced patient safety outcomes across both survey versions. Communication about error, organizational learning–continuous improvement, teamwork,

leadership support, and nonpunitive response to error emerged as important correlates and predictors of safety perceptions and reporting behaviours.

HSOPSC Version 1.0 Analysis

In the HSOPSC 1.0 chapter, I examined nurses' perceptions of patient safety culture at Hail General Hospital using the original HSOPSC instrument. The study included 129 frontline nurses representing multiple clinical departments, with the majority comprising Saudi, Filipino, and Indian nurses. Most participants held baccalaureate-level qualifications and reported working more than 40 hours per week.

Overall, the findings demonstrated a mixed pattern of strengths and weaknesses across patient safety culture composites. Teamwork Within Units emerged as the strongest composite, followed by Organizational Learning–Continuous Improvement and Feedback and Communication About Error. In contrast, Nonpunitive Response to Error represented the weakest composite by a substantial margin, while Staffing, and Handoffs & Transitions also demonstrated low scores.

The reliability analyses demonstrated acceptable overall internal consistency for the HSOPSC 1.0 instrument. However, considerable variability was observed across individual composites and subgroup analyses. Several composites, including Feedback and Communication About Error, Frequency of Events Reported, Teamwork Within Units, Handoffs & Transitions, and Nonpunitive Response to Error, demonstrated strong reliability. In contrast, composites such as Overall Perceptions of Patient Safety, Communication Openness, Staffing, and Management Support for Patient Safety showed weak internal consistency. Subgroup analyses further demonstrated variability across nationality and departmental groups, suggesting that cultural,

linguistic, and contextual factors may influence interpretation of patient safety culture items within multinational healthcare workforces.

Correlation analyses demonstrated that several patient safety culture composites were significantly associated with patient safety outcomes. Positive relationships were observed between teamwork, organizational learning, management support, communication-related composites, and patient safety outcomes, including overall perceptions of patient safety, patient safety grade, and frequency of events reported. In contrast, staffing demonstrated negative associations with several outcomes, reflecting the influence of workload pressures and workforce adequacy on patient safety perceptions and reporting behaviours.

Regression analyses further identified several independent predictors of patient safety outcomes. Nonpunitive Response to Error emerged as a significant predictor of overall perceptions of patient safety, while Teamwork Within Units, Feedback and Communication About Error, and Nonpunitive Response to Error significantly predicted frequency of events reported. In addition, Management Support for Patient Safety and Feedback and Communication About Error predicted patient safety grade, whereas Communication Openness, Staffing, and Nonpunitive Response to Error predicted the number of events reported. The findings further highlighted the influence of multicultural workforce dynamics on patient safety culture measurement and reinforced the importance of strengthening communication practices, leadership engagement, and supportive reporting systems within Saudi healthcare settings.

HSOPSC Version 2.0 Analysis

In the HSOPSC 2.0 chapter, I examined nurses' perceptions of patient safety culture at Hail General Hospital using the revised HSOPSC instrument. Similar to the HSOPSC 1.0 study, the sample included 129 frontline nurses representing multiple clinical departments, with the

majority comprising Saudi, Filipino, and Indian nurses. Most participants held baccalaureate-level qualifications and reported working more than 40 hours per week.

Overall, the HSOPSC 2.0 findings demonstrated positive perceptions of communication and teamwork alongside persistent concerns related to errors and staffing. Communication About Error emerged as the strongest composite, followed by Teamwork and Organizational Learning—Continuous Improvement, while most other composites demonstrated moderate scores. In contrast, Response to Error and Staffing and Work Pace demonstrated weak scores.

The reliability analyses demonstrated acceptable overall internal consistency for HSOPSC 2.0. However, notable variability was observed across individual composites and subgroup analyses. Communication About Error and Reporting Patient Safety Events demonstrated strong reliability, whereas several composites, including Supervisor, Manager, or Clinical Leader Support for Patient Safety, Staffing and Work Pace, Communication Openness, and Hospital Management Support for Patient Safety, demonstrated weak internal consistency. Similar to the HSOPSC 1.0 findings, subgroup analyses revealed substantial variability across nationality and departmental groups, indicating that cultural, linguistic, and contextual factors may influence how nurses interpret and respond to patient safety culture items within multicultural healthcare settings.

Correlation analyses demonstrated meaningful relationships between several HSOPSC 2.0 composites and patient safety outcomes. Communication About Error, Organizational Learning—Continuous Improvement, Teamwork, Hospital Management Support for Patient Safety, and Handoffs and Information Exchange were positively associated with patient safety ratings and reporting-related outcomes. In contrast, Staffing and Work Pace demonstrated

negative associations with several safety outcomes, highlighting the influence of workload pressures and staffing adequacy on patient safety perceptions and event reporting behaviours.

Regression analyses further identified several independent predictors of patient safety outcomes. Organizational Learning–Continuous Improvement and Communication About Error significantly predicted reporting patient safety events, whereas Teamwork, Organizational Learning–Continuous Improvement, and Communication About Error significantly predicted patient safety rating. Response to Error demonstrated a significant negative association with patient safety rating, while Staffing and Work Pace emerged as the only significant predictor of the number of events reported. The findings further demonstrated that communication-oriented and learning-focused organizational processes continue to play a central role in influencing patient safety outcomes within Saudi healthcare settings while also highlighting ongoing psychometric and contextual challenges associated with patient safety culture measurement in multicultural healthcare environments.

