

Research Article

Practices Used to Improve Patient Safety Culture Among Healthcare Professionals in a Tertiary Care Hospital

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ABSTRACT

Introduction: A patient safety culture primarily refers to the values, beliefs, attitudes, and behaviors within a healthcare setup in a community that assists in prioritizing patient safety and encouraging the reporting of errors and near-misses in that facility. There is a direct impact of patient safety culture on how well patient safety and quality improvement programs work. The aim of this cross-sectional descriptive study was to investigate the practices to improve patient safety culture and adverse event reporting practices among healthcare professionals in a tertiary care hospital located in Mirpur Azad Jammu and Kashmir. **Methods:** In the non-probability convenience sampling of this cross-sectional study, Divisional Headquarters Teaching Hospital in Mirpur, Azad Kashmir used the Agency for Healthcare Research and Quality Surveys on Patient Safety Culture Hospital Survey to collect data about the perceptions of healthcare professionals regarding patient safety culture within their hospital to assess the trends of patient safety culture by obtaining longitudinal data. A pre-validated questionnaire that has undergone a rigorous trial of testing to maximize the reliability and accuracy of the outcomes was distributed among clinical staff (healthcare professionals who interact with patients on a daily basis, such as nurses, doctors, pharmacists, and laboratory technicians) and administrative staff (medical superintendent, deputy medical superintendent, assistant medical superintendent, heads of departments). **Results:** A total of 312 questionnaires were returned (response rate, 76%). The study found that the dimension “supervisor/manager expectation and action promoting safety” had the highest positive response rate (65.16%), and “nonpunitive response” had the lowest (27.4%). Higher scores in “nonpunitive response to error” were associated with lower rates of medication errors, pressure ulcers, and surgical site infections, and higher scores in “frequency of event reporting” were associated with lower rates of medication errors, pressure ulcers, falls, hospital-acquired infections, and urinary tract infections. **Conclusion:** We suggest that in order for hospital staff to continue providing excellent, clinically safe treatment, a well-structured hospital culture promoting patient safety is necessary. Moreover, further study is needed to determine strategies to improve patient safety expertise and awareness, and lower the frequency of adverse occurrences.

Keywords: adverse events, Azad Kashmir, Hospital Survey on Patient Safety Culture (HSOPSC), patient safety, tertiary healthcare

INTRODUCTION

Patient safety is a “framework of organized activities in healthcare that creates cultures, processes, procedures, behaviors, technologies, and environments that consistently

and sustainably lower risks, reduce the occurrence of avoidable harm, make errors less likely, and lessen the impact of error when it does occur.”^[1] Patient safety is essential to healthcare quality; however, there may be risks of hazards and injuries at every stage of the healthcare process.^[2] The

scope and nature of these risks differ enormously based on the context in which health services are provided, as well as the accessibility of facilities and resources, both within and between nations. All healthcare systems and organizations have the task of increasing their understanding to identify and reduce safety hazards as well as to manage all potential causes of injuries. The World Health Organization aims to persuade regions to give as much consideration to patient safety as possible and to build and enhance the science-based systems required for improving patient safety and the standard of care.^[3]

Safety concerns were assumed to be caused by safety violations, mistakes, and unintended errors. Studies also show that instead of being caused by human error, most errors and negative occurrences are caused by a complicated chain of circumstances.^[4] Technical mistakes, errors with medications and prescriptions, problems with surgical planning, problems with medical records, and errors with surgery and post operative care are frequent in hospital settings and can result in negative consequences if not addressed immediately.^[5] In the hospital context, reporting adverse events is crucial for ensuring patient safety and reducing negative outcomes. The use of a non-punitive approach in reporting incidents and errors is one of the elements that has proven helpful in the evolution of a patient safety culture in healthcare settings. Other factors include organizational learning, management and leadership commitment, good information flow, and mutual trust-based communication.^[6]

Despite the growing awareness and interest in investigating and analyzing patient safety culture (PSC) within healthcare organizations worldwide, there is a lack of data on PSC from Pakistan. In addition, insufficient focus has been placed on examining and explaining the expectations and actions of medical practitioners regarding patient safety. In Pakistan, the absence of standard operating procedures has caused significant heterogeneity in clinical practice, ultimately it may reduce the efficacy and safety of medical care. As a result, it is predicted that these factors may contribute to a greater burden of hazardous treatment in Pakistan. Limited research has been conducted on Pakistan's healthcare sector's PSC and reporting of adverse events.^[4] Therefore, this study aimed to evaluate the PSC at a tertiary-care hospital in Mirpur Azad Kashmir because of the scarcity of information on this urgent issue.

