

Perspectives on Patient Safety in Educational Hospitals: A Cross-Sectional Study

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Abstract

Background: Patient safety is a critical component of healthcare quality, with a substantial influence on patient outcomes and overall performance of healthcare systems. In educational hospitals, where the dual roles of patient care delivery and nursing education intersect, understanding the perspectives of various stakeholders—including nursing students, practicing nurses, and patients—is essential.

Aim: This study aimed to assess perceptions of patient safety among nursing students, nurses, and patients in educational hospitals.

Method: This descriptive cross-sectional comparative study was conducted among nursing students, nurses, and hospitalized patients at educational hospitals in Tehran, Iran and the Faculty of Nursing affiliated with Shahid Beheshti University of Medical Sciences, from October 2022 to February 2023. Using convenience sampling method, 125 participants from each group were recruited according to predefined inclusion criteria. Data were collected using three validated self-reported tools: the SFS for patients, the HSOPS for nurses, and the HSOPS-NS for nursing students. Statistical analysis was performed using SPSS version 21.

Results: A total of 375 participants (125 nursing students, 125 nurses, and 125 hospitalized patients) completed the study. The overall percentage of positive responses regarding patient safety was 33.6% among nursing students and 53.4% among nurses, whereas patients reported favorable perceptions of effective care (81.9%), confidence in the healthcare team (74.8%), and emotional enrichment (72.8%). Patient safety perceptions differed significantly according to selected characteristics, including semester and clinical placement among students, educational level, ward, and shift type among nurses, and hospital ward among patients ($p < 0.05$).

Implications for Practice: The findings of this study highlight the potential value of interventions such as dedicated patient safety training and non-punitive reporting systems for strengthening safety culture; however, their effectiveness cannot be established from the present study and should be evaluated in future interventional or longitudinal research.

Keywords: Hospital, Nurse, Nursing Students, Patient, Patient Safety, Safety Culture

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Introduction

Patient safety is a fundamental component of high-quality healthcare and encompasses organizational processes, professional practices, and patient-centered actions aimed at preventing avoidable harm during healthcare delivery (1, 2). In educational hospitals, patient safety is particularly important because these institutions simultaneously function as settings for patient care, professional education, and clinical learning. The presence of learners within complex clinical environments may influence communication, supervision, teamwork, and the implementation of safety practices, making patient safety a shared responsibility among healthcare professionals, learners, and patients (3-6). Existing research demonstrates that patient safety has been examined from the perspectives of different stakeholders; however, these perspectives have largely been investigated independently. Nursing students are increasingly recognized as important stakeholders in patient safety, as clinical education shapes their knowledge, attitudes, safety competencies, and readiness to identify and report safety concerns (7). Recent cross-sectional and mixed-method studies have examined nursing students' perceptions of patient safety culture and their experiences with factors influencing the delivery of safe care in clinical settings. These studies have highlighted key safety-related factors, including communication, incident reporting, supervision, teamwork, and the clinical learning environment (8-10).

Practicing nurses represent another essential stakeholder perspective, as they are directly involved in the delivery and coordination of patient care and are continually exposed to organizational conditions that may influence patient safety. Research among nurses has identified several important dimensions of patient safety culture, including staffing, teamwork, communication, management support, incident reporting, and responses to errors (11, 12). Studies conducted in teaching hospitals have demonstrated considerable variation in nurses' perceptions across different dimensions of patient safety culture, underscoring the role of organizational and work-environment factors in shaping perceptions of patient safety (13-15). The patient perspective provides a complementary dimension that cannot be fully captured by assessments from healthcare professionals (16-18). Patients experience care directly and may perceive safety risks, communication failures, information gaps, involvement in decision-making, and responses to safety incidents differently from healthcare professionals involved in their care (19, 20). Recent research has increasingly emphasized patient-reported measures and patient involvement as important components of patient safety, while systematic reviews have identified a range of patient-reported safety climate measures and highlighted the importance of incorporating patients' perspectives into safety assessments (9). This distinction is important because patients' perceptions of safety may reflect aspects of care that are not captured by conventional, staff-oriented measures of safety culture (21).

