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Patient Safety Culture and Its Relationship with Compassionate Care among Nursing Students in Saudi Arabia: A Cross-Sectional Study

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Abstract

Background

The links between patient safety culture and compassion are vital and productive in the nursing profession. Compassionate care provides the basis for providing empathetic care to patients, whereas safety characterizes a basis for acknowledging errors and learning from past performance. Although there is a good level of connection between these two concepts with respect to nursing education, little is known about how they function together within the context of nursing students. This study examined the connection between patient safety culture and compassionate care among nursing students at King Faisal University in Al-Ahsa, Saudi Arabia.

Methods

A descriptive cross-sectional design was used to examine the relationship between patient safety and compassionate care among 315 nursing students from their second year through the year of independent practice. Data were collected using the Health Professional Education in Patient Safety Survey (H-PEPSS) to assess perceptions of patient safety culture and an adapted compassion scale to measure compassionate attitudes toward others. Participants were recruited through convenience sampling, and data were analyzed using descriptive statistics, Pearson correlations, t-tests, and ANOVA.

Results

The findings revealed that nursing students demonstrated high perceptions of patient safety in both classroom (M = 4.304 ± 0.644) and clinical settings (M = 4.276 ± 0.674), with a statistically significant difference (p = 0.038), indicating slightly higher awareness in the classroom. Clinical Safety Skills received the highest scores in both settings (classroom vs clinical, p = 0.003), followed by Safety Culture (p = 0.029). Regarding compassion, most students scored moderately across all domains, with low Indifference scores indicating minimal emotional detachment. Total compassion was not significantly correlated with total patient safety (r = 0.043), whereas Indifference was negatively correlated with patient safety (r = − 0.366).

Conclusions

The findings demonstrate that while technical safety knowledge is well-developed, affective compassion remains vulnerable to clinical stressors. Consequently, nursing education must move beyond a dual-track approach. Curricula should integrate patient safety and compassionate care as synergistic competencies, utilizing model-based instruction to ensure that students develop both systems-based clinical vigilance and the humanistic capacity for patient-centered engagement.

Background

Patient safety and compassionate care play a significant role in providing quality care in the dynamic and high-stakes healthcare environment [1]. According to the World Health Organization, "patient safety is the prevention of errors and adverse effects to patients associated with health care" [2]. While compassionate care is defined as "the recognition, understanding, and emotional resonance with another's concerns, distress, pain or suffering, coupled with relational action to ameliorate these states" [3]. Thus, the focus of patient safety is to prevent errors, reduce harm, and foster a culture where healthcare professionals communicate openly, report mistakes without fear, and continually learn from adverse events [4, 5]. In contrast, empathy, respect, presence, and a profound understanding of patients' emotional and psychological needs are key features of compassionate care [6, 7]. Even though both concepts are important for high-quality nursing care, they are frequently studied separately. However, while both concepts are recognized as pillars of quality care, empirical evidence investigating their interrelationship, particularly during the formative educational years of nursing students, is notably scarce.

Quality care depends on patient safety, as stated by the International Council of Nurses (ICN) [1]. Therefore, the quality of nursing care can be improved by health system managers by improving the patient safety culture [8, 9]. Different universities offer patient safety teaching and practical training in different ways [10]. Compassion is acknowledged as a standard of care and a crucial part of patients' healthcare experience, but it is not being adequately delivered [6, 7, 11, 12], and is in much need of improvement. Additionally, the literature suggests that there is a lack of compassion in providing care to students and new graduates entering the field.

Despite the global recognition of patient safety and compassionate care as two critical pillars of quality healthcare, the academic literature still addresses these two areas often separately [13–15]. Patient safety concepts have been systematically integrated into nursing curricula in many countries, with a focus on preventing errors, promoting effective communication, and fostering a safety-based culture [15]. Compassionate care that includes empathy, presence, and responsiveness to the patient's psychological and emotional needs is an essential part of nursing practice, but the available evidence clearly suggests that this dimension is under-delivered, especially among nursing students and recent graduates who have difficulty translating theoretical knowledge into practice.

Furthermore, despite significant progress in integrating a culture of patient safety into nursing education, it remains unclear whether the establishment of this culture is also reflected in the development of compassionate care skills. There is not yet enough empirical evidence to show whether the two fields are interrelated, complementary, or develop in parallel during the early years of nursing education. This gap poses a fundamental challenge for educators and health policymakers seeking to prepare future nurses with technical competence, safety awareness, and the ability to provide compassionate, humanitarian care.

