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Assessment of Nurses' Patient Safety Culture in Primary Health Care Centers in Saudi Arabia



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Abstract

Purpose: Patient safety culture emphasizes strategies to prevent harm, learn from errors, and strengthen healthcare systems, nurses play a crucial role in maintaining patient safety within health facilities. Assessing patient safety culture (PSC) among nurses is essential for identifying gaps, fostering improvements, and strengthening overall care delivery. This study aims to explore nurses' perceptions of patient safety culture in the primary health care centers (PHCs) in Saudi Arabia.

Materials and Methods: A cross-sectional study design was utilized to select 387 nurses employed in primary healthcare centers in Jeddah, using convenient sampling via an online survey. The Hospital Survey on Patient Safety Culture (HSOPSC) questionnaire was used to evaluate the perception of patient safety culture. Data were saved and examined utilizing SPSS Ver.26 software. Along with descriptive statistics, independent sample t-tests and ANOVA were employed to examine the significance of differences among subgroups. A p-value below 0.05 signifies statistical significance.

Findings: The overall score representing nurse managers' perceptions of patient safety culture was a mean of 3.93 with a standard deviation of 0.44. Among the assessed domains, the teamwork support domain received the highest score, with a mean of 4.27 and a standard deviation of 0.587, while the nonpunitive response to error had the lowest score, with a mean of 2.44 and a standard deviation of 0.883. Nurses younger than 30 years reported a significantly lower overall score, with a mean of 3.74 and a standard deviation of 0.43. In contrast, nurses holding diplomas

and those in clinical roles achieved higher scores, with means of 3.97 and 3.99, respectively, and standard deviations of 0.44 and 0.46. Scores increased notably with additional years of experience, particularly for nurses with ten or more years of experience, who achieved a mean score of 4.07 with a standard deviation of 0.62, compared to those with ten to less than fifteen years of experience, who achieved a mean score of 3.75 with a standard deviation of 0.33. The differences were statistically significant with a p-value of less than 0.001. Significant differences, also with a p-value of less than 0.001, were observed across departments. The WBC unit recorded the highest perception score, with a mean of 4.32 and a standard deviation of 0.50, followed by the X-ray unit, with a mean of 4.01 and a standard deviation of 0.33

Implications to Theory, Practice and Policy: Nurses viewed the safety culture positively in the primary health care centers. Less experienced and younger nurses indicated lower perceptions of PSC, whereas clinical nurses assessed it higher than non-clinical personnel. High-pressure areas such as the Operating Room encounter more significant PSC challenges than other departments. It is essential to create training programs that connect younger nurses with older professionals to boost their clinical confidence and safety skills, focusing on learning from errors instead of placing blame.

Keywords: *Patient Safety Culture, Nurses, Perception, Primary Healthcare Centers*

JEL Codes: I11, I18, J28

1.0 INTRODUCTION

Patient safety is a critical component of healthcare delivery worldwide, directly influencing the quality of care and patient outcomes. The World Health Organization (WHO) defines patient safety as the effort to prevent unnecessary harm and reduce risks linked to the provision of healthcare (1). The Institute of Medicine's seminal report "To Err is Human" highlighted systemic challenges contributing to patient harm and proposed a framework for addressing these issues (2).

In line with this, patient safety culture refers to the shared values, beliefs, attitudes, and norms that shape how safety is prioritized, discussed, and addressed within a healthcare organization. An effective patient safety culture is essential for reducing medical errors, improving patient outcomes, and creating a safer healthcare environment. It promotes open communication, a non-punitive approach to error reporting, and a commitment to continuous improvement, all of which are essential for building trust in healthcare systems (3,4).

Patient safety culture emphasizes strategies to prevent harm, learn from errors, and strengthen healthcare systems (5). In contrast, negative perceptions of safety culture are associated with higher rates of medical errors and adverse events (6). A systematic literature review identified the persistence of a "blame culture" as a significant barrier to patient safety in Arab countries. This punitive atmosphere discourages healthcare workers from reporting incidents, thus limiting opportunities for organizational learning and improvement (7).

