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Patient Safety Culture Structures and Outcomes: A Sample from Isolation Units at Saudi Arabia

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Abstract

To identify the relationship between safety culture structures and selected safety outcomes in isolation units, 120 registered nurses were invited to participate. Ten patient safety culture composites and two safety outcomes composites were measured. The patient safety composites with the highest positive scores were organizational learning, feedback and communication about error and teamwork within units. The composites with the lowest scores were staffing, and non-punitive response to errors. Positive significant correlations highlight staffing and non-punitive response to errors as key challenges for patient safe hospital care.

Keywords

Isolation, Patient Safety Culture, Saudi

1. Introduction

With an increased worldwide attention to provide high quality of care in healthcare settings, a main matter has grown up called Patient Safety Culture (PSC). Patient safety is defined by the Institute of Medicine (IOM) as 'the freedom from accidental injury due to medical care or medical errors' [1]. The issue received a significant attention after releasing the well-known report from the IOM 'To Err is Human: Building a Safer Health System' [1]. The report raised a flag that preventing death and injury from medical errors requires changes in health system extensively [2]. Emerging a culture of patient safety is a critical element in the improvement of patient safety in health-care organization [3]. Achieving a culture of patient safety needs an understanding of the values, beliefs and norms about what is significant in an organization and what attitudes and behaviors related to patient safety are reinforced, rewarded and expected [3]. The assessment of the established culture is a first step that should go before designing patient safety programs in hospitals [4].

The Agency for Healthcare Research and Quality (AHRQ) 2004 identified several gaps in safety research, including validating instruments for measuring the safety culture concept, examining the relationship between safety culture and patient outcomes, developing interventions that improve safety culture, exploring the essential dimensions of safety culture and their relative importance, and studying safety culture in various healthcare settings [3, 4].

Due to the importance of the mentioned gaps in establishing a clear and broad picture of the safety culture in healthcare organizations, the current study is intended to bridge some of these gaps. One of the methods to measure patient safety is through studying the concept of safety culture.

AHRQ developed a useful tool to assess healthcare organization culture regarding patient safety, the Hospital Survey on Patient Safety Culture (HSPSC) [4]. This tool has been widely used in different healthcare settings in many countries [5-9].

In Saudi Arabia, little is recognized about the level of safety culture in high dependency units namely isolation

units. Studying safety culture can afford much needed information to guide healthcare leaders and policymakers to improve quality of care and avoid medical errors. Additionally, exploring various dimensions of hospital safety culture and their relationships with safety outcomes will display areas of strengths and weaknesses that can guide hospital administrators to improve health services.

A review of healthcare literature revealed several predictors to establish patient safety culture such as communication, information stream between and across units, common vision on the importance of patient safety, solid and constant commitment from management and leadership, and non-punitive approach to incident and error reporting [6-9]. Despite the wealth of evidence published on patient safety culture in recent years, there is a limited literature on patient safety culture in isolation units (high dependency units) that take care of serious diseases such Middle East respiratory syndrome – coronavirus…etc, specifically in Saudi Arabia. Furthermore, the concern of the culture of patient safety in Saudi Arabia is verified by studies conducted in low dependency units and revealed that management support, proper reporting system and adequate resources might stimulate the patient safety culture in hospitals [10]. Further, in 2010 another study aimed to appraise the extent to which the culture supports patient safety in 13 general hospitals located in Riyadh, the capital of Saudi Arabia, among 223 health professionals including nurses, technicians, managers and medical staff. Results revealed that areas with potential for improvement in most hospitals were under-reporting of events, non-punitive response to error, staffing and teamwork across hospital units [9].

Patient Safety Culture (PSC) is a complex phenomenon that is poorly understood [11]. A gap in the literature exists regarding the perception of PSC among nurses particularly in isolation units. Once nurses are at the heart of the inpatient healthcare enterprise, this element must be clarified and addressed through assessing their perception in order to create environments that promote safety behaviors. Additionally, understanding what signifies signs of a safe culture for future nursing professionals is poorly understood. Understanding the contributors to the formation of a safety culture could inform the potential interventions to improve safety climate for patients and caregivers.