Meta-Analysis of Patient Safety Culture Studies in GCC Healthcare Settings

In the meta-analysis chapter, I provided an updated quantitative synthesis of nurses' perceptions of patient safety culture across GCC healthcare settings using both HSOPSC versions 1.0 and 2.0. The updated review expanded the literature search from 2004–2024 to 2004–2026 and added Web of Science and Scopus to the three databases used in the original systematic review (CINAHL, MEDLINE, and EMBASE). The included studies were conducted in Saudi Arabia and Oman, and the review represented one of the first meta-analytical examinations of patient safety culture among nurses within the GCC region. Separate pooled analyses were conducted for HSOPSC 1.0 and HSOPSC 2.0 to maintain methodological

consistency and account for differences in composite structure and terminology between instrument versions.

The HSOPSC 1.0 meta-analysis included 11 studies with a pooled sample of 3,454 nurses. Teamwork Within Units and Organizational Learning–Continuous Improvement emerged as the highest-performing composites. Moderate pooled scores were observed for Feedback and Communication About Error, Management Support for Patient Safety, Supervisor/Manager Expectations and Actions Promoting Patient Safety, Frequency of Events Reported, Teamwork Across Units, and Overall Perceptions of Patient Safety. In contrast, Staffing, Communication Openness, Handoffs & Transitions, and Nonpunitive Response to Error consistently demonstrated low pooled scores.

The HSOPSC 2.0 meta-analysis included three studies with a pooled sample of 648 nurses. Similar to HSOPSC 1.0 findings, Teamwork, Communication About Error, and Organizational Learning–Continuous Improvement represented the highest-performing composites, although no composite achieved a high-performance threshold. Moderate scores were observed for leadership support, communication openness, reporting patient safety events, hospital management support, and handoffs and information exchange. However, Staffing and Work Pace and Response to Error remained the lowest-performing composites.

Across both HSOPSC versions, substantial heterogeneity was observed across most pooled analyses, particularly within HSOPSC 1.0 composites, indicating variability across organizational settings, workforce characteristics, and hospital contexts. The findings further highlighted the multinational and multicultural composition of the GCC nursing workforce, with substantial representation of expatriate nurses from the Philippines and India across most included studies.

Situating the Study Elements Within the Current Literature

Teamwork and Organizational Learning as Consistent Strengths of Patient Safety Culture

One of the most consistent findings across all components of this dissertation was the positive perception of teamwork and organizational learning within GCC healthcare settings. Teamwork emerged as one of the highest-rated patient safety culture composites in the HSOPSC 1.0 and HSOPSC 2.0 studies, while organizational learning–continuous improvement also demonstrated strong performance across both survey versions. Similar findings were identified in the systematic review and meta-analysis, where teamwork and organizational learning consistently ranked among the highest-scoring patient safety culture composites across healthcare settings in the GCC (AlMa'mari et al., 2019; AlMuharraq, 2024; Alquwez et al., 2018; Alshammari et al., 2026). These findings support previous evidence that teamwork plays a crucial role in shaping patient safety culture and contributes to improved healthcare outcomes and reduced adverse clinical events (Daheshi et al., 2023; Labrague et al., 2020; Schot et al., 2020). Furthermore, the strong performance of teamwork may reflect the collaborative nature of nursing practice and the need for close coordination in complex clinical environments (Kalisch et al., 2009; Manser, 2009).

The consistently high scores for organizational learning–continuous improvement suggest that many healthcare settings in the GCC actively support quality improvement and learning activities. Previous studies have suggested that the availability of dedicated educational resources, continuing professional development opportunities, and institutional support for staff development and learning may contribute to stronger perceptions of organizational learning within the region (Alkhazim et al., 2015). Similarly, the increasing emphasis on accreditation standards, quality improvement initiatives, and continuous evaluation processes across

healthcare systems in the GCC may have strengthened organizational learning practices and reinforced patient safety culture development (Albalawi et al., 2020; Alquwez, 2023; Moafimadani et al., 2020). These findings are particularly important because supportive learning environments encourage staff engagement in patient safety activities and continuous improvement efforts.

Despite these positive findings, the integrated results suggest that strengths in teamwork and organizational learning do not necessarily translate into equally positive perceptions across all patient safety culture dimensions. While teamwork and organizational learning consistently demonstrated strong performance, weaker findings were observed for communication openness, staffing, and nonpunitive response to error across several studies (Alquwez, 2023; Ammouri et al., 2015; Rawas & Abou Hashish, 2023). Previous research has shown that supportive environments encourage staff participation in organizational learning and reporting behaviours, whereas punitive environments may limit these opportunities (Mahsoon & Dolansky, 2021; Yan et al., 2021). This suggests that although opportunities for learning from patient safety incidents exist within healthcare settings in the GCC, the effectiveness of these processes may be constrained by insufficient feedback mechanisms and persistent blame-oriented attitudes toward error reporting (Abdurabuh et al., 2024; Kaud et al., 2022). Collectively, these findings suggest that although teamwork and organizational learning represent important strengths within healthcare settings in the GCC, further improvements in staffing, communication openness, reporting culture, and leadership support are necessary to achieve a more comprehensive and effective patient safety culture.

