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Evaluation of patient safety culture as perceived by nurses during the COVID-19 pandemic

Original Article

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Abstract: **Objectives:** A good patient safety culture (PSC) is linked to a reduced risk of patient problems and minimal undesirable occurrences. This study investigated the PSC levels from nurses' perspectives during the COVID-19 pandemic.

Methods: A descriptive cross-sectional design was applied. The Hospital Survey on Patient Safety Culture (HSOPSC) questionnaire was administered to 315 nurses working at 2 major hospitals in Jeddah, Saudi Arabia. The data were analyzed using descriptive statistics, a *t*-test, and a one-way ANOVA test. The statistical significance of the correlation was determined at the 0.05 level.

Results: PSC was rated as medium overall according to the nurses, with a weighted mean of 2.88–0.76 and a relative weight of 57.57%. In addition, all PSC composites were rated from medium to high, except organizational learning, which was rated low. The correlation between sociodemographic variables as well as PSC levels was investigated using the *t*-test and one-way ANOVA test. The association is statistically significant when $P \leq 0.05$. The findings revealed a statistically significant correlation between nurse nationality ($t = -4.399$, $P = 0.000$), age ($F = 7.917$, $P = 0.000$), experience in years ($F = 3.760$, $P = 0.024$), and hospital ($t = -0.401$, $P = 0.689$).

Conclusions: The nurses in this study had a medium overall PSC level, and all PSC composites ranged from a medium to a high level, except organizational learning, which had a low level. In addition, the findings showed that there is a significant relationship between PSC levels, nurses' nationalities, experience in years, and the hospital itself.

Keywords: *COVID-19 • patient safety • Saudi Arabia • staff nurses • cultural issue • evaluation • hospital survey • quality and safety*

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1. Introduction

Millions of patients suffer from sickness, accidents, or death each year due to unsafe medical practices. Worldwide, it is believed that 4 in 10 clients are injured in primary care and outpatient settings. One in every 10 patients in developed countries is predicted to be harmed during hospitalization. Each year, 134 million

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adverse incidents happen in hospitals in low- and middle-income countries (LMICs), resulting in 2.6 million fatalities.[1–3]

Hospital safety culture evaluation has been used as a managerial tool in countries all over the world, with backing from health authorities and administrators. The evaluation of culture can be used for a variety of purposes, including increasing staff knowledge of the importance of patient safety; assessing current conditions of the organisation; highlighting the positive aspects of safety culture as well as development opportunities; analyzing the evolution of safety culture over time; assessing the effect of patient safety strategies and initiatives on safety culture; and making parallels between them within healthcare facilities.[4]

It is available to experts all around the world who are interested in evaluating their hospital's safety culture. Hundreds of hospitals in the United States and other developed and poor nations utilize it. Over 60 countries have researched using this tool by 2015, and it is available in 30 versions and is backed up by research on cross-cultural adaptation.[5]

Patient safety culture (PSC) has become an important component of healthcare organizations' efforts to minimize patient harm and provide safe, high-quality treatment. The term "patient safety culture" refers to a subset of the corporate culture. Beliefs, ideas, attitudes, opinions, norms, processes, skills, and behavioral patterns of individuals and groups all play a role in determining a health organization's commitment to patient safety management.[6]

The IOM has emphasized the creation of basic patient safety initiatives to strengthen safety culture and create safe health systems; for example, reporting and analyzing safety incidents using non-punitive methodologies, establishing multidisciplinary team training safety programs, and using firm safety concepts, equipment, materials and work methods that are standardized and streamlined. The IOM, on the other hand, has stated that the most challenging aspects of achieving a safety culture are the cultural change that happens and the frequent blame put on people for a system approach.[6,7]

An Albanian study indicated that 6 organizational factors could influence the safety culture of healthcare workers. These factors included managerial support, teamwork climate, communications, job satisfaction, and working conditions. Finally, there was the stress recognition component and how stressors affect work. Communication failures and ineffectiveness are blamed for a large percentage of mistakes in healthcare.[8]