Hence, in response to the growing alarm about patient safety culture, Ministry of Health in Saudi Arabia designed a board in the early 2000s to take responsibility for educating, training and improving patient care throughout Saudi Arabia [11].

Thus, despite the emphasis on improving patient safety in hospitals, as evidenced by many hospitals' attempts to obtain accreditation requirements imposed by various authorized agencies, there are limited national research studies describing the level of hospital safety culture in isolation units in Saudi Arabia. The aims of the current study were to identify nurses' perception of safety culture in isolation units, and to identify the relationship between safety culture structures (composites) and selected safety outcomes in isolation units.

A Conceptual Model

The conceptual model guided the study is based on the Structure-Process-Outcome Model proposed by Avedis Donabedian [13]. Donabedian model was extensively recognized for his structure-process-outcome approach for quality assessment activities. Most of his professional works centered on the systemization of knowledge throughout health care organizations, especially with respect to quality assessment and monitoring safety [4, 13].

The model includes three main concepts: structure, process and outcome, which are essential for quality assessment activities. Within the model, the structure of care is defined as the physical and organizational attributes of settings, in addition to the attributes of human resources that can be associated with provision of care. These attributes were studied as safety culture dimensions (teamwork within units, organizational learning, openness of communication, error feedback and communication, supervisor/manager expectations and actions promoting safety, non-punitive response to error, staffing, hospital management support for safety, hospital handoffs and transitions, and teamwork across units). Process of care is referred to series of operations or activities that are performed on patients, but they weren't studied because there were no standard patient safety programs established in the selected hospital. Outcomes of care refer to what happens to patients and their families that result from structure and process of care [13] and were studied as selected outcomes (frequency of event reporting, and patient safety grade).

The interrelationship of structure and process dictates the final outcome [13]. Structural characteristics of the settings directly influence the process of care. Subsequently, change in the process of care can affect the outcome of care. It can be, therefore, implied in Donabedian model that when good structural inputs are in place, better outcomes will be produced. Therefore, it will be worthy to apply this in isolation settings where patients' outcomes are significantly affected by structural elements.

2. Method

2.1. Design and Samples

The study was conducted over a period of four months in the isolation settings in a large medical city located in Riyadh. The medical city has around 1200 active beds in total. This includes many isolation beds where patients are admitted with different kinds of infections, such as Middle East respiratory syndrome coronavirus (MERS-CoV), Swine Flu virus (H1N1), tuberculosis … etc. Nurse to patient ration is 1:2, and personal protective equipment's are always available.

A descriptive correlational design was used to identify nurses' perceptions of safety culture dimensions and relation to selected safety outcomes in isolation units. The English version of the Hospital Survey on Patient Safety Culture (HSPSC) [4] was used.