Persistent Challenges in Nonpunitive Response to Error and Reporting Culture

One of the most consistent challenges identified across all components of this dissertation was the persistently low composite scores for nonpunitive response to error and reporting-related dimensions of patient safety culture. Nonpunitive Response to Error in HSOPSC 1.0 and Response to Error in HSOPSC 2.0 were among the lowest-scoring composites in the empirical studies and meta-analysis, while frequency of events reported and reporting patient safety events demonstrated only moderate scores (AlMuharraq et al., 2024; Alquwez, 2023; Alshammari et al., 2026). These findings are concerning because a positive patient safety culture is founded on open communication, trust, and nonpunitive approaches to incidents that encourage staff to report errors and contribute to organizational learning to improve patient safety (Churruca et al., 2021; Farokhzadian et al., 2018; Kim et al., 2023).

The consistency of these findings across the dissertation components suggests that blame-oriented cultures continue to represent a significant barrier to patient safety culture within healthcare settings in the GCC. Previous studies have suggested that low nonpunitive response to error scores may reflect concerns regarding blame, fear of punishment, and negative professional consequences associated with incident reporting (Alaska & Alkutbe, 202; Al Harmali et al., 2024; Azyabi et al., 2022; He et al., 2023). Furthermore, although formal reporting systems may exist within healthcare organizations, reporting behaviours are often influenced by psychological safety, trust, organizational responses to error, and the extent to which staff receive meaningful feedback following reported incidents (Camacho-Rodríguez et al., 2022; Lee & Dahinten, 2021; Singal, 2020). The multinational composition of the nursing workforce in the GCC may further contribute to these concerns, as fears regarding professional consequences and hierarchical

workplace relationships may discourage open reporting of errors and near misses (Al Harmali et al., 2024; Alshammari et al., 2026).

These findings were consistent with international patient safety culture literature discussed throughout the dissertation, where nonpunitive response to error and reporting-related dimensions frequently emerged as areas requiring improvement across many diverse global healthcare settings (Granel-Giménez et al., 2022; Oliveira et al., 2024; Sosa-Palanca et al., 2022; Yavuz et al., 2023). The persistence of these findings suggests that punitive responses to error may remain embedded within some healthcare environments, potentially weakening the principles of a just culture and discouraging transparent reporting of incidents. This is particularly concerning given the increasing emphasis of the World Health Organization on learning from errors rather than assigning blame as a cornerstone of patient safety improvement (WHO, 2022). Consequently, healthcare organizations may not be fully capturing valuable information from patient safety incidents, thereby reducing opportunities for organizational learning and system-level improvement despite the availability of formal reporting systems (Camacho-Rodríguez et al., 2022; Lee & Dahinten, 2021). Collectively, these findings suggest that strengthening psychologically safe reporting environments, promoting learning rather than blame, and providing timely feedback following incident reporting are essential for improving patient safety culture and supporting organizational learning within healthcare settings in the GCC.

Staffing, Workload Pressures, and Workforce Challenges

Staffing and workload-related challenges consistently emerged as important concerns across all components of this dissertation. Staffing in HSOPSC 1.0 and Staffing and Work Pace in HSOPSC 2.0 were among the lowest-scoring patient safety culture composites in the

systematic review, the empirical studies, and the meta-analysis. Similar findings were identified in international studies, where staffing deficits were consistently reported across several international healthcare settings (Abdulla et al., 2023; Aileen et al., 2024; Alsaleh et al., 2025; Imran et al., 2024; Oliveira et al., 2024; Sosa-Palanca et al., 2022; Yavuz et al., 2023; Soden et al., 2025). These findings suggest that workforce-related challenges remain a persistent concern within healthcare systems both regionally and internationally.

The consistently low staffing scores may reflect broader workforce pressures affecting healthcare systems globally, including nursing shortages, workforce turnover, and increasing healthcare demands (WHO, 2025; Ren et al., 2024). Previous research has demonstrated that inadequate staffing levels may contribute to increased stress, burnout, and job dissatisfaction among nurses, all of which can negatively influence patient safety culture and healthcare quality (Azyabi et al., 2022; He et al., 2023; Falcone et al., 2022). The findings of this dissertation support these concerns, as nurses frequently reported extended working hours and demanding workloads. These conditions may contribute to fatigue, reduced attention, and diminished engagement in safety-related activities, potentially compromising the quality and safety of patient care (Dall'Ora et al., 2023; Li et al., 2024; Li et al., 2025).

The findings further suggest that staffing challenges extend beyond workforce numbers alone and may also influence broader organizational safety processes. High workload has been associated with reduced incident reporting, increased fatigue, and lower participation in patient safety activities (Li et al., 2025a; Rawas & Abou Hashish, 2023). This interpretation is supported by the HSOPSC analyses in this dissertation, in which staffing-related composites showed significant relationships with reporting-related outcomes. Adequate staffing and manageable workloads may therefore provide nurses with greater capacity, time, and cognitive resources to

recognize, document, and report patient safety events, whereas staffing pressures may limit opportunities for active engagement in patient safety practices (Kang et al., 2016; Pearson et al., 2010).

