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The Impact of Nurses Clinical Decisions on Patient Safety and Quality of Care

Zobia Parveen[1], Abida Zahoor[2], Bilqees Anjum[3], Abida Perveen[3], Smer Yasmeen[1], Amir Sultan[4*] and Usama Siddique[4]

[1]Department of Nursing, Bahawal Victoria Hospital, Bahawalpur, Pakistan
[2]College of Nursing, Layyah, Pakistan
[3]College of Nursing, Quaid-e Azam Medical College, Bahawalpur, Pakistan
[4]Department of Nursing, Times Institute, Multan, Pakistan

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***Corresponding Author:**
Amir Sultan
Department of Nursing, Times Institute, Multan, Pakistan
amirsultan204@gmail.com

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ABSTRACT

Patient safety (PS) and quality of care are central to healthcare delivery, with clinical decisions playing a pivotal role in influencing outcomes. **Objective:** To assess the impact of clinical decisions on PS culture and the quality of care in tertiary care hospitals of Khyber Pakhtunkhwa, Pakistan, and to identify key predictors influencing these outcomes. **Methods:** A cross-sectional analytical study was conducted from January to April 2025 in three tertiary care hospitals of KPK. A total of 384 participants (192 healthcare providers and 192 patients) were enrolled. PS culture was assessed using the Hospital Survey on Patient Safety Culture (HSOPSC), and patient satisfaction was evaluated using the PSQ-18. An audit of 450 clinical decisions was also conducted. Descriptive statistics and inferential statistics were employed for data analysis using SPSS version 26.0. **Results:** Experienced staff (>5 years) reported significantly higher PS scores (3.96 ± 0.49, p<0.001). ICU/Emergency Departments had higher safety perceptions compared to medical and surgical units (p=0.041). Teamwork climate (4.15 ± 0.47) and supervisor expectations (3.96 ± 0.59) were rated highest among safety dimensions. Guideline non-adherence was significantly associated with adverse events (12.3% vs. 4.5%, p=0.018). Teamwork score (OR: 1.78) and experience (OR: 2.33) emerged as strong predictors of high safety culture. **Conclusions:** It was concluded that clinical decisions significantly affect PS and quality of care. Enhancing teamwork and experience-based leadership can strengthen safety culture, reduce adverse events, and improve patient satisfaction.

INTRODUCTION

It was in the twenty-first World Health Assembly in 2002 that the issue of PS was first given serious international significance. The annual report published by the World Health Organization (WHO) reveals that one out of every ten cases of hospitalized patients reported medication-related harm because of adverse events. The incidences of these events are between 3.7 to 17% in different countries. For instance, 10.1% of hospital admissions in Australia were associated with adverse events, and in Portugal, 11.1% of such incidents occurred in acute care hospitals, with 53.2% deemed preventable [1, 2]. Studies have shown that many patients suffer injuries during clinical procedures, resulting in infections, long-term disability, or even death. These alarming findings have prompted numerous global initiatives prioritizing PS across healthcare systems [3, 4]. In 2006, the European Network for Patient Safety (EUNetPaS) defined PS culture as a merged element of organizational and entity behaviour grounded in combined values and beliefs, with a continuous goal of minimizing harm to patients resulting from healthcare processes [5]. Essentially, the PS culture within healthcare institutions reflects hospital management's commitment to both PS and the delivery of high-quality care. For ongoing improvement in PS, it is therefore essential to regularly assess this culture [6]. One widely adopted tool for evaluating healthcare staff perceptions of PS culture is the