Reason's Swiss cheese model has emerged as the leading framework for examining medical errors and patient safety events and has been widely adopted in research dealing with patient safety (8). This model suggests that in a complicated system, a sequence of barriers prevents hazards from leading to human losses. Every barrier has unexpected vulnerabilities or gaps, thus the resemblance to Swiss cheese. These vulnerabilities are irregular, meaning the gaps appear and disappear unpredictably. If all openings align by coincidence, the danger reaches the patient and inflicts damage (9).

In Saudi Arabia, primary healthcare centers (PHCs) are essential for improving population health and well-being. As frontline providers, nurses as primary caregivers, play a crucial role in maintaining patient safety within these centers. Their participation in safe practices, promotion of patient-centered care, and involvement in error prevention strategies are essential for attaining optimal patient outcomes (3).

Even with the increasing international focus on safe practices in health facilities, extensive studies and evaluations continue to reveal ongoing vulnerabilities in patients worldwide, leading to an alarming frequency of adverse events (AEs) that vary between 3% and 17%, significantly affecting healthcare experiences (10). This wide range in the prevalence of AEs may be linked to variations in the patient safety culture among healthcare professionals, as detailed in a systematic review conducted for this objective (11).

In Saudi Arabia, the importance of patient safety culture has grown significantly, particularly within the framework of the Vision 2030 reform agenda, which emphasizes improving healthcare quality and accessibility (12). However, Saudi PHCs face unique challenges, including rapid system expansion, workforce diversity, and varying adherence to global safety standards (13). Therefore, understanding the perceptions of HCWs in PHC enables healthcare organizations to implement targeted interventions that strengthen the safety culture, thus reducing risks and

preventing potential harm to patients. Accordingly, this study explores nurses' perceptions of patient safety culture in the PHCs in Saudi Arabia and identifies the factors that influence these perceptions.

Statement of the Problem

In Saudi Arabia, PHC centers act as the main contact for patients, rendering the safety culture among nurses vital to the overall efficacy of healthcare services. Although there is worldwide acknowledgment of the significance of patient safety, there has been minimal research focused on evaluating nurses' perceptions regarding the safety culture in PHCCs in Saudi Arabia.

2.0 MATERIAL AND METHODS

A cross-sectional survey design was employed to collect data from nurses working in primary healthcare centers in PHCs in Jeddah, including nurses from both urban and rural areas. Participants must be licensed nurses currently practicing in Saudi Arabia. The sample size was calculated using the Raosoft program with the following parameters: Confidence level: 95%, Margin of error: 5%, Response distribution: 50%. The required sample size was approximately 384 participants. A convenience sampling method was employed. Online surveys were distributed via email, and social media applications were shared with nurses working in PHCs in Jeddah to ensure accessibility and participation. A structured and validated questionnaire was used, consisting of two main sections: Demographic characteristics: Age, gender, profession, years of experience, and education level.

The second section included items reflecting the perception of patient safety culture: utilizing the Hospital Survey on Patient Safety Culture (HSOPSC) questionnaire, which has been translated and validated. The HSOPSC is widely recognized for its robust psychometric properties, making it a valid and reliable tool for assessing patient safety culture (PSC), with Cronbach's alpha= 0.88 for the entire instrument, with values ranging from 0.46 to 0.84 across individual dimensions. A 5-point Likert scale was used to measure participants' perceptions of PSC, ranging from strongly disagree to strongly agree. Data were analyzed using SPSS ver.28. with the following methods: Descriptive statistics: Mean, standard deviation, and frequency were used to summarize demographic data and perceptions of patient safety culture. The scores of the items of HSOPSC are presented in their original responses in the descriptive analysis. For estimating the total score, fourteen items (3,4,10,11,24,25,26,27,29,30,33,36,37,38) were reversed according to the guidelines for using the tool (14,15), the total score was tested for normality by Shapiro Wilk's test. For inferential statistics, independent sample t-tests and ANOVA were used to analyze group differences. The regional Institutional Research Committee in the Directorate of Health Affairs approved the study.