Taken together, the existing literature indicates that each stakeholder group provides a distinct source of information on patient safety. However, the evidence remains fragmented. Studies have predominantly examined nursing students, nurses, or patients separately, rather than directly comparing their perspectives within the same educational-hospital context. Recent research illustrates this fragmentation, with studies focusing separately on nursing students' perceptions of patient safety culture, nurses' perceptions of safety culture and patient-reported or patient-perceived aspects of safety. Thus, although the literature provides substantial knowledge about patient safety from the perspective of individual stakeholder groups, comparatively less is known about whether and to what extent these groups perceive patient safety similarly or differently within the same educational healthcare environment. Comparing these three perspectives is scientifically important because each group occupies a different position within the patient-care system. Nursing students participate in clinical care while developing their professional safety competencies; practicing nurses possess direct clinical and organizational experience; and hospitalized patients experience the care process from the recipient's perspective. Agreement across groups may highlight safety dimensions that are consistently recognized within the clinical environment, whereas discrepancies may point to areas requiring further investigation regarding communication, supervision, organizational practices, education, or patient engagement. A multi-stakeholder comparison may therefore provide a more comprehensive understanding of patient safety than assessments of individual stakeholder groups in isolation. Accordingly, this study aimed to assess and compare perceptions of patient safety among nursing students, nurses, and patients in educational hospitals. Specifically, the study examines whether perceptions of patient safety differ among the three stakeholder groups and explores the

relationship between these perceptions and relevant participant characteristics, where applicable to the study analyses.

Methods

This study employed a descriptive, cross-sectional, comparative design. The target population comprised employed nurses, undergraduate nursing students, and hospitalized patients receiving care in various wards of educational hospitals in Tehran, Iran, including emergency, surgery, internal medicine, and intensive care units, during 2022–2023. A total of 375 participants were recruited, including 125 nurses, 125 undergraduate nursing students, and 125 hospitalized patients. Participants were selected using convenience sampling and were required to meet the predefined eligibility criteria specific to their respective stakeholder group.

Nurses were eligible if they were directly involved in patient care, had at least one year of professional experience, held a bachelor's degree or higher in nursing, and were able to communicate in Persian. Undergraduate nursing students were eligible if they were enrolled in the nursing program and able to communicate in Persian; students with a history of formal hospital employment were excluded. Hospitalized patients were eligible if they were conscious adults aged ≥ 18 years, had been hospitalized in the selected university-affiliated hospitals for at least three days, and were able to communicate and express their perceptions in Persian. Participants in all three groups were excluded if they declined participation, withdrew from the study, or returned an incomplete questionnaire. For hospitalized patients, cognitive impairment, severe psychiatric illness, or significant communication barriers that could interfere with understanding the questionnaire or providing reliable self-reported data were also considered exclusion criteria. The sample size was calculated using a previous study (22) and a minimum of 104 participants was determined using a one-way analysis of variance (ANOVA) framework for three groups; given a 20% sample drop, we chose 125 Participants for each group.

Three separate instruments were used to assess the respective target groups. For patients, the 12-item Safety Feeling Scale (SFS), developed and validated by Dabaghi et al. (23), was used. The SFS comprises four subscales: effective care (5 items), confidence in the healthcare team (3 items), emotional enrichment (2 items), and hygienic facilities (2 items). Items are rated on a 5-point Likert scale ranging from 1 to 5, with response options from “always” to “never.” The total raw score ranges from 12 to 60, with higher scores indicating a greater sense of safety among hospitalized patients. The first section of the questionnaire collects demographic and clinical characteristics, including sex, marital status, hospital unit, income level, and length of hospitalization, among other variables. The SFS is a valid and reliable self-report instrument for assessing patients' general sense of safety in the hospital setting. In the present study, its internal consistency reliability was assessed using Cronbach's alpha, which yielded a coefficient of 0.90, indicating excellent internal consistency.