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Safety Attitudes Questionnaire (SAQ) [7, 8]. The SAQ, which was initially created by Sexton et al., [9], has six scales of PS culture: the teamwork environment, the safety climate, job satisfaction, stress recognition, perception of management, and the working conditions. The subsequent translations of the SAQ consist in a Chinese version that the Joint Commission of Taiwan (JCT) translated into their local realities in 2007 to match the healthcare conditions in Taiwan [10]. By the end of 2014, two other scales, that is, emotional exhaustion and work-life balance, were added to the CSAQ to provide a broader measure of staff well-being [11, 12]. During the implementation of the CSAQ, valuable results have been established about the issues that improve PS culture. Several factors have been uncovered to affect a sense of safety culture, which have been revealed by Huang et al., [11] and include emotional exhaustion, managerial attitudes and teamwork climate. Nurses were also observed to be mostly stressed than the physicians owing to the engagements they had to perform simultaneously. Moreover, the other possible implicating demographic factors related to safety perception are age, gender and work experience. Male staff members generally reported higher satisfaction with safety climate, working conditions, and job satisfaction, whereas female staff were more attuned to stress [12]. Managerial roles were associated with more favourable perceptions of safety, teamwork, and job satisfaction.

This study aims to investigate the impact of clinical decisions on PS and quality of care, with a specific focus on the mediating role of PS culture as assessed through the CSAQ.

METHODS

The cross-sectional analytical study was carried out in three major tertiary care hospitals of Khyber Pakhtunkhwa, Pakistan, I.e Lady Reading Hospital, Hayatabad Medical Complex Hospital and Saidu group of Teaching Group. These hospitals were selected due to their high patient turnover, diverse Clinical Departments, and established infrastructure for healthcare delivery, making them ideal for assessing the correlation between clinical decisions, safety protocols, and quality care outcomes. The duration of the study was four months, from January to April 2025. All participants were briefed about the nature of the study, and informed written consent was obtained before participation. Ethical approval was granted by the Ethical Review Committee of the Institute of Nursing Sciences, DIR/KMU/INS/24/215. The study adhered strictly to the principles of the Declaration of Helsinki and maintained the confidentiality of all collected data. The target population included healthcare professionals directly involved in patient management, including physicians, nurses, and allied health staff, as well as hospitalized patients from general medicine and surgical wards who had received treatment decisions during their hospital stay. The sample size was calculated using the online sample size calculator, Open Epi software version 3.01, by using total nurses working in the hospitals as the population, then using a confidence level of 95%, a margin of error of 5%, and an anticipated population proportion of 50% to ensure maximum variability. This yielded a sample size of 384 participants. To ensure representatives, the sample was stratified across the three hospitals proportionally according to the average patient and staff volume reported monthly. A non-probability purposive sampling technique was adopted to recruit healthcare providers involved in direct clinical decision-making, and a systematic random sampling technique was used to select patient participants. Inclusion criteria for healthcare providers included physicians and nurses with at least one year of clinical experience in a tertiary care setting, currently employed in departments where decisions about patient care were routinely made (e.g., internal medicine, surgery, ICU, and emergency). Inclusion criteria for patients included those aged 18 years and above, admitted for at least 48 hours, and having undergone at least one clinical decision intervention (e.g., diagnostic or therapeutic). Exclusion criteria for both groups included those unwilling to participate, interns or students, and patients discharged against medical advice or admitted for less than 48 hours. The study investigated two core parameters: PS and quality of care, both of which were evaluated through validated tools. For assessing clinical decision impact on PS, the HSOPSC tool, developed by the Agency for Healthcare Research and Quality (AHRQ), was adapted. This tool was administered to healthcare providers and focused on domains such as teamwork, handoff communication, non-inflicting response to errors, and the overall concept of PS. Each item was scored on a Likert scale from 1 (strongly disagree) to 5 (strongly agree), with higher scores indicating better PS practices. Moreover, the scoring system is based on the two upper responses of agree and strongly agree as good score, while the two lower responses of not-agree and strongly disagree are poor culture, while the response of neither agree nor disagree is average culture. To measure the quality of care from the patient's perspective, the Patient Satisfaction Questionnaire Short-Form (PSQ-18) was used. It included seven dimensions: general satisfaction, technical quality, interpersonal manner, communication, financial aspects, time spent with the doctor, and accessibility of care. This tool was translated into Urdu and back-translated for consistency. Data were collected through structured interviews conducted by trained research assistants to ensure uniformity. The Cronbach alpha score ranged from