METHODS

This was an in-hospital cross-sectional descriptive study carried out at Divisional Headquarters (DHQ) Hospital Mirpur Azad Jammu and Kashmir (AJK), with data collected from August to December, 2022. Ethical approval was obtained from the institutional review board of the Health Services Academy Islamabad, and informed consent was obtained from the respondents. The population of the study for this survey was hospital staff, including healthcare professionals who had direct interaction with

patients and the administrative staff of the hospital. The sample was collected by the non-probability convenience sampling method. Of the 410 individuals who were requested to provide their responses, 312 questionnaires were received. This quantity was determined for practical reasons and adhered to established guidelines from reputable sources, such as the Agency for Healthcare Research and Quality (AHRQ) Hospital Survey on Patient Safety Culture (HSOPSC) Version 2.0.^[7] The participants or respondents are asked to rate the PSC using a grading scale consisting of five categories: poor, fair, good, very good, and excellent. Furthermore, the frequency of each adverse event that healthcare professionals within their working units perceived in the preceding year was scored. Then the responses were categorized in seven groups, which indicated the number of adverse events. The categorization is as follows: never, rarely (1-5 events), occasionally (6-10 events), regularly (11-20 events), frequently (21-30 events), very frequently (31-40 events), and daily.

Tool Evaluation and Data Collection

The HSOPSC and adverse events questionnaires were used to collect data.^[6] This questionnaire was used as a tool to assess the patient safety concerns, medical errors, and reporting of adverse events. It consists of 34 items for evaluating 10 dimensions or composites of PSC: "communication openness" (three items), "feedback and communication about errors" (three items), "frequency of events reported" (three items), "handoffs and advances" (four items), "the executives support for patient well-being" (three items), "non-corrective reaction to mistake" (three items), "hierarchical learning-nonstop improvement" (three items), "staffing" (four items), "supervisor/manager expectations and actions promoting safety" (four items), and "teamwork within units" (four items). The researchers had determined that the certain dimensions of the original 12-dimension version were not directly applicable or relevant to their specific study research objectives so, as a result, modifications were made to focus on the most relevant dimensions for assessing PSC.

Adverse Events

We investigated the following five critical incidents, which are considered sensitive markers of nursing care and commonly occur in hospitals: medication errors, pressure ulcers, falls, use of physical restraints for 8 or more than 8 hours, and health-associated infections, (including surgical site, urinary tract, and central line-associated bloodstream infections). On a seven-point scale, the frequency of each adverse event was scored, ranging from zero (never) to six (daily).

Statistical Analysis

The Statistical Package for the Social Sciences (SPSS) version 26 was used for data analysis. Descriptive statistics, including frequency and percentages, were used for the evaluation of healthcare professionals' demographic

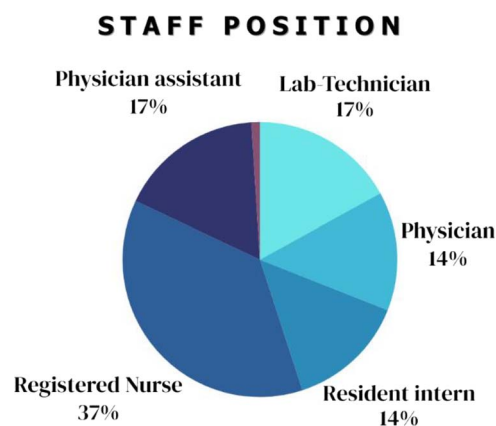


Figure 1. Percentage of participants in Divisional Headquarters Hospital Mirpur Azad Jammu and Kashmir.

characteristics, HSOPSC, and adverse events. Regression models predicting adverse events using HSOPSC were used to investigate the relationship between HSOPSC and adverse events. In addition, regression models were applied using adverse events as the dependent variable and HSOPSC dimensions as independent variables and considering the healthcare professionals' demographic characteristics. It assesses the influence of different dimensions of PSC on the likelihood of experiencing adverse events while considering the effects of demographic factors.