For nurses, the Hospital Survey on Patient Safety Culture (HSOPS) was used. The 42-item instrument assesses 12 patient safety culture composites and uses a 5-point Likert response scale. Depending on the item, responses range from “strongly disagree” to “strongly agree” or from “never” to “always,” with three to four items contributing to each composite (24). The questionnaire also includes an overall patient safety grade for the respondent's work area or unit, rated from “excellent” to “failing.” In the present study, the total score for each HSOPS composite was calculated by summing the scores of its constituent items, and the composite scores were then used to derive the overall score. Based on the scoring criteria applied in the present study, total scores below 105 indicated poor patient safety culture, scores from 105 to <157.5 indicated a moderate level of patient safety culture, and scores from 157.5 to 210 indicated a favorable level of patient safety culture (25). The validity and reliability of the Persian version of the HSOPS have been established in several studies among Iranian populations (26-29). In the present study, internal consistency reliability was assessed using Cronbach's alpha. The Cronbach's alpha coefficient was 0.80, indicating good internal consistency.

For nursing students, the Hospital Survey on Patient Safety Culture for Nursing Students (HSOPS-NS) was used. The instrument was adapted for nursing students by Ortiz de Elguea et al. (2019) (30). The questionnaire comprises 49 items rated on a 5-point Likert-type scale, together with one item assessing the respondent's overall perception of patient safety on a 1–10 scale, three items assessing knowledge and use of the incident reporting system, and one open-ended question. The instrument is scored in two phases. In the first phase, 14 factors are identified and subsequently grouped into five

main dimensions: (1) frequency of events reported, (2) overall perceptions of patient safety, (3) perception of patient safety in the unit or clinical area, (4) individual perception of the overall level of patient safety, and (5) indicator of good practice. The original five-factor structure was evaluated using confirmatory factor analysis (CFA). The model demonstrated a good fit to the data [$\chi^2(5) = 18.87$, $p = .002$; CFI = 0.98; IFI = 0.98; RMSEA = 0.07], with factor loadings ranging from 0.52 to 0.82. The instrument demonstrated good internal consistency, with a Cronbach's alpha of 0.88 in the validation sample. Cronbach's alpha values across the three participating universities were also comparable with those reported for the subscales of the original survey in previous validations conducted in different samples and countries (31-33). In the present study, the Persian version of the HSOPS-NS underwent psychometric evaluation. The instrument demonstrated good internal consistency (Cronbach's $\alpha = 0.72$ – 0.91), strong test–retest reliability (ICC = 0.82–0.93), and acceptable construct validity (RMSEA = 0.09; CFI = 0.88). All items were retained based on the psychometric findings, and factor loadings supported the associations between the questionnaire items and their respective factors. These findings supported the validity and reliability of the Persian HSOPS-NS for assessing nursing students' perceptions of patient safety.

Sociodemographic and relevant background characteristics, including age, sex, marital status, academic year, work experience, and clinical ward, were collected using the demographic section of the respective questionnaires. Because the SFS, HSOPS, and HSOPS-NS assess safety from different stakeholder perspectives and use different item structures and scoring systems, their raw total scores were not treated as directly equivalent measures. Accordingly, analyses were conducted using the scoring procedures appropriate to each instrument and stakeholder group.

Data were analyzed using the Statistical Package for the Social Sciences (SPSS), version 21. Descriptive statistics included frequencies and percentages for categorical variables and means and standard deviations (SDs) for continuous variables. Differences in patient safety scores across categories of qualitative demographic variables were assessed using independent-samples *t*-tests for two-category variables and one-way analysis of variance (ANOVA) for variables with more than two categories. Pearson's or Spearman's correlation coefficients were used, as appropriate, to examine associations between patient safety scores and quantitative demographic variables. Because the three stakeholder groups were assessed using different instruments with different scoring ranges, the total score of each instrument was linearly transformed to a standardized 0–100 scale to facilitate comparison across groups. The normalized score was calculated as follows:

Normalized score = [(raw score – minimum possible score) / (maximum possible score – minimum possible score)] $\times$ 100.