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0.67 to 0.89 [13]. Furthermore, a brief audit of documented clinical decisions in the selected departments was conducted to assess alignment with established clinical guidelines and their subsequent outcomes. This involved reviewing 150 randomly selected patient files from each hospital to trace the rationale behind key decisions, timeliness, and follow-up documentation. This component provided a triangulated view of how decision-making patterns influenced real-world safety and care outcomes. The data were entered and analyzed in the use of IBM SPSS version 26.0. Demographic characteristics and professional characteristics were summarized using descriptive statistics. Continuous variables were expressed as the mean and standard deviations, whereas categorical variables as frequencies and percentages. To interpret the relationships between PS or quality scores and clinical decision parameters, chi-square and independent t-tests were performed in inferential analysis. A multivariable logistic regression model was adopted to identify the factors that predict having high PS scores by controlling for confounders, including hospital, department, staff experience and workload. The p-value of less than 0.05 was judged as significant.

RESULTS

A total of 384 participants were enrolled in the study, comprising 192 healthcare providers and 192 patients. The distribution was proportional across the three tertiary care hospitals: Lady Reading Hospital (n=128), Khyber Teaching Hospital (n=128), and Hayatabad Medical Complex (n=128). The study presents the demographic and professional characteristics of the participating healthcare providers (n = 192). The mean age of the respondents was 34.6 ± 7.8 years. Among the participants, 112 (58.3%) were female and 80 (41.7%) were male. Regarding professional experience, 129 (67.2%) had more than five years of clinical experience, while 63 (32.8%) had between one and five years of experience. The majority of healthcare providers were working in the Medicine Department, 70 (36.5%) or the Surgical Department [63 (32.8%)], followed by ICU/Emergency [35 (18.2%)] and other departments, 24 (12.5%) (Table 1).

Table 1: Demographic Data of enrolled Health Professionals

Characteristics	n (%)
Gender	
Male	80 (41.7%)
Female	112 (58.3%)
Age (Mean ± SD)	34.6 ± 7.8 Years
Experience	
1–5 Years	63 (32.8%)
>5 Years	129 (67.2%)
Departments	
Medicine	70 (36.5%)
Surgery	63 (32.8%)
ICU/Emergency	35 (18.2%)
Other	24 (12.5%)

Results illustrated that the mean composite HSOPSC score was 3.82 ± 0.56. The highest mean scores were observed in the "Teamwork within Units" (4.15 ± 0.47) and "Supervisor Expectations" (3.96 ± 0.59) domains, while the lowest scores were noted for "Non-Punitive Response to Errors" (3.21 ± 0.64). Patient satisfaction scores measured using the PSQ-18 indicated that the highest satisfaction was observed for "Technical Quality" (4.29 ± 0.41) and "Interpersonal Manner" (4.19 ± 0.49), while the lowest satisfaction was for "Accessibility" (3.37 ± 0.63) (Table 2).

Table 2: PS Culture Scores Among enrolled Nurses

PS Culture Scores	Mean Score ± SD
HSOPSC Dimension	
Collaboration in the unit	4.15 ± 0.47
Manger anticipation	3.96 ± 0.59
Continuous Learning for Improvement	3.87 ± 0.62
Communication Openness	3.72 ± 0.58
Feedback and Communication About Error	3.54 ± 0.66
Non-Punitive Response to Errors	3.21 ± 0.64
Overall Perception of Patient Safety	3.78 ± 0.61
Composite Patient Safety Score	3.82 ± 0.56
PSQ-18 Dimension	
Overall Satisfaction	4.01 ± 0.48
Practical Quality	4.29 ± 0.41
Interactive Manner	4.19 ± 0.49
Communication	4.02 ± 0.53
Economical Aspects	3.45 ± 0.60
Time with Doctor	3.76 ± 0.58
Availability	3.37 ± 0.63
Composite Quality Score	3.87 ± 0.51

The study presents the demographic characteristics of the patient participants (n = 192). The mean age of patients was 49.3 ± 13.2 years. Among the participants, 105 (54.7%) were male and 87 (45.3%) were female. The majority of the patients were admitted to the general medicine ward [79 (41.1%)] and the general surgery ward was 73 (38.0%), followed by the ICU was 25 (13.0%), and the emergency ward was 15 (7.8%) (Table 3).