RESULTS

Sociodemographic and Professional Characteristics of Respondents

The target population sample included clinical staff (healthcare professionals who interact with patients on a daily basis, such as nurses, doctors, pharmacists, and laboratory technicians) and administrative staff (medical superintendent, deputy medical superintendent, assistant medical superintendent, heads of departments). Of the 410 people who were approached, 312 responded to our study questionnaire with a response rate of 76%. Thus, 312 clinical and administrative staff members were included in this study.

The percentage of healthcare professionals who participated in this survey is shown in Figure 1. Registered nurses provided the highest percentage of responses, which was found to be 37%. The response rates for laboratory technicians, physician assistants, resident interns, and medical doctors were approximately 17%, 17%, 14%, and 14%, respectively. In the case of supervisors, only 1% of the respondents responded. The respondents were from different working units, with most from surgery and medicine units.

Positive Response Rate on Dimension of Patient Safety Culture (PSC)

Table 1 shows that the dimensions of PSC that received positive ratings over 50% were supervisor/manager

Table 1. Positive response rate on dimension of patient safety culture and competency

Dimensions	Positive Response Rate, %
1. Supervisor/manager expectation & action promoting safety	65.2
2. Organizational learning-continues improvement	57.9
3. Teamwork within hospital unit	55.2
4. Communication openness	47.2
5. Feedback and communication about errors	65.1
6. Nonpunitive response	27.4
7. Staffing	34.5
8. Hospital management support for patient safety	52.1
9. Hospital handoff & transition	41.5
10. Frequency of events reporting	28.5

expectations and actions promoting safety, organizational learning and continuous improvement, teamwork within the hospital unit, feedback and communication about errors, and hospital management support for patient safety. This indicates that staff members believe that their supervisors and managers prioritize patient safety, staff members perceive a culture of continuous learning and improvement within the organization, the collaboration and effective communication among healthcare professionals as a team, an open and transparent environment for reporting errors and discussing potential improvements, and the support by hospital management in their efforts to prioritize patient safety.

Frequency and Percentage for PSC Grades

Table 2 displays the overall participant grade for patient safety. According to the findings, 128 (41%) and 12 (3.8%) of the respondents rated patient safety as good and poor, respectively.

Table 3 shows the most frequently reported frequencies of various adverse events in healthcare settings, categorized into seven levels. Notably, "Rarely" is the most common frequency for medication errors (52.2%) and pressure ulcers (29.2%). "Regularly" (23.1%) and "Rarely" (40.7%) are the dominant categories for falls. For urinary tract infections, "Very Frequently" (20.8%) stands out. Hospital-acquired infections are reported "Regularly" (24.7%) and "Occasionally" (26.6%). Table 3 provides valuable insights into the prevalence and distribution of adverse events in the context of healthcare, which can inform targeted interventions and quality improvement efforts.

Table 2. Patient safety grades among participants

Grade	n (%)
Poor	12 (3.8)
Fair	62 (19.9)
Good	128 (41.0)
Very good	78 (25.0)
Excellent	32 (10.3)
Total	312 (100)