Accordingly, a score of 0 represented the minimum possible score and a score of 100 represented the maximum possible score for each instrument. For example, because the SFS has a possible score range of 12–60, a raw score of 60 corresponded to a normalized score of 100. The normalized total scores were used for between-group comparisons, whereas analyses of demographic characteristics were conducted according to the appropriate statistical procedures within each stakeholder group. Statistical significance was set at $p < 0.05$. Continuous variables were first assessed for normality using the Shapiro–Wilk test and homogeneity of variances using Levene's test. For normally distributed outcomes, independent-samples *t*-tests or one-way analysis of variance (ANOVA) were used for group comparisons, with Bonferroni-adjusted post hoc comparisons applied when appropriate. For non-normally distributed outcomes, the Mann–Whitney U test or Kruskal–Wallis test was used, as appropriate. Categorical variables were compared using the chi-square test or Fisher's exact test. Pearson's or Spearman's correlation coefficient was used, as appropriate, based on the distribution and measurement level of the variables. All statistical tests were two-sided, with statistical significance set at $\alpha = 0.05$. Bonferroni adjustments were applied for multiple pairwise comparisons to control the overall type I error rate.

Ethical Consideration

This study was approved by the Committee for Ethics in Biomedical Researches, School of Nursing, Shahid Beheshti University of Medical Sciences, Tehran, Iran (Ethical approval code: IR.SBMU.PHARMACY.REC.1402.268). All participants provided written informed consent before participation. They were informed of their right to decline participation, refuse to answer any question, or withdraw from the study at any time without penalty or consequences for their care or

academic status.

Results

A total of 375 participants completed the study, including 125 nursing students, 125 nurses, and 125 hospitalized patients. Because the three stakeholder groups were assessed using different instruments, their scores were analyzed separately according to the scoring procedures specified for each instrument. The mean age was 21.00 ± 2.40 years among nursing students, 34.00 ± 8.30 years among nurses, and 50.00 ± 1.86 years among patients. Female participants comprised 55.20% of nursing students, whereas 72.00% of nurses and 57.60% of patients were male. Nursing students were in semesters 3–8, with the largest proportion being in semester 3 (24.00%). Among nurses, 80.00% had a bachelor's degree, and 62.40% reported working 40–59 hours per week. Among patients, 61.40% had been hospitalized for more than 1 week. The key characteristics of the three participant groups are presented in Table 1.

Table 1: Selected characteristics of study participants

Characteristic	Nursing students (n=125)	Nurses (n=125)	Patients (n=125)
Age, mean $\pm$ SD	21.00 ± 2.40	34.00 ± 8.30	50.00 ± 1.86
Female, n (%)	69 (55.20)	35 (28.00)	53 (42.40)
Male, n (%)	56 (44.80)	90 (72.00)	72 (57.60)
Nurses: Bachelor's degree, n (%)	—	100 (80.00)	—
Nurses: 40–59 h/week, n (%)	—	78 (62.40)	—
Students: Semester 3, n (%)	30 (24.00)	—	—
Patients: Hospitalization >1 week, n (%)	—	—	78 (62.40)

Among nursing students, the percentage of positive responses for overall perception of patient safety was 33.60%, while the mean percentage of positive responses across the five principal dimensions was 38.30%. The most favorable dimensions were teamwork within units (63.00%), non-punitive response to error (60.70%), organizational learning—continuous improvement (54.80%), and feedback and communication about error (51.10%). The least favorable dimensions were handoffs and transitions (22.80%), frequency of events reported (31.70%), communication openness (34.10%), supervisor/manager actions promoting patient safety (34.10%), and teamwork across units (34.50%) (Table 2).