An additional consideration within healthcare settings in the GCC is the highly multinational nature of the nursing workforce. GCC countries continue to rely heavily on expatriate nurses to address workforce shortages, with substantial proportions of nurses originating from the Philippines, India, Malaysia, Sri Lanka, Pakistan, and other countries (Al-Harashseh et al., 2020; Alhourani et al., 2022; Alluhidan et al., 2020; Al-Maaaitah et al., 2023; Al-Yateem et al., 2022). While this workforce diversity contributes significantly to healthcare delivery, differences in language, communication styles, professional training, and cultural expectations may introduce additional workforce-related challenges. Previous evidence from the Gulf region suggests that language-related communication barriers may affect information exchange and patient safety processes (Al-Yateem et al., 2022). Collectively, these findings suggest that strengthening patient safety culture within healthcare settings in the GCC requires not only adequate staffing levels but also workforce retention strategies, workload management, and organizational approaches that support effective communication and collaboration within multicultural healthcare environments.

Care Transitions and Information Exchange

Challenges related to care transitions and information exchange emerged consistently across all components of this dissertation. Handoffs & Transitions in HSOPSC 1.0 and Handoffs and Information Exchange in HSOPSC 2.0 demonstrated low to moderate performance, while similar concerns were identified in the systematic review and meta-analysis. These findings were consistent with studies conducted in several international healthcare settings, where handoff-

related dimensions frequently emerged as areas requiring improvement (Imran et al., 2024; Oliveira et al., 2024; Soden et al., 2025; Sosa-Palanca et al., 2022). Collectively, these findings suggest that communication breakdowns during patient transfers and transitions of care remain an important challenge within healthcare settings in the GCC (Albalawi et al., 2020; Alshammari et al., 2026).

The persistence of these challenges may reflect weaknesses in communication processes across units and departments, where time pressures, inconsistent communication practices, and the absence of standardized handoff procedures can compromise the effective transfer of patient information (Alshammari et al., 2026; Saporito & Mrad Georgis, 2026). Effective communication, learning from previous errors, and providing constructive feedback have been associated with improved patient safety outcomes and stronger safety cultures (Famolaro et al., 2018; Labrague et al., 2020). However, healthcare organizations characterized by top-down management structures and limited frontline engagement may experience greater difficulties in achieving effective communication and cross-unit collaboration (Essex et al., 2023; Kanaris, 2023). Consequently, weaknesses in information exchange may increase the risk of communication failures at critical points of care delivery.

These findings are particularly relevant within healthcare systems in the GCC, where the nursing workforce is highly multinational and comprises professionals trained in diverse healthcare systems with differing communication styles, professional norms, and patient safety practices (Alluhidan et al., 2020). Previous evidence from the Gulf region suggests that expatriate healthcare professionals may experience language-related communication barriers that affect routine clinical communication and information exchange (Al-Yateem et al., 2022). Broader patient safety evidence has similarly identified language barriers as a contributor to

patient harm risk in hospital settings (Canadian Institute for Health Information, 2024).

Therefore, strengthening standardized handoff procedures, promoting effective interdisciplinary communication, and supporting collaboration within multicultural healthcare teams may represent important strategies for improving patient safety culture and reducing communication-related risks during care transitions within healthcare settings.

Openness and Leadership Support for Patient Safety

Communication openness and leadership support emerged as important yet inconsistently developed dimensions of patient safety culture across the components of this dissertation.

Although leadership-related composites demonstrated moderate performance in both HSOPSC versions and the meta-analysis, communication openness remained comparatively weaker across several studies (Alquwez et al., 2018; Alquwez, 2023; Innab et al., 2026). Similar findings were identified throughout the systematic review, where gaps in perceived management support and communication processes were reported in some healthcare settings in the GCC (AL-Dossary, 2023; Al Ma'mari et al., 2019; Wazqar & Attallah, 2024). These findings are important because creating and sustaining a positive patient safety culture requires strong leadership commitment, transparent communication, and active staff engagement (Bartonickova et al., 2021; Lestari et al., 2023).

The findings suggest that leadership support and communication openness are closely interconnected. Across both HSOPSC versions, management support and communication openness regarding errors demonstrated important relationships with reporting-related outcomes and overall patient safety, highlighting the importance of supportive and psychologically safe work environments that enable staff to raise concerns and actively participate in patient safety activities (Brubakk et al., 2021). Previous research has shown that healthcare organizations

characterized by open communication, participatory leadership, and constructive feedback mechanisms are more likely to foster learning-oriented cultures and stronger patient safety outcomes (Abdurabuh et al., 2024; Kim et al., 2023; Famolaro et al., 2018; Labrague et al., 2020). In contrast, limited management responsiveness and restricted communication channels may discourage frontline staff from actively engaging in safety initiatives and voicing concerns regarding patient safety risks (Essex et al., 2023; Kanaris, 2023).

These findings are particularly relevant to nursing practices, where nurses occupy a unique position that intersects between patients, healthcare professionals, and organizational leadership (White et al., 2025). Previous evidence suggests that supportive managerial practices, staff involvement in decision-making, and regular opportunities for dialogue between nurses and management contribute to stronger trust, greater staff engagement, and improved patient safety culture (Almashayekh et al., 2023; Jepkosgei et al., 2022; Sexton et al., 2018; Singer & Tucker, 2014). Conversely, leadership approaches perceived as unresponsive or dismissive may create reluctance among nurses to speak openly about safety concerns, potentially limiting opportunities for organizational learning and patient safety improvement (Roberts, 2015; Thompson et al., 2024). Collectively, these findings suggest that strengthening communication openness and leadership support remains essential for developing transparent, learning-oriented, and nonpunitive healthcare environments.