Research in the Middle East, including Palestine, and Egypt, indicated that there are some areas of weaknesses like communication and teamwork, especially across hospital units and professions, which lower the PSC.[9,10]

According to a Saudi Arabian study, variables contributing to the PSC include blame culture, incompetent leadership, poor communication, and workload/inadequate personnel. In contrast, "strength" characteristics influencing a strong PSC include realistic management expectations and supportive actions encouraging patient safety, good unit collaboration, and organizational attitudes toward learning/continuous improvement.[11] Furthermore, Elmontsri (2017) claimed that blame culture and poor communication were typical variables related to a low PSC in Saudi Arabia. Fear of being accused was cited as a major impediment to nurses in Saudi Arabia reporting incidents and prescription mistakes.[12,13]

Nurses play a critical role in patient safety because they are the frontline advocates who implement safety and quality programs in the clinical setting. Under the practitioner's supervision, however, patient safety-related errors and injuries are nevertheless common. Although there is a wealth of information on PSC in various areas of the world, there is little research on the subject in the Arab world, particularly in Saudi Arabia. As a result, studies on this issue in Saudi Arabian hospitals are required to clearly depict the existing PSC in the Kingdom. Scholars also propose assessing safety culture in the clinical setting regularly to discover opportunities for improvement. As a result, the goal of this study was to determine the degree of PSC from the perspective of nurses during the COVID-19 epidemic.

2. Methods

2.1. Materials

This study was conducted between Monday, March 15th, and Sunday, March 21st, 2021, using a cross-sectional descriptive research approach. This research was carried out at East Jeddah General Hospital (EJGH) and King Fahd General Hospital (KFGH), in the western part of Saudi Arabia, both of which had national and international nursing staff. All nurses with a minimum of 1 year of direct experience who offer direct patient care at EJGH and KFGH were selected. At the same time, new nurses were barred from participating in their organizations due to a lack of comprehensive adaptability. Employee attitudes and managerial variables, which may affect PSC levels and play a vital role in fostering healthy and constructive behaviors among employees or vice versa, are also not yet influencing them. Furthermore, all managerial-level nurses were eliminated because the study's goal was to investigate the extent to which PSC exists among solely direct-care staff nurses.

The entire target population for this study was 1750 people. There were 800 male and female nurses from

King Fahad General Hospital and 950 male and female nurses from East Jeddah Hospital. The final sample size was 315 based on the following equation, which was computed using an online calculator (https://www.surveysystem.com/sscalc.htm) with a 5% confidence interval (margin of error) and a confidence level of 95%.

Electronic self-report questionnaires were employed in this study, which included 2 sections. The first component includes sociodemographic information about the participants (age, gender, marital status, etc.), while the second section uses the Hospital Survey on Patient Safety Culture (HSOPSC) scale to determine the nurses' PSC level. The Agency for Healthcare Research and Quality (AHRQ) created the original English version, HSOPSC. HSOPSC is a valid and accurate psychometric measure for measuring a healthcare organization's overall or particular unit's PSC.[14] The questionnaire has 42 questions which are grouped into 12 subscales or composites. Each subscale has 3–4 items, which are graded on a 5-point Likert scale ranging from 5, strongly agree, to 1, strongly disagree. As a consequence, the overall score of the tool ranges from 42 to 210. The 12 subscales include overall perceptions of safety, frequency of reported events, handoffs and transitions, staffing, teamwork between units, manager expectations and actions promoting patient safety, teamwork within units, communication openness, organizational learning, feedback and communication about errors, non-punitive response to errors, and management support for patient safety.[15,16]

2.1.1. Reliability of the instrument

Reliability is the extent to which a measurement is free from measurement error. It measures the consistency and accuracy of the data collection instrument. The consistency of results across items, is often measured with Cronbach's α. Cronbach's α should minimally reach 0.70 for an instrument to have an acceptable level of consistency.[17] After collecting the data, the data was inputted into SPSS, and computed the reliability coefficient for the instrument. The Cronbach's a coefficients for each scale utilized in this study were as follows: Cronbach's a was 0.91 in Arabic designed for PSC level (HSOPSC), and 0.90 for the complete scale in English. This suggested that the questionnaire's reliability was good.