Table 3. Healthcare professionals reported adverse events during preceding year

Adverse Events	Never	Rarely (1–5 Events)	Occasionally (6–10 Events)	Regularly (11–20 Events)	Frequently (21–30 Events)	Very Frequently (31–40 Events)	Daily (>40 Events)
Medication error	21 (6.7)	163 (52.2)	53 (17)	31 (9.9)	25 (8.0)	7 (2.2)	12 (3.8)
Pressure ulcer	47 (15.1)	91 (29.2)	80 (25.6)	65 (20.8)	23 (7.4)	4 (1.3)	2 (0.6)
Falls	64 (20.5)	127 (40.7)	27 (8.7)	72 (23.1)	14 (4.5)	6 (1.9)	2 (0.6)
Use of restraint > 8 h	74 (23.7)	124 (39.7)	50 (16.0)	34 (10.9)	10 (3.2)	12 (3.8)	8 (2.6)
Hospital-acquired infection	24 (7.7)	91 (29.2)	83 (26.6)	77 (24.7)	11 (3.5)	20 (6.4)	6 (1.9)
Surgical site infection	28 (9.0)	102 (32.7)	83 (26.6)	55 (17.6)	14 (4.5)	22 (7.1)	8 (2.6)
Urinary tract infection	21 (6.7)	113 (36.2)	36 (11.5)	41 (13.1)	30 (9.6)	65 (20.8)	6 (1.9)
Blood stream infection	33 (10.6)	131 (42.0)	76 (24.4)	36 (11.5)	16 (5.1)	12 (3.8)	8 (2.6)

Data are presented as *n* (%).

PSC as a Predictor of Adverse Events

In the multiple regression models, it was found that “non-punitive response to error” and “frequency of event reporting” is a significant predictor of medication errors. The odds of medication errors increased by 125% and 77%, respectively, with each one-unit increase in scores for these dimensions. The risk of falls showed a notable correlation with factors such as “organizational learning-continuous improvement,” “feedback and communication about the error,” and the “frequency of event reporting.” For each unit increase in scores within these dimensions, the likelihood of experiencing falls increased by 87.5%, 87%, and 79%, respectively. Use of restraints for ≥ 8 hours were significantly associated with several PSC dimensions, including “supervisor/manager expectation and actions promoting safety culture,” “teamwork within hospital unit,” “organizational learning-continuous improvement,” “communication openness,” “feedback and communication about error,” “hospital management support for patient safety,” and “hospital handoff and transitions.” Odds of using restraints for ≥ 8 hours increased by various percentages, with each one-unit increase in scores for these dimensions. Hospital-acquired infection was significantly associated with “teamwork frequency of event reporting,” whereas surgical site infection was significantly associated with “non-punitive response to error” and staffing. Urinary tract infection was significantly associated with “hospital management support for patient safety” and “frequency of event reporting.” Finally, bloodstream infection was significantly associated with “communication openness, hospital handoff and transitions,” “teamwork across units,” and “non-punitive response to error (Table 4).

DISCUSSION

The questionnaire from AHRQ is a well-known tool for assessing the safety culture of hospitals as a whole or for specific units within hospitals. A strong organizational culture improves the quality of healthcare for patients. This is one of the few studies of its kind in Pakistan that highlights the problems faced by health practitioners in securing patient safety and preventing

adverse events during care delivery. The assessment of PSC and its promotion are basic requirements for increasing patient safety during the provision of healthcare services.^[8] This study was conducted to assess the recent scenario of PSC in AJK government hospitals using the HSOPSC Questionnaire tool. This study is similar to another conducted by Jafree et al. in local hospitals in Lahore; however, the positive response rate in both of these studies was unsatisfactory.^[4,5] The PSC was assessed using the HSOPSC in another city in Pakistan, and the results showed that the positive response rate of all dimensions was less than 47%. Nevertheless, the results of this survey were lower than those of studies conducted in other countries. For example, in China, the score was 65%^[9] and in Lebanon (61.5%),^[10] higher than the study conducted in Palestine, where the scores were less than 55%.^[11] None of the composites for PSC met the standards for strength. This reveals a serious lack of a PSC in the hospitals under investigation.