Table 2: Patient safety climate dimensions among nursing students

Dimension	Positive response (%)
Teamwork within units	63.00
Non-punitive response to error	60.70
Organizational learning—continuous improvement	54.80
Feedback and communication about error	51.10
Perception of patient safety in the unit/area	49.60
Staffing	40.00
Supervisor/manager actions promoting patient safety	34.10
Communication openness	34.10
Teamwork across units	34.50
Indicator of good praxis	42.40
Frequency of events reported	31.70
Handoffs and transitions	22.80
Overall perception of patient safety	33.60
Overall patient safety climate score (mean score)	38.30

The dimensions of communication openness, teamwork within units, perception of patient safety in the unit or area, and overall grade on patient safety were significantly associated with the overall patient safety climate measure (all $p < 0.05$). Patient safety climate also differed according to selected participant characteristics. Semester was significantly associated with frequency of events reported, organizational learning—continuous improvement, supervisor/manager actions promoting patient safety, and overall grade on patient safety (all $p < 0.05$). Female students reported a more favorable overall perception of patient safety than male students ($p = 0.012$). A significant association was also observed between clinical placement and overall perception of patient safety ($p = 0.048$).

Among nurses, the overall average percentage of positive responses was 53.40%. The least favorable dimensions were teamwork within units (19.40%), management support for patient safety (21.00%), teamwork across units (23.60%), supervisor/manager actions promoting patient safety (31.00%), handoffs and transitions (32.50%), communication openness (32.26%), staffing (35.40%), and organizational learning—continuous improvement (41.60%). Feedback and communication about error had a positive-response score of 40.80%, whereas the highest percentages of positive responses were observed for frequency of events reported (51.20%) and non-punitive response to error (52.80%) (Table 3).

Table 3: Patient safety culture dimensions among nurses

Dimension	Positive response (%)
Non-punitive response to error	52.80
Frequency of events reported	51.20
Feedback and communication about error	40.80
Organizational learning—continuous improvement	41.60
Staffing	35.40
Supervisor/manager actions promoting patient safety	31.00
Handoffs and transitions	32.50
Communication openness	32.26
Teamwork across units	23.60
Management support for patient safety	21.00
Teamwork within units	19.40
Overall perception of patient safety	53.40

Feedback and communication about error was significantly associated with nurses' educational level ($p = 0.018$). Overall perception of patient safety also differed significantly across hospital wards ($p = 0.001$), with more favorable perceptions reported in intensive care and gynecology wards. Several patient safety dimensions were also significantly associated with shift type, including feedback and communication about error ($p = 0.002$), organizational learning—continuous improvement ($p = 0.003$), staffing ($p = 0.025$), and supervisor/manager actions promoting patient safety ($p = 0.010$). No statistically significant association was observed between overall perception of patient safety and shift type ($p = 0.128$).

Among hospitalized patients, the highest percentage of positive responses was observed for effective care (81.90%), followed by confidence in the healthcare team (74.83%) and emotional enrichment (72.80%). Hygienic facilities had the lowest percentage of positive responses (50.15%). The findings indicated generally favorable safety-related perceptions among hospitalized patients (Table 4).

Patients' overall safety perception was significantly associated with hospital ward ($p = 0.005$). Significant associations were also observed between hospital ward and the dimensions of effective care ($p = 0.008$) and hygienic facilities ($p < 0.001$).

Because nursing students, nurses, and patients were assessed using different instruments measuring related but non-equivalent constructs, no inferential comparison of their total scores was performed. Accordingly, differences in the observed percentages across stakeholder groups should be interpreted

as group-specific patterns within their respective measurement frameworks, rather than as direct evidence that one group perceived patient safety more favorably than another.