Conceptual and Methodological Implications of Using HSOPSC Versions 1.0 and 2.0

An important contribution of this dissertation was the comparative examination of HSOPSC versions 1.0 and 2.0 within the Saudi healthcare context. The findings demonstrated both continuity and variation across the two instrument versions. Several composites, including Nonpunitive Response to Error and Handoffs and Information Exchange, showed significantly

higher scores in HSOPSC 2.0, whereas Teamwork Within Units, Organizational Learning–Continuous Improvement, and Hospital Management Support for Patient Safety demonstrated significantly higher scores in HSOPSC 1.0. In contrast, several dimensions, including communication openness, supervisor support, and event reporting, remained relatively stable across both versions. These findings suggest that while both instruments capture similar patient safety culture constructs, modifications in wording, item structure, and composite organization may influence how nurses interpret and respond to patient safety culture items. Consequently, comparisons of patient safety culture findings across HSOPSC versions should be interpreted cautiously, as observed differences may reflect instrument-related variations rather than genuine changes in organizational patient safety culture. Organizations should maintain consistency in the version used when monitoring patient safety culture over time, and researchers should exercise caution when comparing findings derived from different HSOPSC versions. Although HSOPSC 2.0 represents the most recent version recommended by Agency for Healthcare Research and Quality [AHRQ], the comparative and reliability findings of the present dissertation tended to favour HSOPSC 1.0 within this multicultural healthcare setting. HSOPSC 1.0 demonstrated stronger overall reliability and higher reliability estimates across most comparable composites, whereas several HSOPSC 2.0 composites showed notable reductions in internal consistency. These findings suggest that HSOPSC 1.0 may currently provide greater psychometric stability within multicultural healthcare environments; however, additional validation studies of HSOPSC 2.0 across diverse healthcare settings in the GCC are warranted before firm conclusions regarding its performance can be established.

The reliability analyses further highlighted important methodological considerations when applying HSOPSC instruments within multicultural healthcare settings. Although both

HSOPSC 1.0 and HSOPSC 2.0 demonstrated acceptable overall reliability, substantial variability was observed across individual composites and participant subgroups. Similar reliability variation has been reported in both national and international validation studies, suggesting that this is not unique to the present research (Aboshaiqah, 2010; Aileen et al., 2024; Aljaffary et al., 2021; Alswat et al., 2017; Asi et al., 2024; Bodur & Filiz, 2009; Shu et al., 2015; Stoyanova et al., 2018; Reis et al., 2023; Olsen et al., 2024). The subgroup analyses conducted in this dissertation indicated that cultural background, language differences, professional training, and contextual interpretation may influence how nurses respond to patient safety culture items. This interpretation is particularly relevant within the GCC region, where the nursing workforce is highly multinational and comprises professionals trained in diverse healthcare systems with differing norms regarding communication, hierarchy, and patient safety practices (Alluhidan et al., 2020; Alshammari et al., 2026). Furthermore, several composites demonstrated improved reliability following the removal of reverse-worded items, suggesting that item wording may introduce additional complexity within multilingual healthcare environments (Hubley & Zumbo, 2011; Waterson et al., 2019). This observation is consistent with previous methodological evidence indicating that mixed item wording can increase cognitive burden, misunderstanding, and acquiescence bias, particularly among multilingual and multicultural respondent groups, thereby reducing internal consistency estimates (Tavakol & Dennick, 2011; Streiner, 2003). However, these lower reliability estimates may reflect contextual and methodological influences rather than fundamental weaknesses in the HSOPSC instruments themselves.

The framework-guided analyses also provided theoretical support for Donabedian's Quality Framework within patient safety culture research. Across both HSOPSC versions, several patient safety culture processes, including communication, organizational learning,

teamwork, staffing, and leadership-related support processes, demonstrated important relationships with patient safety outcomes. These findings support Donabedian's proposition that organizational structures influence outcomes primarily through the processes of care delivery rather than through direct effects alone (Donabedian, 2005). The prominence of communication- and learning-oriented processes within this dissertation further aligns with previous theoretical and empirical work identifying care processes as key mechanisms linking organizational structures to patient outcomes (Carayon et al., 2006; Hafezi et al., 2022; Lee & Dahinten, 2021). Therefore, the findings not only support the continued relevance of Donabedian's framework for understanding patient safety culture but also demonstrate its applicability across different HSOPSC versions and within the multicultural healthcare environments characteristic of healthcare systems in the GCC.

Implications of the Findings

Implications for Nursing Practice

The findings of this dissertation suggest that strengthening patient safety culture within healthcare settings in Saudi Arabia and the GCC requires greater emphasis on developing safer and learning-oriented nursing environments. Although teamwork and organizational learning emerged as relative strengths, persistent weaknesses in reporting culture, communication openness, and nonpunitive response to error may discourage nurses from openly discussing mistakes and patient safety concerns. Nursing practice should foster a culture in which errors are viewed as opportunities for learning and system improvement. This may be achieved through promoting open dialogue, providing constructive feedback following incident reporting, and encouraging staff participation in patient safety improvement initiatives.

The findings also highlight the importance of strengthening care transitions and information exchange practices as they represent a potential source of patient safety risk. Nursing practices across the GCC may therefore benefit from greater use of standardized communication approaches, structured handoff processes, and simulation-based education programs. Particular attention should be given to communication during patient transfers and transitions between departments, where information loss may compromise continuity of care and patient safety.