3.0 FINDINGS

The characteristics of the nurses (n=387) are presented in Table 1. The majority are Saudis (97.4%), with a predominance of female nurses (77.0%). The largest age group was nurses aged 30–39 years (42.9%), followed by those aged 40–49 years (29.2%) with a mean age of 40.4±8.1 years. Most of them held a Diploma (75.5%), while bachelor's and postgraduate holders made up (20.9%) and (3.62%), respectively. Staff nurses were the majority (93.3%). Most nurses worked in both clinical and nonclinical duties (69.5%), with others in strictly non-clinical roles (16.3%) or

clinical roles (14.2%). The largest group worked in Clinics (63.31%, n=245). Experience showed 40.8% with 15+ years in Primary Healthcare.

Table 2 provides an overview of nurses' perceptions of safety culture based on responses to multiple items. The overall safety culture rating was satisfactory, at 3.51, highlighting strengths while pinpointing major areas for improvement, especially in error management, staffing, and collaboration. The teamwork support domain received the highest score (Mean = 4.27, SD = 0.587), whereas the lowest was noted for the nonpunitive response to error (Mean = 2.44, SD = 0.883). Nurses stressed the importance of placing patient safety ahead of workload (Mean: 4.49, SD: 0.942) and pointed out the significance of efficient error prevention (Mean: 4.38, SD: 0.630). Nonetheless, they were not in agreement that patient safety issues are frequent (Mean: 2.54, SD: 1.115) or that errors occur randomly (Mean: 1.87, SD: 0.824). Regarding the reported event frequency, the nurses reported a strong consensus on the regular reporting of errors, indicating a robust reporting culture (Mean: 4.26, SD: 0.611). Nurses believed that managers acknowledged safe practices (Mean: 4.26, SD: 0.701) and appreciated their suggestions, resulting in a generally favorable rating for managerial support (Mean: 3.51, SD: 0.588). Also, nurses showed high agreement regarding effective safety enhancements (Mean: 4.24, SD: 0.545). Regarding the collaboration among teams, the high mean score (Mean: 4.28, SD: 0.587) reflected robust assistance and teamwork among nurses.

Nurses assigned a positive rating to communication openness, achieving an average score of 3.56, which reflects a general readiness to express safety concerns (mean range: 4.11-4.12) but minimal worry regarding possible consequences for bringing up issues (mean: 2.45). The element of nonpunitive error response achieved a low average score (mean: 2.44), indicating nurses' disapproval of punitive approaches associated with errors (mean range: 2.34-2.50). Staffing was viewed as neutral (mean: 3.35), with nurses disputing assertions of heavy workloads (mean range: 2.16-2.18), resulting in an unfavorable overall score (mean: 2.56). In contrast, support from management for patient safety was highly confirmed (mean: 4.25), positively influencing the safety climate (mean: 3.79). Collaboration among units was rated highly (mean: 4.22), though some neutrality was noted regarding coordination (mean range: 2.73-2.83).

The total score for the perception of nurse managers towards patient safety culture after reversing the negative statements accounted for (Mean = 3.93, SD = 0.44). Table 3 presents variations in nurses' perceptions according to their characteristics. Male (3.93±0.38) and female nurses (3.92±0.46) exhibited similar perceptions ($P=0.063$). Both Saudi (3.93±0.44) and non-Saudi nurses (3.97±0.48) reported comparable perceptions ($P=0.789$). However, significant variations were noted ($P<0.001$), with younger nurses (<30 years, 3.74±0.43) reporting lower perceptions compared to older nurses (≥ 50 years, 4.34±0.47). Also, those with diplomas had significantly higher scores (3.97±0.44) than postgraduate nurses (3.77±0.43) ($P=0.004$). Moreover, clinical nurses (3.99±0.46) had significantly higher scores than non-clinical roles (3.78±0.40) ($P=0.007$), while the staff (3.93±0.45) and nurse managers (3.95±0.31) showed similar perceptions ($P=0.802$). The results showed that .The score increases significantly with greater experience, especially ≥ 10 years (4.07±0.62) compared to 10–<15 years (3.75±0.33) ($P<0.001$). Significant differences ($P<0.001$) were found in nurses according to department, with WBC (4.32±0.50) and X-ray (4.01±0.33) units reporting highest perceptions, whereas Operation Room (3.72±0.40) and Maternity Care (3.74±0.24) scored lower scores.