2.1.2. Validity of the instrument

Validity is the degree to which an instrument measures what it is intended to measure.[18] Using the same data sample, and SPSS, the item level validity of the instruments was examined by determining the following scoring assumptions: A—the item belonging to the same instrument and measuring the same construct should show approximately the same mean and standard divisions. B—All instruments are valid and powerful. Using the mean, standard deviation, and *F*/*P*-values of a one-way ANOVA test were employed to examine any relationship between sociodemographic characteristics and levels of research variables. The correlation's statistical significance was examined at the 0.05 level.

As a result of the COVID-19 pandemic, the researcher employed Google Drive to create electronic linkages in English and Arabic. To avoid spreading the COVID-19 virus, both hospitals refused to accept hard copies of the questionnaires. The researcher then contacted nursing directors, managers, and heads of nursing to explain the computerized questionnaire and encourage them to email it to their staff nurses. The overwork load at KFGH as a result of the pandemic caused by COVID-19 had a detrimental impact on the hospital's response rate, which was just 27%. In comparison, EJGH had a response rate of 73%. The study sample had a total response ratio of 100%.

2.2. Statistical analysis

SPSS version 25 statistical tools for social science were used to analyze the data. To begin, sociodemographic data were subjected to descriptive statistical analysis using percentages and frequencies. To assess the extent to which PSC exists and its dimensions, descriptive statistics such as percentages, frequencies, standard deviations, means, and weighted means were applied. To establish the extent of PSC, as well as its subscales, descriptive statistics such as percentages, frequencies, standard deviations, means, and weighted means were employed. The mean, standard deviation, and *t*/*P*-values were used to assess the association between nurses' demographics (gender, country, and hospital) and the levels of research variables using an independent sample *t*-test. The statistical significance was examined at the 0.05 level. Finally, the mean, standard deviation, and *F*/*P*-values of a one-way ANOVA test were employed to examine any relationship between sociodemographic characteristics and levels of research variables. The correlation's statistical significance was examined at the 0.05 level.

2.3. Ethical approval

All ethical issues were strictly observed throughout the study. The Faculty of Nursing Ethical Committee of King Abdul-Aziz University was first consulted under code

(NREC Serial No: Ref No 1M. 27). Second, the Ministry of Health (MoH) gave its approval. After obtaining the MoH's facilitation letter, permits were sought from EJGH and KFGH. Participating in the study would not result in any potential or actual harm to participants, and the benefit of this study is that it provides fresh information on PSCs to the targeted hospitals. Before completing the questionnaire, the respondents were fully informed, and their consent to participate was obtained via an explicit consent form. Furthermore, the computerized questionnaire stated clearly that the information gathered would be kept confidential, and the participants (nurses) were not requested to provide their identities, assuring anonymity. In addition, the computerized questionnaire explains how they can withdraw from the research at any time. Participant information was coded and only the study team had access to it.

3. Results

Registered nurses working at EJGH and KFGH who offer direct care and have at least 1 year of experience were included in the study (n = 315). There was a 100% response rate. Table 1 shows the frequency and percentage of sociodemographic characteristics of the 2 hospitals in the study sample, which consisted of n = 85 from KFGH (27%) and n = 230 from EJGH (73%) participants. Only 10.2% of the nurses were >40 years old, with slightly more than half of the nurses (53.3%) being between the ages of 30 years and 40 years. The majority (94.9%) were female, with Saudi nurses accounting for slightly more than two-thirds (68.9%). When it came to marital status, over half of the nurses (58.4%) were married, with only 6.3% being divorced. Furthermore, just 62.5% of respondents had a bachelor's degree, in addition to only 3.8% having a master's degree or above. A little >3-quarters of respondents (77.4%) had >5 years of experience, whereas just 22.6% of nurses had 1–5 years of experience. In addition, one-third (34%) worked in intensive care units, whereas just 2.5% worked in isolation. In terms of the hospital, just over a third of the nurses (27%) worked at King Fahad General Hospital, while almost 3-quarters (73.0%) worked at EJGH.