Although healthcare services have significantly improved, quality and safety have been inconsistently integrated into the AJK healthcare system. This study highlights numerous areas that require improvement. For instance, “supervisor/manager expectation and action promoting safety” and “feedback and communication about errors” received the best feedback but still required some adjustments. The preceding dimensions were scored highest in other studies as well,^[12] however, the outcomes for these dimensions from the hospitals of various nations, including those ranked high in these areas, had similar responses to the studies conducted in Korea and the United States.^[6,12] However, the factor with the lowest score was “non-punitive response” and “frequency of event reporting,” indicating that healthcare professionals believe that “punitive response” and “frequency of event reporting” were insufficient to manage the task linked to patient safety. Patient safety is difficult to attain in nations like Korea, according to a study conducted in the region,^[13] which added that one factor is inadequate staffing. Research conducted in China, the United States, and Korea also revealed comparable results; however, the rates were higher in the United States.^[9,14,15] It is particularly important to note that the dimensions “frequency of

Table 4. Association between hospital survey on patient safety culture and adverse events

Safety Culture Aspects	Medication Error		Pressure Ulcer		Falls		Restraint Use > 8 h		Hospital-acquired Infection		Surgical Site Infection		Urinary Tract Infection		Bloodstream Infection	
	OR	P	OR	P	OR	P	OR	P	OR	P	OR	P	OR	P	OR	P
Supervisor/manager expectation and actions promoting safety culture	0.81 (0.6–1.0)	0.070	0.743 (0.06–0.87)	0.00	0.99 (0.87–1.1)	0.970	0.87 (0.77–0.99)	0.040	0.830 (0.77–1.0)	0.730	0.880 (0.73–1.1)	1.810	0.860 (0.69–1.0)	1.670	0.850 (0.71–1.0)	0.690
Teamwork within hospital unit	1.061 (0.92–1.1)	0.395	1.06 (0.96–1.1)	0.186	1.025 (0.94–1.1)	0.569	0.837 (0.76–0.92)	0.001	1.033 (0.90–1.1)	0.623	1.08 (0.96–1.2)	0.172	1.10 (0.96–1.2)	0.1157	0.95 (0.84–1.0)	0.433
Organizational learning-continuous improvement	0.918 (0.75–1.1)	0.379	0.929 (0.81–1.0)	0.275	0.875 (0.74–0.98)	0.031	0.838 (0.74–0.94)	0.030	0.869 (0.72–1.0)	0.141	0.90 (0.76–1.1)	0.260	1.03 (0.86–1.2)	7.450	1.08 (0.93–1.2)	0.270
Communication openness	1.01 (0.85–1.2)	0.890	0.976 (0.86–1.1)	0.693	0.985 (0.88–1.0)	0.780	0.70 (0.61–0.81)	0.001	0.996 (0.84–1.1)	0.964	1.06 (0.92–1.2)	0.409	1.02 (0.86–1.2)	0.075	1.16 (1.0–1.3)	0.027
Feedback and communication about error	0.865 (0.71–1.0)	0.132	0.97 (0.88–1.0)	0.679	0.87 (0.78–0.97)	0.015	0.79 (0.70–0.89)	0.001	0.99 (0.86–1.1)	0.910	1.03 (0.91–1.1)	0.590	1.02 (0.89–1.1)	0.690	1.02 (0.91–1.1)	0.721
Nonpunitive response to error	1.25 (1.0–1.5)	0.003	1.33 (1.1–1.5)	0.001	1.10 (0.98–1.2)	0.840	1.01 (0.91–1.1)	0.734	1.10 (0.94–1.3)	0.207	1.3 (1.1–1.5)	0.001	1.19 (1.0–1.4)	0.034	0.904 (1.0–1.4)	0.214
Staffing	1.19 (0.99–1.4)	0.061	1.25 (1.0–1.4)	0.010	1.05 (0.93–1.1)	0.378	0.90 (0.80–1.0)	0.136	1.07 (0.89–1.2)	0.470	1.22 (1.0–1.4)	0.015	1.142 (0.94–1.3)	0.169	0.94 (0.77–1.0)	0.527
Hospital management support for patient safety	1.10 (0.96–1.2)	0.159	1.02 (0.92–1.1)	0.692	1.01 (0.92–1.1)	0.714	0.767 (0.68–0.86)	0.001	0.94 (0.81–1.1)	0.432	1.01 (0.89–1.1)	0.821	1.1 (1.0–1.3)	0.016	0.95 (0.84–1.0)	0.508
Hospital handoffs and transitions	0.95 (0.79–1.1)	0.612	0.98 (0.86–1.1)	0.809	0.97 (0.87–1.0)	0.708	1.18 (1.0–1.3)	0.020	1.09 (0.92–1.2)	0.290	1.003 (0.85–1.1)	0.972	1.40 (0.86–1.2)	0.669	1.16 (1.0–1.3)	0.030
Frequency of event reporting	0.77 (0.62–0.96)	0.020	0.77 (0.66–0.9)	0.001	0.79 (0.69–0.91)	0.001	0.96 (0.84–1.0)	0.597	0.74 (0.59–0.91)	0.005	0.91 (0.75–1.1)	0.366	0.76 (0.61–0.95)	0.019	0.95 (0.80–1.1)	0.610