Table 4: Safety perceptions among hospitalized patients

Dimension	Mean $\pm$ SD	Positive-response score (%)
Effective care	21.40 $\pm$ 4.10	81.90
Confidence in the healthcare team	12.30 $\pm$ 2.60	74.83
Emotional enrichment	8.03 $\pm$ 2.03	72.80
Hygienic facilities	6.70 $\pm$ 2.60	50.15
Overall SFS	48.00 $\pm$ 9.30	75

Discussion

The present study examined patient safety-related perceptions among undergraduate nursing students, practicing nurses, and hospitalized patients in educational hospitals in Tehran. Rather than assuming a single, uniform perception of patient safety across these stakeholder groups, the findings demonstrated distinct patterns within each measurement framework. Nursing students reported a relatively less favorable patient safety climate, particularly in the areas of handoffs, event reporting, communication openness, and managerial support, whereas nurses identified notable weaknesses in teamwork, management support, staffing, and organizational processes. In contrast, hospitalized patients reported more favorable perceptions, particularly regarding effective care and confidence in the healthcare team. Because the three groups were assessed using different instruments measuring related but non-equivalent constructs, these findings should be interpreted as stakeholder-specific perspectives rather than direct comparisons of patient safety scores.

Nursing students: The overall patient safety climate score among nursing students was 38.30%, whereas the percentage of positive responses for overall perception of patient safety was 33.60%. These findings should not be interpreted as evidence of limited patient safety knowledge or clinical competence, because the HSOPS-NS primarily assesses perceptions of the patient safety climate rather than objective measures of knowledge or clinical competence. Instead, the findings may indicate that students do not consistently perceive their clinical learning environment as supportive of patient safety.

The relatively low scores for handoffs and transitions (22.80%), frequency of events reported (31.70%), communication openness (34.10%), and supervisor/manager actions promoting patient safety (34.10%) are particularly noteworthy. One possible explanation is that nursing students occupy a relatively peripheral position within the clinical hierarchy, which may limit their opportunities to participate in safety-related communication, reporting, and decision-making. In addition, students often rotate across different clinical settings and work with different healthcare teams, potentially limiting continuity of supervision and resulting in variable exposure to local patient safety practices. Evidence from teaching and clinical learning environments has similarly shown that trainees may report less favorable perceptions across several patient safety domains, including teamwork, management support, communication, and organizational learning (34). At the same time, teamwork within units (63.00%), non-punitive response to error (60.70%), organizational learning—continuous improvement (54.80%), and feedback and communication about error (51.10%) showed comparatively more favorable scores. This pattern may indicate that some aspects of teamwork and organizational learning are perceived more favorably by students, whereas domains requiring greater organizational coordination and openness may be perceived less favorably. Thus, strengthening patient safety education should not be limited to the delivery of additional theoretical content; students also need opportunities to observe and participate in authentic patient safety practices, including structured handoffs, incident learning, open communication, and supervised reflection on patient safety events. This interpretation is consistent with previous intervention-based evidence. Lee and Dahinten reported that a dedicated patient safety course was associated with improvements in nursing students' patient safety competency, knowledge, and attitudes, supporting the potential value of structured patient safety education (35). However, educational interventions may be more effective when classroom learning is reinforced by a clinical environment in which safety principles are visibly

modeled by supervisors and clinical teams. A systematic review of patient safety education interventions also reported beneficial effects on safety culture, although sustained improvements may require ongoing educational activities rather than one-time interventions (36).