The nurses' responses regarding PSC statements or items (overall safety perception, number of reported incidents, and handoffs and transitions) are clarified in Table 2. When it comes to general safety perceptions, the nurses strongly agreed with the statement "getting more work done never means compromising patient safety," with the highest weighted mean (4.37 ± 0.73), while the lowest weighted mean was 3.61 ± 0.93, showing that nurses agreed with the item "here, we have a very low serious error rate just by chance."As indicated in the composite of the rate of incidents stated, the ultimate weighted mean was 4.23 ± 0.91 for the statement "when a mistake is made that could injure the patient but does not". Conversely, the lowest weighted mean was 3.61 ± 0.93, which indicated that nurses agreed with the statement "when a mistake is made but has no risk of injury to the patient."

Variables	Frequency	%
Age, years		
20–30	115	0.365
30–40	168	0.533
≥40	32	0.102
Gender		
Male	16	0.051
Female	299	0.949
Marital status		
Single	111	0.353
Married	184	0.584
Divorced	20	0.063
Nationality		
Saudi	217	0.689
Non-Saudi	98	0.311
Diploma	106	0.337
Education level (Diploma)		
Bachelor	197	0.625
Master and above	12	0.038
Years of experience, years		
1–5	71	0.226
5–10	245	0.774
≥10	122	0.387
Workings units		
Medical	50	0.159
Surgical	18	0.057
Isolation unit	8	0.025
Intensive care unit	107	0.340
Emergency room	34	0.108
Outpatient department	23	0.073
Delivery room	32	0.102
Antenatal room	11	0.035
Operation room	13	0.041
Postnatal care	19	0.060
Hospital		
KFGH	85	0.270
EJGH	230	0.730

Note: EJGH, East Jeddah General Hospital; KFGH, King Fahd General Hospital.

Table 1. The socio-demographic characteristics of studied nurses (n = 315).

Composites and statements of PSC	Weighted mean	SD	Overall Response
Perceptions of overall safety			
Getting more work done never means compromising patient safety.	4.37	±0.73	Strongly agree
Our systems and procedures are effective at avoiding errors from occurring.	4.16	±0.82	Agree
Here, we have a very low serious error rate just by chance.	3.61	±0.93	Agree
In this unit, we have issues with patient safety.	4.18	±0.75	Agree
The rate of incidents stated			
When a mistake is made, it is recognized and corrected before it has an impact on the patient.	4.18	±0.75	Agree
When a mistake is made but has no risk of injury to the patient.	3.61	±0.93	Agree
When an error has been made that could have a serious impact on the patients but it does not.	4.23	±0.91	Strongly agree
Handoffs and transitions			
Problems frequently arise during information flow around hospital departments."	3.42	±1.37	Agree
Throughout handovers, important patient care data is frequently lost.	3.82	±0.97	Agree
Patients in this hospital have a hard time adjusting to changes in shifts.	3.91	±1.04	Agree
While moving clients from one department to a different unit, things "slip between the cracks."	4.19	±0.79	Agree

Table 2. Nurses' responses regarding PSC statements or items (n = 315).

PSC composites	Mean	Weighted mean	SD	Relative weights	Level
Perceptions of overall safety	20.61	4.12	±0.48	0.8543	High
The rate of incidents stated	34.24	2.85	±0.87	0.5707	Medium
Handoffs and transitions	22.83	2.85	±0.86	0.5709	Medium
Staffing	19.45	3.57	±0.55	0.7134	High
Expectations and behaviors of managers that promote patient safety	20.66	3.89	±0.54	0.7779	High
Teamwork within units	15.54	3.11	±0.91	0.6217	Medium
Cross-unit collaboration	16.45	3.29	±0.75	0.6582	Medium
Transparency in communication	13.11	2.62	±0.94	0.5246	Medium
Organizational learning	4.32	2.16	±1.16	0.4321	Low
Communication and feedback on faults	14.17	4.10	±0.67	0.8263	High
Errors are handled in a non-punitive manner	92.72	3.54	±0.35	0.7086	High
Support from management for patient safety	20.61	3.86	±0.54	0.7726	High
Overall PSC	294.70	2.88	±0.76	0.5757	Medium

Note: PSC, patient safety culture.