Workforce-related challenges also emerged as a central consideration for nursing practice. The consistently low scores observed for staffing-related composites across all dissertation components indicate that workload pressures and nursing shortages remain important patient safety concerns within healthcare settings in the GCC. Healthcare organizations may therefore need to strengthen staffing allocation strategies, support nursing workforce retention initiatives, and reduce excessive workload demands, particularly administrative tasks, to improve both patient safety culture and nursing practice environments.

Finally, the multicultural composition of the GCC nursing workforce should be recognized as an important consideration in patient safety culture development. The findings suggest that differences in language, professional training, and cultural backgrounds may influence communication processes, teamwork, and patient safety perceptions within clinical settings. Nursing practice may therefore benefit from culturally responsive training initiatives, communication support mechanisms, and team-based learning approaches that strengthen collaboration among healthcare professionals from diverse backgrounds. These strategies may contribute to safer care environments while supporting effective teamwork and patient safety improvement efforts.

Implications for Healthcare Leadership and Policy

The findings of this dissertation highlight the critical role of healthcare leadership in shaping and sustaining patient safety culture within healthcare settings in Saudi Arabia and the GCC. The persistence of challenges related to communication, nonpunitive response to error, and incident reporting suggests that organizational patient safety priorities may not yet be fully translated into frontline clinical practice. Healthcare leaders should therefore prioritize supportive supervision, staff engagement, and leadership approaches that promote transparency, openness, constructive feedback, and learning from errors rather than blame. Strengthening leadership visibility and staff engagement in patient safety initiatives may further enhance staff confidence in organizational commitment to patient safety.

The findings also highlight the importance of aligning patient safety strategies with workforce and organizational sustainability to address persistent staffing and workload challenges. Healthcare leaders and policymakers should therefore consider short-term and long-term initiatives that include workforce planning, retention strategies, and resource allocation decisions. Maintaining safe staffing levels, supporting workforce retention, and reducing avoidable workload pressures may contribute not only to improved patient safety culture but also to enhanced quality of care and staff wellbeing.

At a policy level, the findings support continued investment in patient safety infrastructure, leadership development, and quality improvement initiatives in healthcare organizations in the GCC. Particular attention should be given to strengthening reporting systems, feedback mechanisms, and communication processes that facilitate organizational learning from patient safety incidents. Furthermore, given the multicultural composition of the GCC healthcare workforce, leadership development programmes and organizational policies

should support cultural safety, effective communication, and interdisciplinary collaboration across diverse professional groups. These efforts may strengthen patient safety culture and support the delivery of safe, high-quality care within multicultural healthcare settings.

Implications for Future Research

This dissertation identified several important directions for future patient safety culture research within healthcare settings in Saudi Arabia and the GCC. First, additional studies are needed across underrepresented GCC countries, particularly Bahrain, Kuwait, Qatar, and the United Arab Emirates, as most available evidence remains concentrated within Saudi Arabia and Oman. Expanding geographical representation would strengthen understanding of patient safety culture across diverse GCC healthcare systems.

Second, future research should extend beyond cross-sectional survey designs to examine longitudinal changes in patient safety culture following organizational and national patient safety initiatives. Longitudinal investigations may provide greater understanding of how healthcare reforms, leadership interventions, workforce changes, and quality improvement programs influence patient safety culture over time. Third, the findings highlight the importance of further psychometric evaluation of HSOPSC versions 1.0 and 2.0 within healthcare settings in the GCC. The comparative analyses demonstrated that differences in wording and composite structure between the two instruments may influence patient safety culture scores and interpretation. Additional psychometric studies may therefore help clarify the contextual suitability, reliability, and validity of HSOPSC instruments within multicultural healthcare environments in the GCC.

Future research should also further examine the influence of multicultural workforce dynamics on patient safety culture perceptions. Although the systematic review and meta-analysis consistently demonstrated substantial representation of expatriate nurses, most studies

did not stratify findings according to nationality, language background, or country of training (AlMuharrraq et al., 2024; Innab et al., 2026; Rawas & Abou Hashish, 2023; Wazqar & Attallah, 2024). Future investigations examining these variables may provide deeper insight into how multicultural workforce characteristics influence patient safety culture perceptions within healthcare systems in the GCC.

Finally, future patient safety culture research may benefit from incorporating qualitative and mixed-methods approaches to complement quantitative survey findings. Qualitative investigations may provide deeper insight into nurses' experiences of communication, reporting culture, care transitions, and multicultural workforce challenges that influence patient safety culture in healthcare settings across the GCC.

Strengths and Limitations

Strengths of the Dissertation

This dissertation has several important methodological, theoretical, and contextual strengths. First, the dissertation adopted a comprehensive multi-method research design incorporating a systematic review, framework-guided analysis, cross-sectional quantitative investigations using HSOPSC versions 1.0 and 2.0, and a meta-analysis. Furthermore, the direct comparison of HSOPSC versions 1.0 and 2.0 represents a novel contribution to the patient safety culture literature and provides empirical evidence regarding the implications of transitioning between instrument versions. The integration of multiple methodological approaches strengthened the depth, breadth, and overall robustness of the findings. Second, this dissertation represents one of the first comprehensive examinations of nurses' perceptions of patient safety culture within Saudi Arabia and the GCC region integrating systematic review, comparative instrument analysis, empirical investigation, and meta-analytical synthesis. Before this