Recent studies have measured the competencies of nursing students in patient safety but not their relationship with compassionate care [4, 16, 17]. Batalha et al. (2022) found that most of the patient safety culture dimensions and the patient safety grade were positively related to compassion satisfaction [18]. Moreover, Wang et al. (2024) showed that compassionate care encourages patients to participate in healthcare decisions more actively by enhancing collaboration, cooperation, and effort between healthcare staff and patients [19]. As a result, patients may be more likely to speak up to discuss their care preferences, which can enhance adherence to healthcare plans. In Saudi Arabia, nursing students were assessed about how they perceive patient safety culture (PSC) and obstacles to reporting Medication Errors (MEs) [10]. According to their findings, nursing students in Hail City had different perceptions of PSC. The classroom consistently has a higher score than the clinical setting. To enhance PSC perceptions, it is crucial to incorporate PSC training and an error reporting system into the development of interventions.

Moreover, a study done by Alrasheeday et al. on perceptions of patient safety culture among nursing students in Hail City, Saudi Arabia, recommended gaining a deeper understanding of students' perceptions and experiences related to PSC [10]. Another study, conducted by Abdelrahman & Mohamed at Minia University in Egypt, found positive correlations between patient safety levels and all factors of patient safety culture. Also, they asserted that assessing health care providers' attitudes regarding issues related to patient safety is the initial stage of developing a safety culture [20].

The theoretical knowledge and support when dealing with adverse events must be acquired by nursing students during their clinical training. Patient safety can be strengthened by evaluating it regularly and comprehensively, and enhancing nursing students' awareness [6]. Health professional curricula and training programs need to incorporate patient safety content. Also, improving patient safety competency at entry to practice is necessary by focusing on socio-cultural aspects [21].

Despite increasing acknowledgement of the importance of patient safety and compassionate care in healthcare, there is limited understanding of how these two critical components are interrelated, particularly among nursing students who are in the formative stages of developing their professional identity.

This particular research has great importance for nursing education, clinical placement and the global healthcare system by trying to develop a better understanding of how patient safety culture and compassionate care among student nurses may be associated with, or influence one another [4]. When nursing students move from being students to being nurses, the values and behaviors they developed during their time as students will impact the quality and safety of their care [22]. Findings in this area may also assist nursing educators in understanding how to incorporate concepts related to safe cultural practice into curricula that support the development of compassionate care competencies. Ultimately, this could lead to more holistic models of training where students receive instruction that balances both technical competencies with emotional intelligence/compassionate care and ethical practice [23, 24]. For healthcare facilities, cultivating a comprehensive learning environment during clinical placements (with regard to patient safety) and also an appreciation of compassionate contact between the student nurse and patients is essential; enhancing these areas may lead to increased levels of patient satisfaction and decrease incidences of medical errors and an improvement in the overall workplace environment. So far, there are only a few studies that have examined the relationship between the culture of patient safety and the practice of providing compassionate care within the nursing student population. This research contributes to the body of knowledge regarding the relationship between patient safety culture and compassionate care among nursing students as identified in this study; therefore, it is a starting point for future research in this topic area. Thus, a need exists to understand the relationship between these two variables within the nursing student population to improve educational methodologies and to promote quality of care for future patients in the health care system. This study is the first to examine the relationship between patient safety culture and compassionate care among nursing students in Saudi Arabia.

It highlights the pressing need to understand how safety and compassion training can be integrated into nursing education, helping policymakers and educators prepare nurses who are both safety-conscious and capable of delivering empathetic care.

The goal of this study is to investigate how patient safety culture relates to compassionate care in nursing students. The objectives were: (1) to evaluate how nursing students perceive patient safety culture; (2) to determine how much compassionate care is demonstrated to or perceived by nursing students; (3) to investigate how patient safety culture and compassionate care are related; and (4) to explore how demographic factors affect the relationship between patient safety culture and compassionate care, including year level, clinical experience, age, and gender.

Methods

Study Design

A cross-sectional quantitative descriptive correlation design was utilized to explore the association between nursing students' perceived patient safety culture and their level of compassion in providing care to patients. This design is appropriate for studying relationships between variables without intervention, thus making it useful for identifying correlational relationships between naturally occurring variables in an educational setting.