Table 3. The nurses' responses regarding the overall level of PSC and its composites (n = 315).

In the composite of handoffs and transitions, the highest weighted mean was 4.19 ± 0.79, which indicated that nurses agreed with the statement "while moving clients through one department to a different unit, things 'slip between the cracks,'" while the lowest weighted mean was 3.42 ± 1.37, indicating that nurses agreed with the statement "problems frequently arise during information flow around hospital departments."

PSC was rated as medium overall, with a weighted mean of 2.88 ± 0.76 and a relative weight of 57.57%. Also, all PSC composites were rated on a scale from medium to high, except for the composite of organizational learning, which had a low level. The highest weighted mean for the average of people's overall safety perceptions was 4.12 ± 0.48, with a relative weight of 85.43%. In contrast, the lowest mean was for

Overall PSC level	Mean range	Weighted mean range	No	%
Very Low	37 < 66.6	1 < 1.80	17	0.0540
Low	66.7 < 96.2	1.81 < 2.60	52	0.1651
Medium	96.3 < 125.8	2.61 < 3.40	134	0.4254
High	125.9 < 155.4	3.41 < 4.20	88	0.2794
Very high	155.5 to 185	4.21 to 5	24	0.0761

Note: PSC, patient safety culture.

Table 4. The frequency for nurses regarding the levels of PSC (n = 315).

Items	Mean ± Std	*t*/F	*P*
Gender a		–0.13	0.897
Male	2.85 ± 0.68		
Female	2.88 ± 0.76		
Nationality a		–4.399	0.000*
Saudi	3.15 ± 0.74		
Non-Saudi	2.76 ± 0.73		
Hospital a		–0.401	0.689*
KFGH	2.85 ± 0.74		
EJGH	2.89 ± 0.76		
Age b, years		7.917	0.000*
20–30	2.89 ± 0.76		
30–40	2.76 ± 0.81		
≥40	3.32 ± 0.52		
Marital status b		0.644	0.526
Single	2.82 ± 0.74		
Married	2.92 ± 0.76		
Divorced	2.80 ± 0.75		
Diploma	2.82 ± 0.73		
Education level b		2.767	0.064
Bachelor	2.94 ± 0.77		
Master and above	2.46 ± 0.65		
Years of experience b, years		3.760	0.024*
1–5	2.98 ± 0.75		
5–10	2.73 ± 0.74		
≥10	2.97 ± 0.76		
Workings department b		1.865	0.066
Medical	2.78 ± 0.75		
Surgical	2.87 ± 0.50		
Isolation section	2.88 ± 0.94		
ICU	2.95 ± 0.72		
ER	2.73 ± 0.75		
OPD	3.32 ± 0.75		
Delivery room	2.75 ± 0.82		
Antenatal room	2.60 ± 0.50		
Operation room	3.04 ± 0.76		
Postnatal care	2.92 ± 1.00		

Note: *a* Independent *t*-test; *b* One-way ANOVA test; * Sig = $P \leq 0.05$.

Table 5. The correlation between socio-demographic data and the PSC level (n = 315).

the composite of organizational learning (2.16 ± 1.16) with a relative weight of 43.21% (Table 3).

The frequency and percentages for the nurses regarding the levels of PSC are indicated in Table 4. The nurses' responses reveal that 42.54% of them had a weighted mean from 2.61 to <3.40, which means they had a medium level of PSC. In comparison, the lowest percentage, 5.40%, had a weighted mean from 1 to <1.80, implying a very low PSC level.

The relationship between sociodemographic variables and levels of PSC was investigated using the *t*-test and one-way ANOVA test, as indicated in Table 5. The association is statistically significant when $P \leq 0.05$. The findings revealed a statistically significant correlation between respondent nationality (t = -4.399, P = 0.000), experience in years (F = 3.760, P = 0.024), nurses age (F = 7.917, P = 0.000), and hospital (t = -0.401, P = 0.689).

EJGH, East Jeddah General Hospital; KFGH, King Fahd General Hospital; PSC, patient safety culture.