Values in parentheses are 95% CIs.

event reporting” and “non-punitive response to error” were recognized as the main safety issues in this study, independent of the hospital, profession, and work experience. American and Dutch healthcare staff had expressed a higher level of concern regarding information exchange during patient handoffs and transfers which emphasized the importance of effective communication in ensuring patient safety. On the other hand, healthcare staff from the Middle Eastern region, including Palestine, Lebanon, and Saudi Arabia, showed more emphasis on the need for non-punitive responses to errors, indicating their critical views on the blame-free approach to addressing mistakes. Although the complexity of healthcare in developed nations may contribute to problems with handoffs and care transitions, these factors were strongly correlated with and adversely affected our results, such as the absence of cross-unit teamwork, punitive response to errors, and managerial inaction for promoting patient safety. The Institute of Medicine has noted the difficulties facing healthcare organizations as they attempt to transition from a blame-based culture to one in which mistakes are viewed not as possibilities for personal failure, but rather as ways to strengthen the system and prevent harm.^[8] This cultural change in AJK is not solely attributable to staff members’ willingness; it also requires strong leadership that encourages staff members to be safety-conscious, committed to learning from their mistakes, and competent to stop problems from happening again. Although AJK medical personnel and those in this region frequently adopted a proactive measure to report errors, this study was the first to identify improved event reporting outcomes. When compared with the study results published in Lebanon (41%), Palestine (47%), Saudi Arabia (57%), and even the United States (45%), two-thirds of the healthcare professionals reported at least one incidence in the previous year.

However, compared with Korea (63.5%) and the United States (76%), the total patient safety grade remained lower in this study. The relationship between culture and safe care practices (such as event reporting), which has been demonstrated in earlier studies, was not found in this investigation.^[16,17] This problem was also described by Aveling et al. in Eastern Africa.^[13] The current study discovered differences in how DHQ Hospital Mirpur AJK and staff positions perceive PSC. The findings demonstrated that hospital clinical staff had a favorable influence on numerous variables of PSC. Nurses spend more time with patients and have the chance to address patient safety issues, and the highest number of respondents in the present study were nurses (37%).^[14] As a result, a higher rating for nurses in the safety culture is anticipated. Likewise, El-Jardali et al.^[18] found a finding along these lines. In several dimensions, district hospital scores were also higher than teaching/referral hospitals. The reliability study of individual constructs revealed many components with lower than appropriate levels of reliability (alpha 0.7), despite the survey’s internal consistency being

adequate. This may be partially because the fact or structure of the HSOPSC model for these items may not adequately fit the data, but it may also reflect the instability of the aspects measured by the instrument, which are connected to professionals' perceptions of safety at a particular time and are, in turn, highly changeable.^{18,19]} Thus, the need to create an ideal model became more obvious. This study, unlike others that concentrated on tool development, was not intended to optimize the HSOPSC measurement model. Instead, we modified the model to determine whether a smaller model could produce factor structures more similar to those of the original HSOPSC.

CONCLUSION

There is a serious lack of PSC in the AJK Public Hospital, as evidenced by most of the dimension-related scores, and the total Patient Safety score falling below the baseline. Despite the punitive approach of reporting errors being frequently visible, two-thirds of the workforce reported at least one event in the previous year. It is crucial to foster a culture of patient safety by implementing measures that support all aspects of the safety culture. This study has numerous limitations that must be recognized. As the questionnaire was administered in English, even though it is an understandable language for most hospital staff and the medium of education in AJK medical and health colleges, staff members may not feel comfortable answering, which may affect the readability of the instrument. It could be assumed that the study's questionnaire in English might have affected how the participants responded to some of the questions. Another notable limitation is the use of a non-probability convenience sampling method. The decision to use this approach was driven by practical considerations, including the accessibility and willingness of healthcare professionals to participate within the constraints of their demanding work schedules. In interpreting the findings of this study, it is imperative to acknowledge certain limitations that may affect the generalizability and robustness of the results.