Setting

The public College of Applied Medical Sciences at King Faisal University is located in Al-Ahsa, Saudi Arabia, and was founded in 1975. The 4-year Bachelor of Science in Nursing is accredited by the Commission for Health Specialties, and integrates both theoretical and clinical learning which begins in Year 2. Students are prepared for their roles in the provision of patient safety and compassionate care, which is done in both academic and clinical environments.

Population and Sample

Target Population

The target population included Bachelor of Science in Nursing students at King Faisal University for the 2025-2026 academic year who participated in clinical rotations.

Sample Size Determination

Yamane's formula [25] was used to calculate the sample size of this study. The formula requires three pieces of information: the population size (N), the desired confidence level (95%), and the margin of error (e = 0.05). The sample was calculated to be 177 students; however, to account for potential non-response and incomplete surveys, the target sample size was increased to 240. Ultimately, the survey was completed by 315 students, exceeding both the calculated minimum and the targeted sample size. A post hoc power analysis using G*Power 3.1.9.7 indicated that, with an α level of 0.05 and an observed effect size of r = 0.218, the achieved statistical power was 0.90, exceeding the acceptable level of 0.80. Based on this information, the sample size was adequate to detect low- to moderate correlations between patient safety culture and self-compassion.

Sampling Strategy

Due to the constraints of the educational setting, a convenience sampling strategy was utilized. All students eligible to participate in the study were invited to participate through both institutional email distribution and classroom announcements. Limitations of this non-probability sampling method are acknowledged, such as possible selection bias and decreased ability to generalize findings.

Inclusion and Exclusion Criteria

Inclusion criteria comprised: (a) enrollment in the second, third, fourth year, or internship phase of the nursing program; (b) completion of at least one clinical rotation involving direct patient care (modified to include second-year students without clinical experience to capture the full developmental spectrum); (c) voluntary agreement to participate; (d) ability to comprehend Arabic or English; (e) questionnaires with less than 20% missing responses; and (f) students not on academic leave during the data collection period.

Exclusion criteria included: (a) non-enrollment in the second, third, fourth year, or internship phase of the nursing program; (b) non-completion of at least one clinical rotation involving direct patient care; (c) no voluntary agreement to participate; (d) inability to comprehend Arabic or English; (e) questionnaires with greater than 20% missing responses; and (f) students on academic leave during the data collection period.

Data Collection Procedures

Recruitment

The recruitment of study participants followed an elaborate and stepwise approach. The first step was to contact the target population via academic coordinators; once they agreed, the coordinators distributed email messages containing details of the study, such as the subject matter, procedures, and consent forms. To provide the target population with additional information about the study's purpose and procedures, short presentations were delivered at regular intervals in class settings. Additional email reminders were sent at 1- and 2-week intervals from the initial contact to improve response rates.

Data Collection Protocol

Data were collected electronically in a password-protected survey format from 1 July to 31 August 2026, using a secure online survey platform. The completion time of the survey questionnaires was approximately 12 to 20 minutes.

Instrumentation

The survey instrument comprised three sections: demographic characteristics, patient safety culture assessment, and compassion assessment.

Demographic Questionnaire

A demographic and clinical information survey was developed by the researcher. This included: age (in three brackets: <21 years, 21-25 years, >25 years), gender (male, female), residence (urban, rural), marital status (single, married, divorced, widowed), academic level (2nd, 3rd, 4th year, intern), and clinical exposure (yes/no).

Patient Safety Culture Assessment

Patient safety culture perceptions were assessed using the Health Professional Education in Patient Safety Survey (H-PEPSS), developed by Ginsburg et al. (2012). The H-PEPSS is a 20-item instrument measuring health professional students' perceptions of patient safety competence across seven domains: (1) Clinical Safety (4 items), (2) Safety Culture (3 items), (3) Teamwork (3 items), (4) Communication (3 items), (5) Risk Management (3 items), (6) Human and Environmental Factors (2 items), and (7) Recognizing Hazards (2 items) [26].

Participants rated their confidence in patient safety competencies using a 5-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree). Higher scores indicate stronger perceptions of patient safety culture. The original instrument demonstrated acceptable internal consistency reliability (Cronbach's α = 0.973) and test-retest reliability (r = 0.85).