Discussion

To the best of our knowledge, there have been no investigations of PSC among nurses employed in primary healthcare within Saudi Arabia. Consequently, this study was carried out to evaluate nurses' PSC in primary healthcare centers. Nurses stressed the importance of prioritizing patient safety over workload, emphasizing efficient error prevention, and recognizing their vital role in minimizing patient risks. This patient-centered approach highlights nurses' awareness of their critical role in minimizing risks to patients. Research indicates that focusing on safety enhances the safety climate, decreases preventable errors, and improves patient outcomes.(16) Although nurses acknowledge safety's importance, which indicates a robust reporting culture, they do not perceive that there are frequent patient safety issues or random errors, which may either indicate confidence in their practices or underreporting due to fear of penalties (17). Nevertheless, nurses display strong support for regular error reporting, which is crucial for organizational learning and improvement, sustained by perceptions of managerial support, positively influencing safety culture and fostering trust among healthcare staff (18). Effective teamwork and open communication are highlighted as vital for infection prevention and coordinated care, while concerns persist about punitive responses to errors. Research indicates that blame-based cultures hinder incident reporting and systemic learning opportunities (19).

The findings revealed notable differences in safety culture perceptions among nurses, influenced by age, education, and experience. Younger nurses (<30 years) showed lower safety culture perceptions, likely due to limited clinical exposure with insufficient integrity in safety principles compared to older nurses (≥ 50 years), who possess greater confidence and expertise. This disparity underscores the challenges younger nurses face in adapting to institutional norms while gaining competence in safety protocols(20). Nurses with diplomas reported higher safety perception scores than postgraduate nurses. This could be attributed to the nature of the Diploma nursing programs, which typically focus more on practical and clinical skills rather than academic or theoretical knowledge (21). Moreover, this outcome may stem from diploma nurses' closer engagement with patient care and practical safety measures, thus enhancing their safety perceptions. In contrast, postgraduate nurses, with their advanced theoretical knowledge, might focus on evaluating systems critically, which can highlight gaps and lead to lower scores (22). Clinical nurses scored significantly higher than non-clinical nurses, likely due to their direct involvement with patient care and safety protocols, which allows them to observe and implement safety measures firsthand. Non-clinical nurses may lack this exposure, limiting their understanding of safety protocols' impacts.

Clinical environments also encourage teamwork and communication, further supporting safety perceptions (23). Additionally, perceptions of safety culture improved with experience, particularly among nurses with ≥ 10 years in the field compared to their 10–<15 years experienced counterparts. These seasoned professionals develop confidence in implementing safety protocols and can better recognize and respond to hazards, contributing to higher safety perceptions (24). Departmental differences were notable, with units like WBC and X-ray reporting the highest safety perceptions, likely due to standardized protocols and routine tasks that minimize variability and risk. Conversely, units such as Operating Room and Maternity Care had lower scores, attributed to high-pressure situations that complicate safety maintenance, alongside emotional and physical stress impacting safety culture perceptions (23). Moreover, hierarchy is more evident in OR, as surgeons frequently occupy leadership positions. This situation can deter other employees, such as

nurses, from voicing safety issues or challenging choices. However, this needs to be further verified and investigated deeply in future research.

Limitations of the study: The study deployed convenience sampling, which can lead to selection bias since the sample might not accurately reflect the larger population, which restricts the generalizability of the results. Moreover, self-reported information can be influenced by potential biases like social desirability bias, which may affect the accuracy and dependability of the findings.