References

1. Organization World Health. *Global Patient Safety Action Plan 2021–2030: Towards Eliminating Avoidable Harm in Health Care*. World Health Organization; 2021.
2. Aiken LH, Cimiotti JP, Sloane DM, et al. The effects of nurse staffing and nurse education on patient deaths in hospitals with different nurse work environments. *Med Care*. 2011;49:1047.
3. Akologo A, Abuosi AA, Anaba EA. A cross-sectional survey on patient safety culture among healthcare providers in the Upper East region of Ghana. *PLoS One*. 2019;14:e0221208.
4. Alahmadi H. Assessment of patient safety culture in Saudi Arabian hospitals. *Qual Saf Health Care*. 2010;19:e17.
5. Jafree SR, Zakar R, Zakar MZ, Fischer F. Assessing the patient safety culture and ward error reporting in public sector hospitals of Pakistan. *Safety in Health*. 2017;3:1–8.
6. Han Y, Kim J-S, Seo Y. Cross-sectional study on patient safety culture, patient safety competency, and adverse events. *West J Nurs Res*. 2020;42:32–40.
7. Sorra J, Yount N, Famolaro T, Gray L. *AHRQ Hospital Survey on Patient Safety Culture Version 2.0: User's Guide*. Agency for Healthcare Research and Quality, 2019.
8. Nieva V, Sorra J. Safety culture assessment: a tool for improving patient safety in healthcare organizations. *Qual Saf Health Care*. 2003;12(suppl 2):ii17–ii23.
9. Nie Y, Mao X, Cui H, et al. Hospital survey on patient safety culture in China. *BMC Health Serv Res*. 2013;13:228.
10. Dimassi H, El-Jardali F, Jaafar M, et al. The current state of patient safety culture in Lebanese hospitals. *Int J Qual Health Care*. 2010;22:386–395.
11. Hamdan M, Saleem AAo. Assessment of patient safety culture in Palestinian public hospitals. *Int J Qual Health Care*. 2013;25:167–175.
12. Campione J, Famolaro T. Promising practices for improving hospital patient safety culture. *Jt Comm J Qual Patient Saf*. 2018;44:23–32.
13. Aveling E-L, Kayonga Y, Nega A, Dixon-Woods M. Why is patient safety so hard in low-income countries? A qualitative study of healthcare workers' views in two African hospitals. *Global Health*. 2015;11:1–8.
14. Chen I-C, Li H-H. Measuring patient safety culture in Taiwan using the Hospital Survey on Patient Safety Culture (HSOPSC). *BMC Health Serv Res*. 2010;10:1–10.
15. Westat R, Sorra J, Famolaro T, et al. *Hospital Survey on Patient Safety Culture: 2010 User Comparative Database Report*. Agency for Healthcare Research and Quality, US Department of Health and Human Services. 2010.
16. Mardon RE, Khanna K, Sorra J, et al. Exploring relationships between hospital patient safety culture and adverse events. *J Patient Saf*. 2010;6:226–232.
17. Najjar S, Nafouri N, Vanhaecht K, Euwema M. The relationship between patient safety culture and adverse events: a study in Palestinian hospitals. *Safety in Health*. 2015;1:1–9.
18. El-Jardali F, Sheikh F, Garcia NA, Jamal D, Abdo A. Patient safety culture in a large teaching hospital in Riyadh: baseline assessment, comparative analysis and opportunities for improvement. *BMC Health Serv Res*. 2014;14:1–15.
19. Occelli P, Quenon J, Kret M, et al. Validation of the French version of the Hospital Survey on Patient Safety Culture questionnaire. *Int J Qual Health Care*. 2013;25:459–468.