Structures
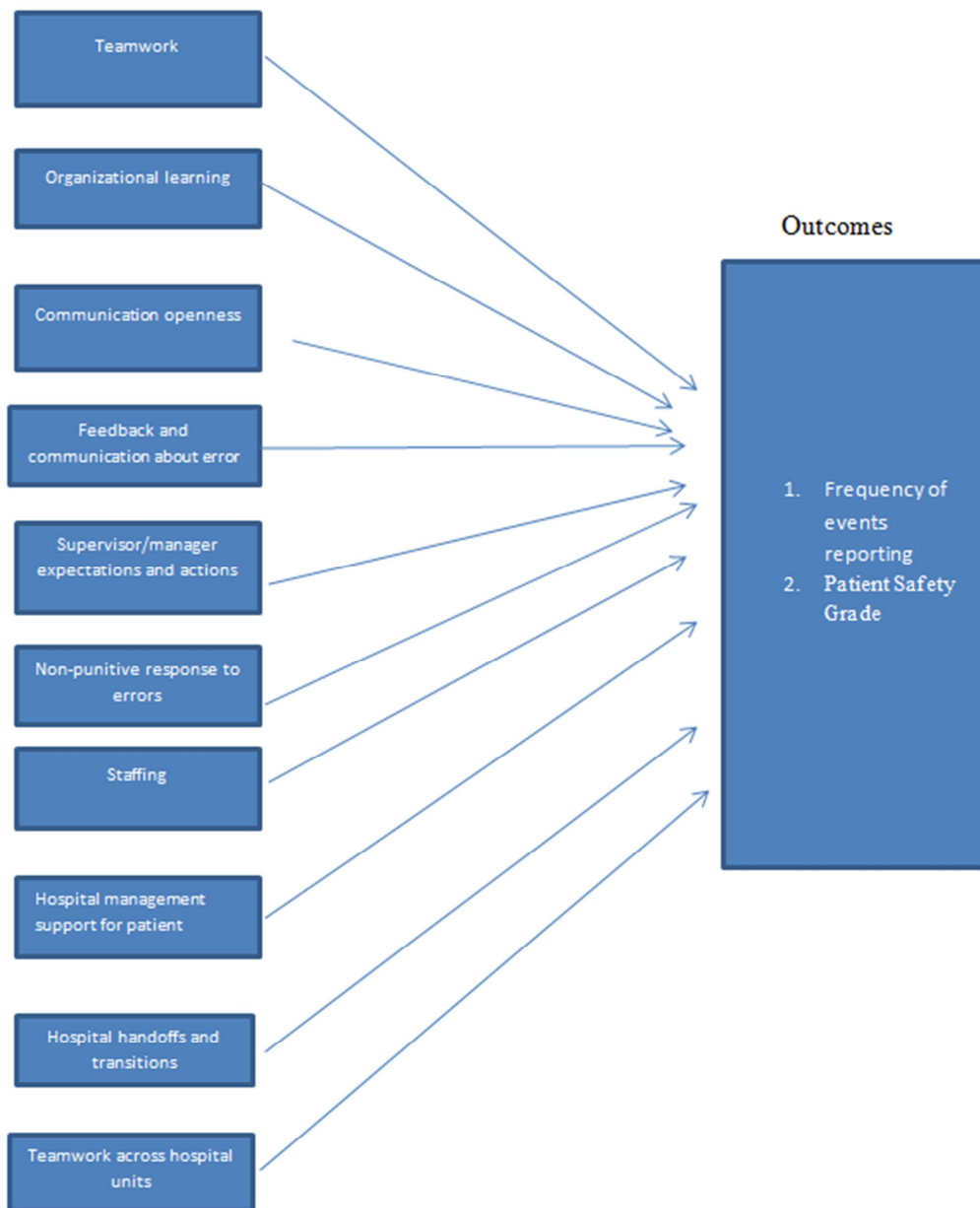
Figure 1. Adapted model for Patient Safety Culture Structures and Outcomes.

The target population of this study included all nursing specialists who were employed in isolation settings. A convenience sample of nursing specialists was drawn through many visits to the isolation settings. The inclusion criteria for this study were nursing specialists who were working in any of the isolation settings, had at least six months of unit experience, and were able to understand written English. The estimated sample size was calculated using power analysis procedures for correlation using the Power Primer [14]. The test revealed that using a desired power of 0.80, medium effect size ($r = 0.25$), and 0.05 level of significance. Moreover, the estimated sample size was 120 nurses.

Institutional Review Board approval was obtained from the selected medical city. The participants were informed that their participation was voluntary, it is their right to withdraw from the study at any time without penalty, and that all information obtained would be treated confidentially and anonymously. All questionnaires and study materials were kept in a secured cabinet in the principal investigator's office. It was anticipated that there were no perceived risks associated with participation in this study.