dissertation, no systematic review or meta-analysis had comprehensively synthesized patient safety culture findings specifically focused on nurses within GCC healthcare settings. Third, the dissertation contributes theoretically through the integration of Donabedian's Quality Framework into the interpretation of patient safety culture processes and outcomes. The framework-guided analyses strengthened understanding of how organizational communication, teamwork, leadership support, staffing, and reporting processes influence patient safety outcomes within healthcare settings. Fourth, the comparative examination of HSOPSC versions 1.0 and 2.0 represents an important methodological contribution. The findings demonstrated both conceptual continuity and important interpretive differences between instrument versions, highlighting methodological considerations relevant to future patient safety culture assessment and benchmarking within healthcare systems in the GCC. Finally, the dissertation contributes important contextual understanding regarding patient safety culture within multinational and multicultural healthcare environments. The findings consistently highlighted the influence of expatriate nursing workforces, language diversity, and communication challenges within healthcare settings in the GCC, thereby contributing regionally relevant evidence to the broader patient safety culture literature.

Limitations of the Dissertation

Several limitations should be considered when interpreting the findings of this dissertation. First, the empirical HSOPSC 1.0 and HSOPSC 2.0 studies were conducted within a single hospital setting with a relatively small sample ($n = 129$), which may limit generalizability of the findings to other healthcare settings within Saudi Arabia and the GCC region. Second, all empirical components relied on self-reported survey measures, which may be influenced by response bias and social desirability bias. Nurses' perceptions of patient safety culture may

therefore not fully reflect actual organizational patient safety practices or clinical outcomes.

Third, substantial heterogeneity was observed across several pooled analyses within the meta-analysis, particularly for HSOPSC 1.0 composites. This heterogeneity likely reflects variability across healthcare settings, workforce characteristics, organizational cultures, and study methodologies within GCC healthcare systems. Fourth, although the dissertation highlighted the importance of multicultural workforce dynamics, most included studies did not stratify findings according to nationality, language background, or cultural characteristics. Consequently, the influence of these factors on patient safety culture perceptions could not be fully examined. Finally, the number of available studies using HSOPSC 2.0 within healthcare settings in the GCC remained limited. Although separate analyses were conducted for both HSOPSC versions, the relatively small number of HSOPSC 2.0 studies may affect the stability and generalizability of some pooled findings.

Conclusion

This integrated discussion chapter synthesized findings from the systematic review, HSOPSC 1.0 study, HSOPSC 2.0 study, framework-guided analyses, comparative evaluation of HSOPSC versions, and meta-analysis to provide a more comprehensive understanding of nurses' perceptions of patient safety culture within Saudi Arabia and the GCC region. Collectively, the findings suggest that patient safety culture within healthcare settings in the GCC is characterized by a combination of established strengths and persistent challenges. Teamwork and organizational learning consistently emerged as positive aspects of patient safety culture, reflecting ongoing efforts to support collaboration and continuous improvement within healthcare organizations. However, recurring concerns related to nonpunitive response to error, reporting culture, staffing and workload pressures, communication processes, care transitions,

and leadership support indicate that important barriers to the development of a fully mature patient safety culture remain.

The integrated findings further demonstrate that patient safety culture is shaped by the interaction of organizational, workforce, communication, and leadership factors. While healthcare organizations appear to have made progress in promoting teamwork and learning-oriented practices, weaknesses in reporting culture, communication openness, and workforce capacity may limit opportunities for organizational learning and patient safety improvements. The findings also highlight the importance of considering the multicultural composition of the GCC healthcare workforce, as communication, language, and diverse nurse backgrounds may influence how patient safety culture is experienced and enacted within clinical settings. This dissertation also makes important methodological and theoretical contributions to the patient safety culture literature. The comparative examination of HSOPSC versions 1.0 and 2.0 demonstrated that revisions to patient safety culture instruments may influence the measurement and interpretation of several patient safety culture dimensions. Although HSOPSC 2.0 represents the most recent version recommended by AHRQ (AHRQ, 2026), the findings suggest that the impact of instrument revision varies across composites and that caution is warranted when comparing findings across versions. In addition, the framework-guided analyses provided further support for the usefulness of Donabedian's Quality Framework in understanding relationships between patient safety culture processes and patient safety outcomes within healthcare settings.

Overall, this dissertation contributes new evidence regarding nurses' perceptions of patient safety culture within Saudi Arabia and the GCC region and provides a foundation for future patient safety improvement initiatives, policy development, and research. Strengthening nonpunitive and safe reporting environments, supporting effective communication and care

transitions, addressing workforce challenges, and promoting visible leadership commitment to patient safety may be essential for advancing patient safety culture and supporting the delivery of safe, high-quality care across healthcare systems in the GCC.