Nurses: Nurses reported an overall perception of patient safety of 53.40%. The pattern across individual dimensions provides additional context beyond the overall percentage: teamwork within units (19.40%), management support for patient safety (21.00%), teamwork across units (23.60%), supervisor/manager actions promoting patient safety (31.00%), and handoffs and transitions (32.50%) were among the least favorable domains. This concentration of lower scores across organizational and teamwork-related dimensions may indicate that nurses' concerns extend beyond individual attitudes to the broader conditions in which care is delivered. Low teamwork scores may reflect multiple interacting features of hospital work, including workload, staffing constraints, frequent interruptions, interprofessional coordination demands, and fragmented communication between units (37, 38). Importantly, these findings should not be interpreted as evidence that nurses themselves lack teamwork skills. Rather, the results may indicate that organizational conditions may not consistently support effective teamwork. Previous studies conducted in Iranian hospitals have similarly identified staffing, communication, non-punitive responses to error, and management support as important areas of concern within patient safety culture (39). The finding that staffing received only 35.40% positive responses further supports this interpretation. When nurses perceive staffing as insufficient, maintaining effective communication, completing safe and timely handoffs, participating in quality-improvement activities, and responding proactively to safety risks may become more challenging. A recent multicenter study of Iranian teaching hospitals also identified staffing as one of the less favorably rated dimensions of patient safety culture and reported that work hours, work area, professional experience, and other organizational characteristics were associated with nurses' perceptions of safety culture (40). Teamwork within units was the least favorably rated domain in the present study, despite previous evidence from Iranian hospitals often identifying this dimension as one of the relatively stronger domains of patient safety culture (41). This discrepancy may indicate that patient safety culture is highly context-dependent and can vary according to hospital characteristics, organizational climate, staffing conditions, leadership practices, and the specific clinical environment. It also highlights the need for caution when generalizing findings across hospitals or regions, as contextual differences may shape how patient safety culture is perceived and reported. The positive-response score for frequency of events reported was 51.20%, making it the highest-rated HSOPS domain among nurses; however, this finding should not necessarily be interpreted as evidence of a stronger safety culture. A moderate reporting score may reflect greater willingness to report events, but it may also be influenced by differences in exposure to reportable events, familiarity with incident-reporting systems, and nurses' understanding of what constitutes a reportable incident (42, 43). Similarly, the significant association between educational level and feedback and communication about error may suggest that educational attainment is related to nurses' perceptions of safety-related communication processes. However, given the cross-sectional design, this association should not be interpreted as evidence of a causal relationship (44-46).

Hospitalized patients: Hospitalized patients reported relatively favorable perceptions across several SFS domains, particularly for effective care (81.90%), confidence in the healthcare team (74.83%), and emotional enrichment (72.80%), whereas hygienic facilities had the lowest score (50.15%). These findings may suggest that patients' safety-related perceptions are influenced by their direct experiences of interpersonal and clinical care, including interactions with healthcare professionals, confidence in the care team, and perceptions of the effectiveness and supportiveness of care. Importantly, the relatively favorable responses among patients should not be interpreted as evidence that patients perceived patient safety more positively than nurses, because the two groups were assessed using different instruments measuring related but non-equivalent constructs (47-49). Patients completed the SFS, which focuses on their perceptions of safety during hospitalization, whereas nurses completed the HSOPS, which captures broader organizational dimensions of patient safety culture. Thus, the apparent difference in the observed response patterns may partly reflect the different aspects of patient safety assessed by the two instruments. This distinction may help explain why patients can report relatively positive care experiences even when nurses identify substantial organizational concerns. Patients may primarily evaluate whether care appears effective, whether the healthcare team inspires confidence, and whether interactions are reassuring, whereas nurses may

have greater exposure to staffing pressures, handoffs, reporting processes, managerial support, teamwork across units, and organizational responses to errors. Research on patient engagement also suggests that patients offer a distinct perspective on patient safety that can complement, rather than duplicate, the perspectives of healthcare professionals (40). The significant association between patients' safety perceptions and hospital ward, together with significant associations of hospital ward with effective care and hygienic facilities, further suggests that patients' experiences of safety are context-sensitive and may vary across care settings. These differences may reflect variation in care processes and the physical and organizational environments across wards. The findings also underscore the potential value of collecting patient-reported safety information at the unit level, rather than relying solely on hospital-wide measures.

The educational nature of the participating hospitals provides an important context for interpreting these findings. Teaching hospitals have a dual mission: delivering complex clinical care while simultaneously educating future health professionals. The presence of learners, the need for supervision, trainee rotation across clinical settings, and coordination between educational and clinical responsibilities may introduce additional communication and coordination demands. Patient safety frameworks for teaching hospitals emphasize the importance of aligning clinical care, education, organizational culture, supervision, and interprofessional collaboration (50). However, because the present study did not include non-teaching hospitals, it cannot determine whether patient safety perceptions differ between teaching and non-teaching settings. The educational context should therefore be considered an explanatory context rather than a basis for comparison. Previous research in Iranian academic hospitals has demonstrated considerable variation in patient safety culture across hospitals and has identified communication, staffing, management support, and non-punitive responses to errors as recurrent areas requiring improvement (39).