4.0 CONCLUSIONS AND RECOMENDATIONS

This study explores nurses' perceptions of patient safety culture (PSC) in Saudi Arabia's primary healthcare centers. Nurses showed a positive perception of patient safety culture in the PHCs. They stressed the necessity of prioritizing patient safety over workloads and underscored error prevention's significance. A robust reporting culture and strong managerial support are seen as vital strengths that cultivate trust and organizational learning. However, fears of punitive measures for errors inhibit transparency and safety reporting. Notably, younger and less experienced nurses reported lower PSC perceptions, while clinical nurses rated safety higher than non-clinical staff. High-pressure departments like the Operating Room face greater PSC challenges compared to standardized units.

It is recommended that policymakers should develop a structured approach to blame-free error reporting, emphasizing learning from mistakes rather than assigning blame. In addition, providing tailored training programs targeting nurses in the high-pressure departments. Also, there is a need for structured mentorship programs pairing junior nurses with experienced professionals to enhance their clinical confidence and safety competencies. Conduct workforce assessments to ensure adequate nurse-to-patient ratios, particularly in high-pressure departments. Future studies ought to focus on overcoming these limitations by utilizing randomized sampling methods and incorporating objective measures when feasible to improve the strength of the results.

Institutional Review Board Statement: The study was approved by the Institutional Review Board (IRB) of the Directorate of Health Affairs, Jeddah, Saudi Arabia.

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Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data presented in this study are available on request from the corresponding author.

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Conflicts of Interest: The authors declare no conflicts of interest.

Table 1: Characteristics of the Participant Nurses (n=387)

	N	%
Nationality		
Saudi	377	97.4%
Non-Saudi	10	2.6%
Gender		
Male	89	23.0%
Female	298	77.0%
Age categories		
<30 years	29	7.5%
30-39 years	166	42.9%
40-49 years	113	29.2%
≥50 years	79	20.4%
Mean±SD		40.4±8.1
Qualification		
Diploma	292	75.5%
Bachelor	81	20.9%
Postgraduate	14	3.6%
Position title		
Staff nurse	361	93.3%
Nurse manager	26	6.7%
Main job role		
Clinical	55	14.2%
Nonclinical	63	16.3%
Both	269	69.5%
Department/unit		
Clinics	245	63.3%
WBC	73	18.9%
Maternal care	12	3.1%
Pharmacy	11	2.8%
Laboratory	10	2.6%
X-ray	8	2.1%
Operation Room	14	3.6%
Supervisor	14	3.6%
Years of experience in the PHC		
<5 years	60	15.5%
5-<10 years	96	24.8%
10-<15 years	73	18.9%
≥15 years	158	40.8%
Mean±SD		40.4±8.1

Table 2: The Nurses' Responses to the Items Reflect Their Perceived Safety Culture

NO.	Variable	Mean	SD	Response
A	<i>Overall perceptions of safety</i>	3.32	0.351	Neutral
1	Patient safety is never sacrificed to get more work done	4.49	0.942	Strongly agree
2	Our procedures and systems are good at preventing errors from happening	4.38	0.630	Strongly agree
3*	It is just by chance that more serious mistakes do not happen around here	1.87	0.824	Disagree
4*	We have patient safety problems in this facility	2.54	1.115	Disagree
B	<i>Frequency of events reported</i>	4.26	0.611	Strongly agree
5	When a mistake is made, but is caught and corrected before affecting the patient, it is reported	4.33	0.628	Strongly agree
6	When a mistake is made, but has no potential to harm the patient, it is reported	4.27	0.698	Strongly agree
7	When a mistake is made that could harm the patient, but does not, it is reported	4.19	0.755	Strongly agree
C	<i>Supervisor/manager expectations and actions promoting patient safety</i>	3.51	0.588	Agree
8	Manager says a good word when he/she sees a job done according to established patient safety procedures	4.26	0.701	Strongly agree
9	Manager seriously considers staff suggestions for improving patient safety	4.19	0.765	Strongly agree
10*	Whenever pressure builds up, my manager wants us to work faster, even if it means taking shortcuts	2.42	1.008	Disagree
11*	My manager overlooks patient safety problems that happen over and over	3.17	1.200	Neutral
D	<i>Organizational learning and continuous improvement</i>	4.24	0.545	Strongly agree
12	We are actively doing things to improve patient safety	4.33	0.597	Strongly agree
13	Mistakes have led to positive changes here	4.29	0.615	Strongly agree
14	After we make changes to improve patient safety, we evaluate their effectiveness	4.32	0.579	Strongly agree
15	We are given feedback about changes put into place based on event reports	4.13	0.726	Agree
16	We are informed about errors that happen in the facility	4.08	0.767	Agree
17	In this facility, we discuss ways to prevent errors from happening again	4.27	0.664	Strongly agree
E	<i>Teamwork within units</i>	4.28	0.587	Strongly agree