Compassion Assessment

This study used the Compassion Scale to measure nursing students' compassion toward others, which would reveal the level of compassionate care perceived by nursing students. The scale was developed from Neff's model of self-compassion [27] and applies its components to how people respond to the suffering of others [28].

Compassion was measured using the 16-item Compassion Scale developed by Pommier et al. [28], which includes four subscales of four items each: 1) Kindness, 2) Common humanity, 3) Mindfulness, and 4) Indifference. Items were rated on a 5-point Likert scale (1 = almost never, 5 = almost always), and the four Indifference items were reverse-coded when calculating the total score. The total score is the mean of all 16 items, with higher total scores indicating greater compassion toward others.

The scale demonstrated excellent psychometric properties in the current study. Internal consistency was high for the total scale (Cronbach's α = 0.951), supporting its use in assessing compassion toward others among nursing students. These findings suggest that the instrument is both reliable and valid for evaluating compassionate care in this population [28].

Likert Scale Categories

The study utilized a 5-point Likert scale, and scores were interpreted according to the following categories: 1.00–1.79 = very low, 1.80–2.54 = low, 2.55–3.39 = moderate, 3.40–4.19 = high, and 4.20–5.00 = very high.

Validity and Reliability

Six faculty members who were qualified to evaluate the content validity of the tool (two were experts in nursing education, two were experts in patient safety research, one was an expert in psychometric assessment, and one was an expert in Arabic language translation) provided reviews of content validity. The experts provided independent evaluations of the relevance, clarity, and cultural relevance of each item. The Content Validity Index (CVI) was calculated at both the item level (I-CVI) and the scale level (S-CVI), with an acceptable threshold set at >0.80 [29].

Pilot Testing

A preliminary study of 24 nursing students (approximately 10% of the anticipated sample) was conducted to test the basic operational elements of survey functioning (completion time, item clarity, and preliminary reliability). The pilot test indicated that the time to complete the survey was acceptable at 12 to 20 minutes, and it established preliminary reliability for both instruments. Participants from this pilot testing were not included in the main study.

Reliability Assessment

Internal consistency reliability was assessed using Cronbach's alpha coefficient for all scales and subscales. Acceptable reliability was defined as $\alpha \geq 0.70$ [30].

Ethical Considerations

Ethics Approval

The Ethics Committee for Research at King Faisal University approved this project prior to data collection (KFU-REC-2025-MAY-ETHICS3415). The researchers adhered to the Declaration of Helsinki in conducting this research work.

Informed Consent and Participant Protection

Participants had access to information regarding the purpose and procedures of the study, as well as the risks and benefits of study participation, the right to voluntarily withdraw, and the guarantee that study participation would not affect the participant's standing in their course, prior to giving electronic consent and participating in the study.

Data Security and Confidentiality

Data were stored on a password-protected, encrypted university server accessible only to research team members, and individual survey responses were not released to faculty or the administration. In addition, aggregate reports ensured the confidentiality of all participants. At the end of the institution's retention period, data were destroyed.

Statistical Analysis

Software and Analytical Approach

Using IBM SPSS statistical software version 30.0 (IBM Corporation, Armonk, NY, USA), all statistical analyses were performed using appropriate methodological approaches for the research questions and data characteristics, employing descriptive, inferential, and correlational statistics.

Descriptive Analysis

Categorical variables were summarized using frequency (f) and percentage (%). Continuous variables were summarized using mean (M), standard deviation (SD), range (R), and 95% confidence interval (CI). Normality of the distribution of data was determined using Shapiro-Wilk test, histograms, Q-Q plots, skewness and kurtosis measures.

Inferential Analysis

For the primary analysis, we assessed whether there was a correlation between H-PEPSS total scores (patient safety culture) and compassion scale total scores (compassionate care) using the Pearson product-moment correlation coefficient. The secondary analysis consisted of: (1) an independent t-test to compare binary demographic variables (e.g., gender, clinical experience), (2) one-way ANOVA to compare differences between academic levels, and post hoc tests conducted with Tukey's HSD, and (3) correlation analyses between H-PEPSS domains and compassion scores.