These results showed that Saudi nurses had higher levels of PSC (3.15 ± 0.74) than non-Saudi nurses (2.76 ± 0.73). Nurses who were ≥40 years old had higher PSC levels (3.32 ± 0.52) than others. Likewise, nurses with work experience of 1 year to <5 years had higher levels of PSC (2.98 ± 0.75) than others. The nurses who worked at EJGH had higher levels of PSC (2.89 ± 0.76) than the nurses who worked at King Fahad General Hospital.

However, the PSC level was not significantly associated with nurses' gender (t = -0.130, P = 0.897), marital status (F = 0.644, P = 0.526), educational level (F = 2.767, P = 0.064), and working unit (F = 1.865, P = 0.066).

4. Discussion

This research aimed to investigate nurses regarding the levels of PSC during the COVID-19 pandemic. Based on the findings of this research, PSC was rated as medium overall. Also, all PSC composites ranged from a medium to a high level, except for the composite of

organizational learning, which had a low level. These findings contradict those of a previous study in which 784 general practitioners (GPs) and triage nurses were utilized in a descriptive cross-sectional design study in the Netherlands to assess PSC in Dutch primary care outside of working hours. The study found a higher score in all PSC factors of triage nurses than GPs, particularly on perceptions of management and communication openness. Also, it was reported that healthcare professionals' perspectives of PSC are influenced by their practice experience and age. However, the Dutch PSC is seen highly by healthcare practitioners.[19] Nevertheless, in Brazil, a study reported the opposite result, revealing a negative PSC among healthcare providers, mainly managerial perception.[20] Furthermore, a study conducted a descriptive cross-section of 250 Egyptian healthcare providers to identify baseline perceptions and attitudes toward patient safety across healthcare disciplines. Based on the results, there was an overall safety culture-positive perception.[10]

Moreover, A descriptive cross-sectional survey was carried out to examine the PSC of different healthcare professionals from various countries employed in a Saudi Arabian medical facility's adult oncology department. The data from 127 healthcare professionals were analyzed. Based on the results, PSC can be considered to be significantly more positive among physicians than among nurses and pharmacists. Additionally, this study assumed a shared understanding of patient safety among all healthcare professionals.[21]

Despite this, a systematic review based on the HSOPSC results attempted to take a closer look at PSC in Arab nations. As a result of this study, they realized that patient safety must be promoted as a strategy in the Arab world.[12]

Another study looked at the culture of patient safety in a large Riyadh-based multi-site healthcare center. They compared it to a previous assessment from 2012 as well as regional and international studies. Furthermore, the researcher looked at the correlation between PSC predictions along with client outcomes while taking demographic factors and hospital size into account. In a descriptive cross-sectional design of 2592 healthcare providers, the Medical City still has areas that need further improvement. However, there was significant progress in many components of the culture of patient safety.[22]

The relationship between sociodemographic variables and the levels of PSC was investigated using the *t*-test and one-way ANOVA test, as indicated in Table 5. The association is statistically significant when $P \leq 0.05$. The findings revealed a statistically significant correlation between respondents' nationality ($t = -4.399$, $P = 0.000$), experience in years ($F = 3.760$, $P = 0.024$), nurses' age ($F = 7.917$, $P = 0.000$), and hospital ($t = -0.401$, $P = 0.689$).

Regarding the composite of communication and feedback on faults, the ultimate weighted mean was 3.89 ± 0.87, which showed that nurses agreed with the statement "we'll talk about how to avoid making the same mistakes in this unit," while the lowest weighted mean was 1.76 ± 1.13, indicating that nurses strongly disagreed with the statement "we receive comments on modifications made in response to event reports."In the composite of non-punitive retaliation for errors, the highest weighted mean was 4.19 ± 0.79, which indicated that nurses agreed with the statement "employees believe their mistakes are being used against them," while the lowest weighted mean was 3.45 ± 1.37, showing that nurses agreed with the statement "employees are concerned that any mistakes they make will be recorded in their personal file."