Table 3: Demographic profile of enrolled Patients (n = 192)

Characteristics	n (%)
Gender	
Male	105 (54.7%)
Female	87 (45.3%)
Age (Mean ± SD)	49.3 ± 13.2 years
Admission Ward	
General Medicine	79 (41.1%)

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General Surgery	73 (38.0%)
ICU	25 (13.0%)
Emergency	15 (7.8%)

Independent t-tests were applied to evaluate differences between the groups regarding experience level, department, and safety scores. Healthcare providers with more than 5 years of experience had significantly higher PS scores (3.96 ± 0.49) compared to those with 1–5 years (3.51 ± 0.64), $p<0.001$, which shows significant differences. Moreover, ANOVA was used between the departments also showed significant differences. ICU/Emergency Departments scored higher (3.95 ± 0.52) compared to medicine (3.81 ± 0.58) and surgery (3.70 ± 0.61), $p=0.041$ (Table 4).

Table 4: Differences Between Groups of Experiences, Departments and Composite Patient Safety Scores

Variables	Mean ± SD	p-value
Experience Groups		
1–5 Years	3.51 ± 0.64	<0.001*
>5 Years	3.96 ± 0.49	
Departments		
Medicine	3.81 ± 0.58	0.041*
Surgery	3.70 ± 0.61	
ICU/Emergency	3.95 ± 0.52	

As a result of a clinical audit, a review of 450 clinical records revealed that 84.4% of decisions aligned with clinical guidelines. However, in 15.6% of the cases, deviation from guidelines was noted, most commonly in emergency settings due to time constraints or undocumented rationale. Among these deviations, the adverse outcome rate was significantly higher (12.3%) compared to the guideline-adherent group (4.5%), p=0.018, as a result of a chi-square test (Table 5).

Table 5: Association of Guideline Adherence with Adverse Events (n=450)

Adherence to Guidelines	Adverse Event	No Adverse Event	Total	Adverse Rate (%)
Yes (n=380)	17	363	380	4.5%
No (n=70)	11	59	70	12.3%
Chi-square p-value	–	–	–	0.018*

Multivariable logistic regression revealed that clinical experience (95% CI: 1.41–3.86, $p=0.001$) and teamwork score (95% CI: 1.21–2.63, p=0.004) were significant independent predictors of higher PS culture scores. Similarly, patient satisfaction was independently associated with technical quality ($p<0.001$) and interactive manner (p=0.006).Years of experience and teamwork scores were statistically significant independent predictors of high PS culture.Other variables showed positive trends but did not reach significance (Table 6).

Table 6: Multivariate Logistic Regression Analysis of Predictors of High Patient Safety Culture Score

Predictor Variables	β (Coefficient)	SE	OR (95% CI)	p-value
Years of Experience (>5 Years)	0.847	0.255	2.33 (1.41 – 3.86)	0.001*
Teamwork Score	0.578	0.201	1.78 (1.21 – 2.63)	0.004*
Supervisor Expectations Score	0.213	0.188	1.24 (0.85 – 1.80)	0.247
Communication Openness Score	0.119	0.168	1.13 (0.81 – 1.59)	0.482
Department (ICU/Emergency)	0.329	0.221	1.39 (0.91 – 2.12)	0.129