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Appendices

Appendix A. University of Ottawa Research Ethics Board Approval

06/12/2024

Université d'Ottawa

Bureau d'éthique et d'intégrité de la recherche

University of Ottawa

Office of Research Ethics and Integrity

CERTIFICAT D'APPROBATION ÉTHIQUE | CERTIFICATE OF ETHICS APPROVAL

Numéro du dossier / Ethics File Number

H-11-24-10989

Titre du projet / Project Title

Nurses' Perceptions of Patient
Safety Culture in Saudi Arabia

Type de projet / Project Type

Thèse de doctorat / Doctoral
thesis

Statut du projet / Project Status

Approuvé / Approved

Date d'approbation (jj/mm/aaaa) / Approval Date (dd/mm/yyyy)

06/12/2024

Date d'expiration (jj/mm/aaaa) / Expiry Date (dd/mm/yyyy)

05/12/2025

Équipe de recherche / Research Team

Chercheur / Researcher Affiliation

Role

Majed ALSHAMMARI

École des sciences infirmières / School of Nursing

Chercheur Principal / Principal Investigator

J. Craig PHILLIPS

École des sciences infirmières / School of Nursing

Superviseur / Supervisor

Conditions spéciales ou commentaires / Special conditions or comments

550, rue Cumberland, pièce 154 550 Cumberland Street, Room 154
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613-562-5387 • 613-562-5338 • ethique@uOttawa.ca / ethics@uOttawa.ca
www.recherche.uottawa.ca/deontologie | www.recherche.uottawa.ca/ethics

Appendix B. Hail Health Cluster Ethics Approval

November 20, 2024

IRB Log Number: 2024-113

Category of Approval: FULL REVIEW

Dear PI. Mr. Majed Alshammari

I am pleased to inform you that your submission for the study entitled "Nurses' Perceptions of Patient Safety Culture in Saudi Arabia" was approved. Please note that this approval is from the research ethics perspective only. You still need to get permission from the concerned institution to commence data collection. We wish you well as you proceed with this study and request you to keep the IRB informed of the progress on a regular base (every six months), using the IRB log number shown above. **This approval is valid for one year from the date of issue.** If you have any further questions, feel free to contact us.

Sincerely yours,

Dr. Sa

Chair _____ d (IRB)

Hail H _____

Email _____



تجمع حائل الصحي
Hail Health Cluster
Research and Studies Department
Institutional Review Board (IRB)

T: +966 16 236 2020 | www.hailthy.gov.sa
E: halthy@hailthy.gov.sa | @hailthy

تجمع حائل الصحي
Hail Health Cluster

Appendix C. Permission to Use the HSOPSC Instruments

11/28/24, 3:13 PM

Mail - Majed Alshammari - Outlook



Re: Request for Permission to Use the Hospital Survey on Patient Safety Culture CRM:02740107

From Safety Culture Surveys <SafetyCultureSurveys@westat.com>

Date Thu 11/21/2024 3:56 PM

To Majed Alshammari <

Attention : courriel externe | external email

Dear Majed,

Thank you for the information about your use of the Surveys on Patient Safety Culture® (SOPS®). Westat, the AHRQ contractor for the Surveys on Patient Safety Culture program (SafetyCultureSurveys@westat.com) are authorized to respond on behalf of the Agency for Healthcare Research and Quality (AHRQ) by Mr. [Howard Holland](#), Director, AHRQ's Office of Communications. We handle the majority of permissions for these tools and their related documents in English and notify AHRQ of requests for permission to translate these documents. **Permission.** Based on the description you provided of your project, AHRQ grants you permission to use the HSOPS in English for your research at Hail General Hospital, located in Hail City, Saudi Arabia. We understand that this research will be carried out at Hail General Hospital, located in Hail City, Saudi Arabia.

Instructions for Use. There are a few restrictions involved in using a SOPS survey outside the United States. The SOPS name and trademark (Surveys on Patient Safety Culture® (SOPS®)) is only allowed to be used on official validated AHRQ SOPS surveys. Therefore, surveys used outside the U.S. whether in English, in translation, or adapted for the local health care system, cannot use the SOPS® name and trademark in the title. You should include a note on the survey as a subtitle or in a footnote that says the survey is "reprinted/translated/adapted with permission from the Agency for Healthcare Research and Quality (an Agency of the United States Department of Health and Human Services); Rockville, Maryland USA."

Reprinting the English form, in full or in part, in a professional journal article or book chapter would require additional permission from the AHRQ Office of Communication to the publisher.

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Surveys on Patient Safety Culture®. Agency for Healthcare Research and Quality, Rockville, MD USA. <https://www.ahrq.gov/sops/>

You should make the translated materials available to researchers at Saudi Arabia in electronic format free of charge, requesting them to give source credit to your organization.

Guidance Documents. The AHRQ SOPS survey and related materials may be found on the AHRQ website at: <https://www.ahrq.gov/sops/>. We can also put you in touch with other non-U.S. users of the survey (go to <https://www.ahrq.gov/sops/international/> for more information).

If you have questions about permissions issues, please feel free to contact Mr. Holland (copied on this email).

Sincerely,
Morella

AHRQ Surveys on Patient Safety Culture® (SOPS®) Technical Assistance
Westat | 1700 Research Blvd | Rockville, MD 20850
phone: 1-888-324-9749 | fax: 1-888-852-8277 | email: SafetyCultureSurveys@westat.com
Sign up for SOPS updates, news, and events and select "Surveys on Patient Safety Culture" under Quality and Safety topics: <https://public.govdelivery.com/accounts/USAHRQ/subscriber/new>

Appendix D. Permission to Reproduce the Guld Cooperation Council Map

6/25/26, 10:38 AM

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Jun 25, 2026

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Appendix E. Permission to Reproduce the Published Systematic Review**Nurses' perceptions of patient safety culture measured by the Hospital Survey on Patient Safety Culture in the Gulf Cooperation Council region: A systematic review**

Author: Majed S. Alshammari, Jane Tyerman, Idrissa Beogo, J. Craig Phillips

Publication: International Journal of Nursing Studies Advances

Publisher: Elsevier

Date: June 2026

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