A variety of medical mistakes or adverse occurrences are to blame for this issue. Most medical mistakes that are harmful are diagnosis, prescription, the use of medicines, unsafe surgical care procedures, and unsafe injection practices. These errors led to the broader recognition of the importance of patient safety, the integration of patient safety methods into healthcare organizations' strategic plans, and the increasing the database of research in this area to prevent and reduce risks, mistakes, and harm that can occur to patients during the provision of healthcare. Medical errors result in longer hospital stays, higher lawsuit expenses, healthcare-associated illnesses, lost earnings, disabilities, and increased healthcare expenditures. However, medical mistakes are preventable, enhancing all aspects of patient safety.[3,23]

There has been a lot of research done on assessing PSC. The literature utilizes 2 of the most widely applied methods created by the AHRQ to assess the safety culture. The safety attitude questionnaire (SAQ) and the HSOPSC are 2 of these instruments. The SAQ is regarded as the most effective instrument in this field, while the HSOPSC examined PSC at a particular hospital in a specific location. As a result, each institution should be treated as a different location for administering surveys and providing hospital-specific feedback.[15,24]

5. Conclusions

The nurses in this study had a medium overall PSC level, and all PSC composites ranged from a medium to a high level, except organizational learning, which had a low level. In addition, the findings showed that there is a significant relationship between PSC levels, nurses' nationalities, experience in years, and the hospital.

5.1. Recommendations

By conducting this study, it can be seen that PSC is considered an essential strategy within the healthcare organizations of KSA. Therefore, suggestions for nursing administration, practice, education, and future research are recommended to be applied within the current hospitals based on the study results, as explained in the following subsections.

(1) Create a work environment supporting trusting relationships between colleagues, supervisors, and managers to increase nurses' PSC. This is achieved when the nurse managers encourage staff nurses to participate in decision-making, foster informal communication with them, and deal with grievance complaints in a just manner.
(2) Assign nurses with the expertise to formal administrative positions and responsibilities because leadership and management functions are essential factors that foster or inherit the organizational citizenship behavior. Also, allowing competent staff nurses to engage in educational programs could increase nurses' PSC.
(3) Maintain a collaborative environment in the nursing profession, such as staff nurses helping other colleagues with work-related problems.
(4) Provide lecture courses and workshops regarding PSC and its importance. Encourage nurses to obtain further education and stay up to date with the current research to raise awareness and disseminate knowledge regarding these concepts.
(5) Conduct future studies that focus only on assessing PSC levels among Saudi nurses to determine which aspects of those variables need to be enhanced and plan appropriate interventions for them

Ethical approval

This study was approved by The Faculty of Nursing Ethical Committee of King Abdul-Aziz University (NREC Serial No: Ref No 1M. 27).

Conflicts of interest

All contributing authors declare no conflicts of interest.

References

1. Al Wahabi S, Farahat F, Bahloul AY. Prevalence and preventability of sentinel events in Saudi Arabia: analysis of reports from 2012 to 2015. *East Mediterr Health J*. 2017;23:492–499.
2. Al-Lawati MH, Dennis S, Short SD, Abdulhadi NN. Patient safety and safety culture in primary health care: a systematic review. *BMC Fam Pract*. 2018;19:104.
3. World Health Organization. 2020. Patient safety. https://www.who.int/publications/i/item/9789240055094. Accessed April 20, 2022.
4. Sorra J, Gray L, Streagle S, et al. AHRQ Hospital Survey on Patient Safety Culture: User's Guide. (Prepared by Westat, under Contract No. HHSA290201300003C). AHRQ Publication No. 15-0049-EF (Replaces 04-0041). Rockville, MD: Agency for Healthcare Research and Quality; January 2016. https://www.ahrq.gov/sites/default/files/wysiwyg/professio nals/quality-patient-safety/patientsafetyculture/hospital/userguide/hospc ult. pdf. Accessed April 20, 2022.
5. Surveys on Patient Safety Culture Research Reference List. Rockville, MD: Agency for Healthcare Research and Quality; Content last reviewed April 2017. http://www.ahrq.gov/professionals/quality-patient-safety/patientsafetyculture/resources/index.html. Accessed April 20, 2022.
6. Farokhzadian J, Dehghan NN, Borhani F. The long way ahead to achieve an effective patient safety culture: Challenges perceived by nurses. *BMC Health Serv*. 2018;18:654.
7. Burlison JD, Quillivan RR, Kath LM, et al. A multilevel analysis of U.s. hospital patient safety culture relationships with perceptions of voluntary event reporting. *J Patient Saf*. 2020;16:187–193.
8. Gabrani A, Hoxha A, Simaku A, Gabrani JC. Application of the safety attitudes questionnaire (SAQ) in Albanian hospitals: a cross-sectional study. *BMJ Open*. 2015;5:e006528.
9. Najjar S, Nafouri N, Vanhaecht K. et al. The relationship between patient safety culture and adverse events: a study in palestinian hospitals. *Saf Health*. 2015;1:16.
10. El-Gendi S, Seung H, Abdelsamie SM, Feemster AA. Assessment of patient safety culture among Egyptian healthcare employees. *Med Saf Glob Health*. 2017;6:134.
11. Albalawi A, Kidd L, Cowey E. Factors contributing to the patient safety culture in Saudi Arabia: a systematic review. *BMJ Open*. 2020;10:e037875.