The combination of low scores for communication openness, teamwork across units, management support, and supervisor actions may be considered in the context of organizational hierarchy and psychological safety. In hierarchical clinical environments, junior staff and students may be reluctant to question decisions, raise concerns, or report errors if they perceive that doing so could affect professional relationships or expose them to blame or other negative consequences. Previous research has identified organizational hierarchy, concerns about negative consequences, and fear of blame as potential barriers to open communication in academic clinical environments (51).

This interpretation should be regarded as plausible rather than causal, because hierarchy, fear of reporting, and psychological safety were not directly measured in the present study. Nevertheless, it may suggest that strengthening patient safety requires not only educational interventions but also organizational mechanisms to facilitate speaking up, support non-punitive responses to errors, provide structured feedback, and demonstrate visible managerial commitment to safety.

Cultural and contextual considerations: The findings should also be interpreted within the Iranian sociocultural and organizational context. Cultural expectations concerning professional hierarchy, respect for authority, interpersonal relationships, and avoidance of conflict may influence how nurses and students communicate safety concerns and report errors. Such factors may be particularly relevant in educational hospitals, where students and junior staff may depend on supervisors and senior clinicians for assessment, learning, and professional development. However, these cultural mechanisms were not directly measured in this study and should therefore be considered hypotheses for future qualitative or mixed-methods research rather than definitive explanations.

Future qualitative studies involving students, nurses, managers, and patients could clarify how hierarchy, communication norms, perceived psychological safety, and attitudes toward error reporting shape patient safety perceptions in Iranian teaching hospitals.

Reporting and self-report bias: Another consideration is the possibility of response bias. All three instruments relied on self-reported responses, and participants may have underreported negative experiences or concerns because of recall limitations, social desirability, or concerns about the consequences of expressing criticism. This issue may be particularly relevant to nurses and students when questions involve communication about errors, management support, or organizational practices. Conversely, patients' responses may be influenced by their immediate interpersonal experiences and expectations of care. Therefore, the results should be interpreted as measures of perceived safety rather than direct indicators of adverse-event rates or objective safety performance.

This study has several strengths, including the inclusion of three important stakeholder groups within

the same educational hospital context and the use of validated, population-specific instruments. At the same time, several limitations should be acknowledged. The cross-sectional design precludes causal inference. Convenience sampling may limit the representativeness of the participants and the generalizability of the findings to other settings beyond the participating educational hospitals. The use of self-reported instruments introduces the possibility of recall and social-desirability bias. Finally, because different instruments were used for the three stakeholder groups, their scores should not be interpreted as directly comparable measures or used to rank stakeholder groups.

Implications for practice

Taken together, the findings suggest that efforts to improve patient safety in educational hospitals may benefit from a multilevel approach. At the educational level, nursing curricula could integrate patient safety longitudinally through simulation, structured handoff training, incident analysis, and reflective learning, rather than relying solely on theoretical instruction. At the organizational level, the findings highlight potential priorities, including strengthening teamwork within and across units, improving staffing conditions, reinforcing non-punitive incident reporting, and increasing visible managerial support for patient safety. At the patient level, systematic collection of patient-reported safety experiences could complement professional assessments and help identify ward-specific concerns that may not be fully captured by staff-based patient safety culture measures.

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Conflicts of interest

The authors declare no conflict of interest.

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Authors' Contributions

K.H.H.A: Project administration, Methodology, Formal analysis, Writing – review & editing, Writing – original draft. S.D: Supervision, Methodology, Formal analysis, Writing – review & editing, Writing – original draft. S.G & F.P.S: Methodology, Formal analysis, Writing – review & editing, Writing – original draft. All the authors have read and agreed to the published version of the manuscript.

Artificial Intelligence statement

The authors have not used any AI tools or technologies to prepare this manuscript.

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