Assumption Testing

All analyses included statistical assumptions evaluations. Normality was evaluated using the Shapiro-Wilk tests and visual assessment of histograms and Q-Q plots. Linearity was evaluated using scatterplots for correlation analysis. Homogeneity of variance was determined with Levene's test in grouped comparisons. Independence was guaranteed through methods used in the sampling and data collection processes.

Effect Size and Significance

Statistical significance was established at $\alpha = 0.05$ for all analyses. Effect sizes were calculated and interpreted using Cohen's conventions: correlation coefficients of 0.10, 0.30, and 0.50 representing small, medium, and large effects, respectively; Cohen's d values of 0.20, 0.50, and 0.80 representing small, medium, and large effects for group comparisons [31].

Missing Data Management

The analysis of missing data showed that missing data was not a significant concern as it was at a near negligible level (<5% across all variables). No questionnaires were missing more than 20% of data. Due to the low concern of missing data, a complete case analysis was performed.

Data Quality Assurance

Data quality was ensured through: (1) prevention of duplicate responses through email validation, (2) reverse-coded item checks for consistency, (3) identification of outliers through z-scores (±3.29), and (4) comprehensive data cleaning reviewed by all members of the research team. No significant outliers or inconsistent response patterns were found.

Results

Demographic Characteristics

The total sample was 315 nursing students. The age distribution was as follows: 24 participants (7.6%) were < 21 years; 236 participants (74.9%) were 21–25 years; and 55 participants (17.5%) were > 25 years. The sample included 72 females (22.9%) and 243 males (77.1%). Academic levels were: second year 30.8%, third year 19.4%, fourth year 24.1%, and interns 25.7%. Prior clinical experience was reported by 62.9% (n = 198), while 37.1% (n = 117) had none. Residence was urban for 83.8% (n = 264) and rural for 16.2% (n = 51). Marital status: single 82.2% (n = 259), married 15.6% (n = 49), divorced 1.6% (n = 5), and widowed 0.6% (n = 2). See Table 1.

Table 1
Demographic Characteristics of the Studied Nursing Students (N = 315)

Category	Group	n	%
Age	< 21	24	7.6
	21–25	236	74.9
	> 25	55	17.5
Gender	Male	243	77.1
	Female	72	22.9
Residence	Urban	264	83.8
	Rural	51	16.2
Marital status	Single	259	82.2
	Married	49	15.6
	Divorced	5	1.6
	Widowed	2	0.6
Academic level	Second	97	30.8
	Third	61	19.4
	Fourth	76	24.1
	Intern	81	25.7
Clinical experience	Yes	198	62.9
	No	117	37.1

Interpretation of Findings on Patient Safety Awareness

Table 2 presents patient safety perceptions across eight areas. Overall patient safety perception scored 4.304 (± 0.644) in the classroom and 4.276 (± 0.674) in the clinical setting. The paired sample t-test showed a statistically significant difference (p = 0.038), with higher perceptions in the classroom. Clinical Safety Skills scored highest in both settings (Classroom M = 4.402 ± 0.690; Clinical M = 4.317 ± 0.719; p = 0.003). Safety Culture also showed a significant difference (p = 0.029). No significant differences were found for Teamwork, Communication, Human and Environmental Factors, or Recognizing Hazards. For Risk Management, a paired t-test could not be performed due to absence of variance, as means were identical (4.277 ± 0.717).

Table 2
Descriptive Analysis of Patient Safety Perceptions Across Educational Settings (N = 315)

Patient safety domains	Classroom Mean ± SD	Clinical settings Mean ± SD	p-value
Patient safety (total)	4.3040 ± 0.6442	4.2757 ± 0.6743	0.038
Clinical safety skills	4.4021 ± 0.6895	4.3175 ± 0.7188	0.003
Safety culture	4.3175 ± 0.7029	4.2603 ± 0.7430	0.029
Teamwork	4.2730 ± 0.7045	4.2444 ± 0.7472	0.267
Communication	4.3063 ± 0.7131	4.2952 ± 0.7239	0.597
Risk management	4.2772 ± 0.7173	4.2772 ± 0.7173	Not computed
Human and environmental factors	4.2952 ± 0.7391	4.2889 ± 0.7053	0.794
Recognizing hazards	4.2190 ± 0.7908	4.2460 ± 0.7512	0.272

Compassion Levels among Nursing Students

In the study assessing compassion among 315 nursing students, approximately 50% of students for each compassion domain fell within the moderate category. In Kindness, 41% (n = 128) demonstrated moderate kindness (M = 3.098 ± 0.283), 21% (n = 65) high kindness (M = 4.268 ± 0.375), and 39% (n = 122) low kindness (M = 1.690 ± 0.521). Similar distributions were found for Common Humanity and Mindfulness. Indifference yielded lower mean scores in the high (2.479 ± 0.987) and moderate (2.568 ± 0.577) categories, reflecting lower emotional detachment. See Table 3.