12. Elmontsri M, Almashrafi A, Banarsee R, Majeed A. Status of patient safety culture in Arab countries: a systematic review. *BMJ Open*. 2017;7:e013487.
13. Mohammad A, Aljasser IA, Sasidhar B. Barriers to reporting medication administration errors among nurses in an accredited hospital in Saudi Arabia. *Br J Econ Manage Trade.* 2016;11:1–13.
14. Meddings J, Reichert H, Todd Greene M, *et al*. Evaluation of the association between Hospital Survey on Patient Safety Culture (HSOPS) measures and catheter-associated infections: results of two national collaborates. *BMJ Qual Saf*. 2017;26:226–235.
15. Sorra J, Gray L, Streagle S, Famolaro T, Yount N, Behm J. Hospital survey on patient safety culture: user's guide. In: AHRQ Publication No. 2016;15(16)-0049-EF (Vol. 9, Issue 10). http://www.ahrq.gov/professionals/quality-patientsafety/patientsafetyculture/hospital/index.html. Accessed April 20, 2022.
16. Lee SH, Phan PH, Dorman T, Weaver SJ, Pronovost PJ. Handoffs, safety culture, and practices: evidence from the hospital survey on patient safety culture. *BMC Health Serv Res*. 2016;16:254.
17. Taber KS The use of cronbach's alpha when developing and reporting research instruments in science education. *Res Sci Educ*. 2018;48:1273–1296.
18. Polit DF, Beck CT. *Nursing Research Generating and Assessing Evidance for Nursing Practice*. 10th ed. Wolters Kluwer: Lippincott publications; 2017.
19. Smits M, Keizer E, Giesen P, Deilkås E, Hofoss D, Bondevik GT. Patient safety culture in out-of-hours primary care services in the Netherlands: a cross-sectional survey. *Scand J Prim Health Care*. 2018;36:28–35.
20. Carvalho R, Arruda L, Nascimento N, Sampaio R, Cavalcante M, Costa A. Assessment of the culture of safety in public hospitals in Brazil. *Rev Latino-Am Enfermagem*. 2017;25:2849.
21. Alharbi W, Cleland J, Morrison Z. Assessment of patient safety culture in an adult oncology department in Saudi Arabia. *Oman Med J*. 2018;33:200–208.
22. Alswat K, Abdalla R, Titi MA, et al. Improving patient safety culture in Saudi Arabia (2012-2015): trending, improvement and benchmarking. *BMC Health Serv Res*. 2017;17:516.
23. Al abbas A. Factors influencing patient safety culture in Saudi Arabia: a systematic review. *Evid Based Nurs Res.* 2021;3:15.
24. Suliman M, Aljezawi M, AlBashtawy M, Fitzpatrick J, Aloush S, Al-Awamreh K. Exploring safety culture in Jordanian hospitals. *J Nurs Care Qual*. 2017;32:E1–E7.