2.2. Instruments

Psychometric evaluation of the English version of the Hospital Survey on Patient Safety Culture (HSPSC) instrument for assessing the safety culture in the English-

speaking hospital settings proved its validity and reliability. In this study, the internal consistency of the instrument was measured using the Cronbach's Alpha (α) coefficient. The highest value (0.81) was for the teamwork within units, and the lowest value (0.37) was for the staffing (Table 2). Five composites were below the HSPSC user's guide acceptable level of Cronbach's alpha equal to or greater than 0.60 [4].

2.3. Analysis of Survey Composite Scores

The English version of the Hospital Survey on Patient Safety Culture (HSPSC) [4] was used because English is the teaching language of Saudi nursing schools and the language of communication in Saudi Arabia hospitals. The HSPSC is a 42-item tool that assesses the perception of hospital staff in regards to safety culture. The HSPSC uses a five-point Likert scale (strongly disagree, disagree, neutral, agree, and strongly agree) or frequency (never, rarely, sometimes, most of the time, and always). A pilot study was conducted with a sample of nursing specialists to evaluate the clarity and appropriateness of the study instrument in Saudi Arabia culture.

The HSPCS assesses two areas related to safety, including safety structure dimensions and safety outcome dimensions. The safety culture dimensions include seven dimensions related to the unit level (Table 1), and three dimensions related to the hospital level (Table 2). Additionally, two safety outcomes dimensions are assessed by the HSPSC, including frequency of events reporting, and patient safety grade (Table 2). We followed the HSPSC User's Guide [4] for data analysis to allow benchmarking the results. The scores of negatively worded HSPCS items were reverse coded so that a higher score indicated a more positive response.

2.4. Data Analysis

The Statistical Package for the Social Sciences (version 17; SPSS Inc, Chicago, Illinois) was used for analysis. Data was screened for entry mistakes, missing data, and outliers. Few missing values and outliers were found. However, missing values were replaced by means, and outliers were removed. Descriptive statistics were calculated to describe and summarize the variables of the study.

To explore the nurses' perception of safety culture, frequencies of average positive responses (strongly agree/agree) or (most of the time/always) for each item and each subscale were calculated. A Pearson's correlation coefficient was used to investigate the relationship between the averages of safety culture dimensions and the averages of safety outcomes.

3. Results

3.1. Respondent Characteristics

Out of 120 registered nurses invited to participate in the study, 92 registered nurses accepted, resulting in a response rate of (77%). The survey length and nurse workload were the main reasons for this modest response rate as reported by non-respondents. The participant's age ranged from 20 to 59 years, with an average of 30.7 years (7.4), and they were predominately female by 88 (95.7%). The majority of study participants had bachelor degree 50 (54.3%), had 1–5 years of hospital experience 45 (49%), and non-administrative position 69 (75%) (Table 1).

Table 1. Demographics of participant's (n = 92).

Variable	Frequency (n)	Percentage (%)	Mean (SD)	Range
Gender				
Male	4	4.3		
Female	88	95.7		
Age			30.7 (7.4)	20-59
Education				
Diploma	42	45.7		
Baccalaureate	50	54.3		
Years of hospital experience				
Less than 1 year	10	11		
1–5	45	49		
6–10	19	21.8		
11–15	10	11.5		
16-20	1	1.1		
21 or more	2	2.3		
Position				
Nurse manager	23	25		
Nurse specialist	69	75		

3.2. Patient Safety Culture Composite Scores

The results showed that organizational learning – continuous improvement had the highest average percentage of positive responses (83.77%). Staffing had the lowest average percentage of positive responses with (15.45%) as shown in (Table 2). In regards to hospital safety culture, the average percentage of positive responses for hospital management support for patient safety, teamwork across hospital units, and hospital handoffs and transitions were (57.27%), (51.55%), and (45.72%), respectively as shown in (Table 2).