Table 3
Total Perception Levels Regarding Compassion Domains (N = 315)

Compassion domains / Levels	High level (> 75%) Mean ± SD	Moderate level (50–75%) Mean ± SD	Low level (< 50%) Mean ± SD
Compassion (Total)	3.4410 ± 0.5377	2.9505 ± 0.3068	1.7773 ± 0.5617
Kindness	4.2677 ± 0.3746	3.0984 ± 0.2828	1.6902 ± 0.5214
Common humanity	4.3385 ± 0.6143	3.3563 ± 0.7257	1.8344 ± 0.6850
Mindfulness	3.4038 ± 0.6536	3.0469 ± 0.5395	1.8094 ± 0.6191
Indifference	2.4785 ± 0.9867	2.5680 ± 0.5768	1.7336 ± 0.5859

Interrelationships within Patient Safety Domains

As shown in Table 4, all patient safety domains exhibited very strong, statistically significant positive correlations (r = 0.774 to r = 0.943; p < 0.01). Safety Culture had the strongest association with overall patient safety (r = 0.943, p < 0.01). Communication and Risk Management also showed strong correlations. These high associations indicate that patient safety is multidimensional yet highly interrelated.

[Insert Table 4 here]

Table 4. Inter-Correlation Matrix between Patient Safety Culture Domains and Compassionate Care Domains (N = 315)

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Patient Safety (Total)	1												
2. Clinical Safety Skills	.909**	1											
3. Safety Culture	.943**	.864**	1										
4. Teamwork	.917**	.791**	.851**	1									
5. Communication	.919**	.805**	.860**	.782**	1								
6. Risk Management	.910**	.808**	.848**	.812**	.862**	1							
7. Human & Env. Factors	.912**	.774**	.819**	.806**	.815**	.815**	1						
8. Recognizing Hazards	.918**	.798**	.830**	.812**	.832**	.863**	.850**	1					
9. Kindness	–0.053	–0.035	–0.089	–0.067	–0.038	–0.030	–0.058	–0.051	1				
10. Common Humanity	–0.024	–0.024	–0.024	–0.024	–0.024	–0.024	–0.024	–0.024	.878**	1			
11. Mindfulness	0.005	–0.055	–0.046	–0.030	–0.032	–0.007	–0.026	–0.032	.806**	.763**	1		
12. Indifference	–0.366*	–0.145	–0.190	–0.200	–0.169	–0.176	–0.166	–0.179	.549**	.449**	.680**	1	
13. Compassion (Total)	0.043	0.032	0.028	0.021	0.038	0.033	0.040	0.051	.909**	.879**	.907**	.790**	1

*p < .05; **p < .01

Interrelationships within Compassion Domains

Strong, statistically significant positive inter-correlations were found among compassion domains. Kindness correlated strongly with overall compassion (r = 0.909, p < 0.01), Common Humanity (r = 0.879, p < 0.01), and Mindfulness (r = 0.907, p < 0.01). Indifference also correlated positively with overall compassion (r = 0.790, p < 0.01). This suggests that compassion domains are interlinked; improving one domain likely improves overall compassionate care capacity.

Associations of Socio-Demographic Characteristics with Patient Safety and Compassion Domains

Table 5 details the relationships between socio-demographic variables and perceptions of patient safety and compassionate care. Gender, residence, clinical experience, and academic level did not demonstrate statistically significant differences across any domains (all p > 0.05).

Conversely, age demonstrated statistically significant effects across multiple patient safety domains: Clinical Safety Skills (F = 4.753, p = 0.009), Safety Culture (F = 5.112, p = 0.007), Teamwork (F = 3.764, p = 0.024), Communication (F = 3.746, p = 0.025), Risk Management (F = 3.800, p = 0.023), and

Recognizing Hazards (F = 4.178, p = 0.016). For compassion, age significantly affected Kindness (F = 3.293, p = 0.021) and Common Humanity (F = 3.928, p = 0.009).