DISCUSSION

This study explored how clinical decisions, as influenced by healthcare provider characteristics and organizational dynamics, impact PS culture and the quality of care. The findings confirm that both individual and systemic factors significantly shape perceptions and outcomes related to safety and quality, aligning with a growing body of literature emphasizing the multidimensional nature of PS culture. The demographic profile of the healthcare providers revealed that a majority were female (58.3%) and had over five years of experience (67.2%). The findings are in line with the work of Huang *et al.*, who also reported a predominance of experienced female staff in safety culture research [11]. Our findings support prior conclusions that demographic variables, especially clinical experience and gender, may shape perceptions of PS, with female staff more attuned to stress-related indicators and male staff expressing greater satisfaction with job and safety climate [12, 13]. The highest scores among the PS culture domains were found in "Teamwork within Units" (4.15 ± 0.47) and "Supervisor Expectations" (3.96 ± 0.59), while "Non-Punitive Answer to Errors" received the lowest score (3.21 ± 0.64). This mirrors findings by Wu *et al.*, where staff consistently rated teamwork and supervisor support highly, while expressing concerns about a culture of blame [12]. The low score on non-punitive response indicates a persistent fear of punitive consequences, which has been identified as a barrier to error reporting and open communication in multiple studies [14, 15].The patient demographic data showed a balanced gender distribution and a mean age of 49.3 ± 13.2 years, with most patients admitted to medical (41.1%) and surgical (38.0%) units. These findings reflect standard tertiary care admissions and do not deviate significantly from other hospital-based PS studies.However, the stratified sampling method ensured inclusion from departments where critical clinical decisions are frequently made, enhancing the relevance of our results. Patient satisfaction was highest in the domains of "Technical Quality" (4.29 ± 0.41) and "Interpersonal Manner" (4.19 ± 0.49), reinforcing previous study by Wang *et*

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al., [16] and Huang *et al.*, [11], who emphasized that perceptions of staff competence and respect are central to quality-of-care evaluations. Conversely, lower satisfaction with "Accessibility" (3.37 ± 0.63) and "Financial Aspects" (3.45 ± 0.60) highlights ongoing systemic constraints in care delivery, especially in resource-limited settings.A statistically significant difference was observed between providers with more than five years of experience and those with less experience regarding PS culture ($p<0.001$). This supports the conclusions of Kim and Weng, who noted that experienced staff members are more likely to perceive a stronger safety climate due to their confidence, exposure, and familiarity with institutional protocols [17].The high odds ratio in our regression analysis (OR: 2.33) further affirms experience as a critical predictor of safety culture. Departmental differences were also significant, with ICU/Emergency staff reporting the highest safety scores (3.95 ± 0.52; $p=0.041$).This can be attributed to heightened risk awareness and team coordination in high-acuity environments. Similar trends have been reported by Lee *et al.*, [18], who emphasized the necessity of inter-unit collaboration, especially in emergency settings where the margin for error is slim. Our review of 450 clinical decision records revealed that guideline non-adherence was significantly associated with higher rates of adverse events (12.3% vs. 4.5%; $p=0.018$). This reinforces prior assertions that standardization of care through evidence-based guidelines directly enhances PS and reduces preventable harm [19].In our logistic regression model, teamwork scores emerged as a strong independent predictor of high safety culture (OR: 1.78, $p=0.004$), consistent with previous findings from Salas *et al.*, [20], which established teamwork climate as the most influential domain in promoting safety. Similarly, Huang *et al.*, [11] identified teamwork and perceptions of management as central to fostering a robust safety culture. Although "Supervisor Expectations" and "Communication Openness" were not statistically significant in our model, their directional alignment with prior research suggests they play supportive, if indirect, roles in shaping safety perceptions [10, 18]. Interestingly, our findings align with the mediation analysis by Huang *et al.*, [11], which emphasized that the teamwork environment, working conditions, and stress recognition fully mediate the effect of management leadership on the safety climate. Our study affirms that years of experience and team dynamics, not direct managerial input alone, drive safety culture outcomes. As such, merely improving perceptions of leadership is insufficient unless accompanied by enhanced working conditions and reduced stress environments [14].

CONCLUSIONS

Clinical decisions significantly influence PS and quality of care, particularly when shaped by experience, teamwork, and guideline adherence. Comparisons with prior literature validate our results while also emphasizing the need for targeted leadership strategies that improve team-based functioning and structural conditions within hospitals. Advancing safety culture is contingent not solely on leadership perception but on its tangible impact through mediated organizational dimensions.

Authors Contribution

Conceptualization: ZP
Methodology: ZP, AZ, AP, SY
Formal analysis: ZP
Writing review and editing: BA, AP, AS, US

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

All the authors declare no conflict of interest.

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