3.3. Safety Outcomes Composites

The average percentage of positive responses of frequency of events reporting was (67.46%). Additionally, (53.8%) of the sample rated patient safety grade of hospital unit as very good, whereas only (1.2%) of the participants described it as failing, as shown in (Table 2).

Table 2. *Subscales of safety culture items and safety outcomes composites (n = 92).*

Subscale of unit safety culture items	Average positive responses (%)
1. Organizational learning – continuous improvement (Cronbach's α = 0.66)	83.77
We are actively doing things to improve patient safety	90.80
Mistakes have led to positive changes here	67.60
After we make changes to improve patient safety, we evaluate their effectiveness	79.00
2. Feedback and communication about error (Cronbach's α = 0.75)	71.60
We are given feedback about changes put into place based on event reports	53.50
We are informed about errors that happen in this unit	70.60
In this unit, we discuss ways to prevent errors from happening again	71.00
3. Teamwork within units (Cronbach's α = 0.81)	63.60
People support one another in this unit	82.40
When a lot of work needs to be done quickly, we work together as a team to get the work done	80.50
In this unit, people treat each other with respect	77.20
When one area in this unit gets really busy, others help out	69.40
4. Communication openness (Cronbach's α = 0.40)	53.57
Staff will freely speak up if they see something that may negatively affect patient care	53.60
Staff feel free to question the decisions or actions of those with more authority	43.90
Staff are afraid to ask questions when something does not seem right (R)	38.90
5. Supervisor/manager expectations and actions promoting safety (Cronbach's α = 0.64)	52.60
My supervisor/manager says a good word when he/she sees a job done according to established patient safety procedures	68.10
My supervisor/manager seriously considers staff suggestions for improving patient safety	69.80
Whenever pressure builds up, my supervisor/manager wants us to work faster, even if it means taking shortcuts (R)	39.50
My supervisor/manager overlooks patient safety problems that happen over and over (R)	25.30
6. Nonpunitive response to errors (Cronbach's α = 0.50)	23.47
Staff feel like their mistakes are held against them (R)	25.50
When an event is reported, it feels like the person is being written up, not the problem (R)	25.60
Staff worry that mistakes they make are kept in their personnel file (R	23.70
7. Staffing (Cronbach's α = 0.37)	15.45
We have enough staff to handle the workload	38.10
Staff in this unit work longer hours than is best for patient care (R)	12.50
We use more agency/temporary staff than is best for patient care (R)	31.20
We work in "crisis mode" trying to do too much, too quickly (R)	12.70
Subscale of hospital safety culture items	
1. Hospital management support for patient safety (Cronbach's α = 0.44)	57.27
Hospital management provides a work climate that promotes patient safety	69.40
The actions of hospital management show that patient safety is a top priority	75.30
Hospital management seems interested in patient safety only after an adverse event happens (R)	36.60
2. Teamwork across hospital units (Cronbach's α = 0.52)	51.55
Hospital units do not coordinate well with each other (R)	41.60
There is good cooperation among hospital units that need to work together	53.50
It is often unpleasant to work with staff from other hospital units (R)	39.20
Hospital units work well together to provide the best care for patients	73.60
3. Hospital handoffs and transitions (Cronbach's α = 0.75)	45.72
Things "fall between the cracks" when transferring patients from one unit to another (R)	41.80
Important patient care information is often lost during shift changes (R)	48.90
Problems often occur in the exchange of information across hospital units (R)	32.10
Shift changes are problematic for patients in this hospital (R)	47.00
Safety outcomes composites/ items	*n (%)*
Frequency of events reported (Cronbach's α = 0.84)	67.46
When a mistake is made, but is caught and corrected before affecting the patient, how often is this reported	-
When a mistake is made, but has no potential to harm the patient, how often is this reported	-
When a mistake is made that could harm the patient, but does not, how often is this reported	-
Patient Safety Grade	
Failing	1(1.2)
Poor	0.0
Acceptable	20(21.2)
Very good	49(53.8)
Excellent	23.8))22