Marital status also showed significant differences across most patient safety domains (p < 0.05) except Communication (p = 0.069), and for Kindness (F = 3.293, p = 0.021) and Common Humanity (F = 3.928, p = 0.009). This implies that married students display higher levels of accountability, responsibility, and emotional maturity, positively affecting both safety awareness and compassionate care.

[Insert Table 5 here]

Table 5. Associations of Socio-Demographic Characteristics with Patient Safety and Compassion Domains (N = 315)

Socio-Demographic Factors & Tests	Clinical Safety Skills	Safety Culture	Teamwork	Communication	Risk Management	Human Factors	Recognizing Hazards	Kindness	Common Humanity	Mindfulness
Gender (t)	–0.098	1.131	1.210	1.251	0.194	0.989	0.765	0.582	0.337	0.720
p-value	0.922	0.259	0.227	0.212	0.846	0.323	0.445	0.561	0.737	0.472
Residence (t)	–0.314	–0.766	–0.518	–0.199	–0.396	–0.166	–0.601	1.401	1.627	1.871
p-value	0.754	0.444	0.605	0.842	0.692	0.868	0.549	0.162	0.105	0.062
Clinical Experience (t)	–0.355	–0.712	–0.478	0.248	0.017	–0.611	–0.576	0.080	–0.583	–0.547
p-value	0.723	0.477	0.633	0.804	0.986	0.542	0.565	0.936	0.560	0.585
Academic Level (F)	1.407	2.281	1.234	1.621	2.520	1.846	1.454	0.648	1.021	0.419
p-value	0.241	0.079	0.298	0.184	0.058	0.139	0.227	0.585	0.383	0.739
Age (F)	4.753	5.112	3.764	3.746	3.800	2.185	4.178	3.293	3.928	2.564
p-value	.009*	.007*	.024*	.025*	.023*	0.114	.016*	.021*	.009*	0.079
Marital Status (F)	4.114	5.586	6.437	2.388	4.991	5.732	5.402	3.293	3.928	0.983
p-value	.007*	.001*	< .001*	0.069	.002*	.001*	.001*	.021*	.009*	0.401

*p < .05

Discussion

Summary of Key Findings

Nursing students recognized patient safety culture in the classroom (M = 4.304 ± 0.644) and in clinical settings (M = 4.276 ± 0.674) with strong awareness. There was a significant difference in patient safety awareness between the classroom and clinical setting, with the classroom showing higher awareness (t = 2.10, p = .038). This difference likely reflects the theoretical, controlled nature of classroom learning versus the unpredictable, complex nature of clinical practice.

Most nursing students had a moderate level of kindness when it comes to caring: 41% had a moderate level, 21% had a high level, and 39% had a low level. A moderate negative correlation was found between patient safety awareness and indifference (r = − 0.366, p < 0.001), with no other significant findings between patient safety awareness and other compassion domains (p > 0.05).

Age and marital status were significantly associated with Kindness (F = 3.293, p = .021) and Common Humanity (F = 3.928, p = .009). No significant findings were observed for other demographics (gender, residence, academic level, prior clinical experience). Both patient safety (r = 0.774–0.943, p < 0.01) and compassion (r = 0.790–0.909, p < 0.01) domains showed significant positive correlations, indicating that they are highly interrelated professional competencies.

Patient Safety Culture in Classroom and Clinical Settings

The results from this study agree with prior literature and indicate that some aspects of nursing program structures help students adopt safe clinical practices [4, 24]. In our study, participants recognized greater safety awareness from classroom activities compared to clinical activities. This may have occurred due to the controlled and "ideal" nature of classroom activities, allowing students to learn and practice safe clinical techniques. In contrast, clinical activities present many real-life challenges and time and communication constraints, making safe practice complicated due to the extensive needs of patients [10, 16, 22]. Considering all of the above, the demands of the hospital system and the challenges of practice introduce a competing and conflicting "hidden curriculum" that can undermine safety practice [23, 26].

Compassionate Care Competencies among Nursing Students

Regarding compassionate care, the moderate levels of kindness, mindfulness, and common humanity observed are supported by research suggesting that these competencies are nurtured during nursing education [3, 11]. However, these qualities remain vulnerable to the significant workloads and psychological stressors inherent in clinical practice [6, 12, 27].