NO.	Variable	Mean	SD	Response
18	People support one another in this facility	4.27	0.671	Strongly agree
19	When a lot of work needs to be done quickly, we work together as a team to get the work done	4.32	0.653	Strongly agree
20	In facility, people treat each other with respect	4.30	0.646	Strongly agree
21	When one area in this unit gets really busy, others help out	4.25	0.655	Strongly agree
F	Communication openness	3.56	0.568	Agree
22	Staff will freely speak up if they see something that may negatively affect patient care	4.12	0.802	Agree
23	Staff feel free to question the decisions or actions of those with more authority	4.11	0.763	Agree
24*	Staff are afraid to ask questions when something does not seem right	2.45	1.038	Disagree
G	Nonpunitive response to error	2.44	0.883	Disagree
25*	Staff feel like their mistakes are held against them	2.47	0.998	Disagree
26*	When an event is reported, it feels like the person is being written up, not the problem	2.50	1.011	Disagree
27*	Staff worry that mistakes they make are kept in their personnel file	2.34	0.901	Disagree
K	Staffing	2.56	0.570	Disagree
28	We have enough staff to handle the workload	3.35	1.232	Neutral
29*	Staff in this facility work longer hours than is best for patient care	2.16	0.976	Disagree
30*	We work in crisis mode trying to do too much, too quickly	2.18	0.928	Disagree
L	Management support for patient safety	3.79	0.516	Agree
31	Management provides a work climate that promotes patient safety	4.16	0.659	Agree
32	The actions of management show that patient safety is a top priority	4.25	0.654	Strongly agree
33*	Management seems interested in patient safety only after an adverse event happens	2.49	1.155	Disagree
34	Units work well together to provide the best care for patients	4.25	0.645	Strongly agree
M	Teamwork across units	3.14	0.735	Neutral
35	There is good cooperation among units that need to work together	4.22	0.678	Strongly agree
36*	Units do not coordinate well with each other	2.78	1.196	Neutral
37*	It is often unpleasant to work with staff from other units	2.73	1.047	Neutral
38*	Things “fall between the cracks” when transferring patients from one unit to another	2.83	1.123	Neutral

Table 3: The Nurses' Perceived Safety Culture Differences According to Their Characteristics

	Mean ± SD	P
Gender:		
Male	3.93±0.38	0.063
Female	3.92±0.46	
Nationality:		
Saudi	3.93±0.44	0.789
Non-Saudi	3.97±0.48	
Age:		
<30 years	3.74±0.43	<0.001*
30-<40 years	3.83±0.35	
40-<50 years	3.84±0.38	
≥50 years	4.34±0.47	
Educational level:		
Diploma	3.97±0.44	0.004*
Bachelor	3.81±0.42	
Postgraduate	3.77±0.43	
Position title:		
Staff nurse	3.93±0.45	0.802
Nurse manager	3.95±0.31	
Main job role:		
Clinical	3.99±0.46	0.007*
Non clinical	3.78±0.40	
Both	3.95±0.44	
Years of experience in PHC:		
<5 years	3.86±0.42	<0.001*
5-<10 years	3.87±0.42	
10-<15 years	3.75±0.33	
≥10 years	4.07±0.62	
Department/unit:		
Clinics	3.84±0.36	<0.001*
WBC	4.32±0.50	
Maternity care	3.74±0.24	
Pharmacy	3.84±0.53	
Laboratory	3.77±0.53	
X-ray	4.01±0.33	
Operation room	3.72±0.40	
Supervisor	3.90±0.42	

*Based on Independent sample t test **Based on ANOVA test ***statistically significant

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