3.4. Relationships Between Safety Culture Structures and Safety Outcomes

Pearson correlation coefficient was used to explore the relationships between safety culture subscales and two safety outcomes, as shown in (Table 3). Positive significant correlations were found between frequency of events reporting and eight subscales of safety culture, including supervisor/manager expectations and actions promoting safety (r = 0. 29, p < 0.05), teamwork across hospital units (r = 0.28, p < 0.05), hospital handoffs and transitions (r = 0.22,p

< 0.05), hospital management support for patient safety (r = 0.35, p < 0.05), feedback and communication about error (r = 0.60, p < 0.05), communication openness (r = 0.513, p < 0.05), organizational learning – continuous improvement (r = 0.35, p < 0.05) and teamwork within units (r = 0.30, p < 0.05). Patient safety grades were positively correlated with non-punitive response to errors (r = 0.30, p < 0.05), hospital management support for patient safety (r = 0.26, p < 0.05), and feedback and communication about error (r = 0.25, p < 0.05) (Table 3).

Table 3. *Correlation between safety culture items and safety selected outcomes variables (n = 92).*

Iltem	Frequency of events reporting	Patient safety grade
Staffing	0.12	-0.19
	0.23	.0.09
Nonpunitive response to errors	-0.03	0.30*
	0.78	0.008
Supervisor/manager expectations and actions promoting safety	0.29*	0.16
	0.008	0.15
Teamwork across hospital units	0.28*	0.20
	0.02	0.10
Hospital handoffs and transitions	0.22*	0.04
	0.04	0.73
Hospital management support for patient safety	0.35*	0.26*
	0.002	0.03
Feedback and communication about error	0.60*	0.25*
	0.000	0.03
Communication openness	0.51*	0.20
	0.000	0.09
Organizational learning – continuous improvement	0.35*	0.18
	0.001	0.11
Teamwork within units	0.30*	0.20
	0.008	0.11

*P < 0.05 (two-tailed)

4. Discussion

This study used the HSPSC questionnaire to provide an overview of the hospital safety culture as perceived by nurses in Saudi Arabia at isolation settings. Study participants perceived organizational learning – continuous improvement as highest positive compared to other dimensions of safety culture (Average positive responses was 83.77%). This dimension received a similar score of positive responses compared to other research findings (55–88%) [7, 15-17].

Nowadays, accreditation for healthcare institutions is a national demand in Saudi Arabia. Since the establishment of the Central Board for Accreditation of Healthcare Institutions (CBAHI) in 2001, many Saudi hospitals improved their performance to meet the standards set by the CBAHI. [7] Accreditation and quality improvement requirements require hospitals to enhance their management systems to improve patient safety [18].

Further, findings emerged with higher composites on feedback and communication about error and communication openness (Average positive responses was (71.60%), (53.57%) respectively).

These findings can be linked to the responses to the question on frequency of event reporting which imply a fear

of reporting, and this can be linked to some respondents' belief that mistakes will be held against them when they report an incident. Fear of reporting can present an impediment to a positive patient safety culture. Reasons for not reporting errors as detailed in literature include fear, humiliation, and the presence of a punitive response to error [16-18].

Study participants perceived teamwork within units as more positive compared to other dimensions of safety culture. "Teamwork within units" score of positive responses (63.60%) was similar to previous research reports (61–94%) [6, 20-22]. In Saudi Arabia, a possible explanation for this trend might be that when nurses perceive having inadequate staff to handle workload, they will improve teamwork effectiveness to handle the increased workload [7].

Additionally, the dimension of non-punitive response to errors is another area that needs improvement and had 23.47% positive responses. Similar results were found in other studies (17–36%) [7, 18, 22-23]. However, this dimension received more positive responses in the current study compared to other studies (39– 42%) in the United States, [19] Slovenia, [12] and Jordan [8]. This result can be related to "the blame culture" of safety, which can be characterized by focusing on individuals rather than systems

in addressing errors.

Nurses who make errors are blamed by hospital administration and by their colleagues, and this does not resolve the errors. The emphasis on punishment in addressing errors makes hospital policies ineffective to prevent future errors and improve patient safety [3]. However, creating a culture in hospitals that supports sharing of errors will enhance patient safety and quality of care [7].

Moreover, the results of the study showed that staffing received the lowest ratings among the ten dimensions of safety culture. This area also had low positive scores in Saudi hospitals (27%), [7] Jordanian hospitals (30.4%), [8] Taiwanese hospitals (36%), Japanese hospitals (37%), [15] and Lebanese hospitals (37%) [9]. The US hospitals showed better scores in this dimension (54%) [24]. Inadequate nurse staffing and retention are major challenges to the Saudi healthcare system [7]. These challenges may be caused by various factors, such as a lack of financial incentives, [7] and lack of commitment [11]. Improving working conditions for nurses should be a priority in hospitals to provide safe care [6]. Improving working conditions for nurses should be a priority in hospitals to provide safe care [8].

The study explored two outcome variables of hospital safety culture as perceived by nurses in Saudi Arabia, including frequency of events reporting, and patient safety grade.

(53.8%) of participants rated their unit safety grade as very good compared to (38%) to (73%) in various research reports [6, 16, 21]. An important area that might be a landmark to Saudi hospital safety culture was the frequency of events reporting, which had an average positive response of (67.46%). These findings suggest that several safety areas need improvement.

All of the safety culture subscales were correlated to one or more of the safety outcomes, except the Staffing subscale that had no significant relationship with any of the safety outcome variables. Study findings showed the significance of safety culture determinants as correlated to various safety outcomes.

The hospital management support for patient safety, and feedback and communication about error subscales were positively correlated with overall perceptions of patient safety, frequency of events reporting, and patient safety grade.

Our findings are consistent with other studies regarding the positive effects of management support and feedback and communication about error on frequency of events reporting, and patient safety grade [7, 12, 18, 24].

These findings support that management support for patient safety and feedback and communication about error are critical elements in improving hospital safety culture. Saudi hospitals will benefit from strategies to improve feedback and communication, which in turn will help improving safety and prevent errors. According to our knowledge, this study is the first study in Saudi Arabia to provide in-depth knowledge regarding hospital safety culture in isolation units.

5. Limitations

The current study provides major contributions to the nursing and healthcare literature by exploring the strengths and areas that need improvement in hospital safety culture. However, there were some limitations in this study, including the use of a self-administered questionnaire, a convenience sampling method, and the low response rate. Additionally, the findings of this study cannot be generalized to the entire population of nurses because aspects of safety cultures may differ between units. Longitudinal research based on regular assessment of patient safety culture is needed to determine whether tangible improvements resulted from implementing quality improvement plans and patient safety programs will affect the culture of safety and clinical outcomes. Using a more objective tool in addition to the HSPSC in future research will increase the generalizability of the results.

6. Conclusion

This study examined Saudi hospital safety culture as perceived by nurses. Participants reported that hospitals have certain deficits in their safety culture, specifically in non-punitive response to errors and staffing. However, nurses have more positive perception of safety culture at the unit level compared to the hospital level. It was remarkable that aspects of organizational learning/continuous improvement, feedback and communication about error and teamwork within units are important factors in hospital culture that may enhance safety in Saudi hospitals.

Healthcare policymakers, hospital administrators, clinical staff, and educators in the healthcare field have the responsibility to emphasize patient safety as a top priority in their countries. Several strategies can be imposed to improve patient safety and quality of care, including developing effective safety policies that enhance safety culture, developing quality systems to prevent future errors rather than blaming individuals, and integrating safety education into nursing curricula.

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