Based on our demographic analysis, older and married students exhibited more safety awareness and compassion than younger and unmarried students. This observation supports the idea that previous life experience and emotional maturity are precursors to developing empathy. However, the absence of correlation between compassion and academic level suggests that time alone does not foster the development of this important skill [15, 28, 29].

Relationships between Patient Safety and Compassion Domains

This study observes a statistically significant finding: a negative correlation between Indifference and Patient Safety Awareness ($r = -0.366$, $p < 0.001$), which acts as a unifying factor between two nursing competencies often perceived as autonomous. This negative correlation evidences that heightened patient safety awareness and assertiveness were associated with reduced indifference toward the patient. This strengthens the argument that the presence of a patient promotes the nurse's situational awareness and reduces emotional detachment. When a nurse/student is not indifferent, they are likely to notice the many subtle changes in patients that an indifferent person might miss. This supports models suggesting that compassion is a cognitive state that facilitates better professional performance [19].

Finally, the absence of significant correlations between patient safety and the other domains of compassion suggests that technical proficiency and affective compassion represent distinct cognitive pathways. A student can possess rigorous safety knowledge without necessarily possessing the emotional capacity to provide compassionate care. This confirms that these competencies are multidimensional and likely require independent, yet parallel, educational strategies: the former focused on systems-based thinking and error prevention, and the latter on cultivating the humanistic foundations of the nurse-patient relationship [9, 13].

Additionally, strong positive correlations detected in these fields promote the idea that developing proficiency in one domain can trigger an enhancement of related skills in an individual, profession, or organization. This phenomenon reveals the importance of developing integrated learning approaches that combine techniques and teaching strategies. For instance, programs can teach technical skills and emotional competencies simultaneously or combine adapted strategies. This should not be done in a fragmented manner or in silos as part of the nursing curriculum [30–33].

Implications for Nursing Education

To ensure that nursing education practices are grounded in empirical evidence, educators must move beyond fragmented approaches and adopt a holistic curricular model that integrates humanistic care within technical safety protocols. This can be achieved through simulation-based learning, structured reflective exercises, role modeling, and interprofessional collaboration, all of which help students internalize both the science of safety and the art of compassion. A critical priority is bridging the persistent theory-practice gap; this requires structured mentorship, guided clinical rotations, and ongoing feedback that simultaneously build students' technical confidence and sustain their emotional connectedness to patients. Faculty should identify specific areas of student deficit such as understanding human and environmental factors or cultivating mindfulness and address them through targeted experiential exercises, reflective debriefings, and dedicated mentorship. Alongside these pedagogical shifts, robust evaluation strategies must be implemented to assess both technical competencies and emotional intelligence, ensuring that assessment frameworks align with patient-centered care and safety outcomes. Finally, given the emotional toll of clinical environments, nursing programs should incorporate mindfulness and stress-management workshops directly into clinical practicums, thereby protecting students' capacity for empathy against the unavoidable stressors of real-world healthcare delivery.

Strengths and Limitations

This study possesses several notable strengths, including a large and diverse participant sample of 315 nursing students, a high response rate of 91%, and the use of validated instruments to measure both patient safety culture and compassion. Furthermore, the inclusion of both classroom and clinical settings provided a comprehensive view of students' perceptions across different learning environments. However, the findings must be interpreted in light of several limitations. The use of a convenience sampling strategy may have introduced selection bias, limiting the generalizability of the results. Additionally, the cross-sectional, correlational design precludes any conclusions about causal relationships between patient safety culture and compassionate care. In addition, compassion was measured with a self-report scale of general compassion toward others rather than observed compassionate behavior with patients, which may not fully capture the interpersonal dimension of compassionate care. Consequently, these characteristics collectively constrain the external validity of the findings and their applicability to broader populations.

Future Research

Building on the current findings, future research should employ longitudinal designs to track how patient safety culture and compassionate care competencies evolve throughout nursing education and into early professional practice. There is also a clear need for interventional studies that test the efficacy of integrated curricula (those that deliberately combine safety training with compassion development) to determine which pedagogical strategies yield the most meaningful improvements in both domains. Cross-cultural investigations would further enrich the evidence base by exploring how contextual and societal factors shape the relationship between safety and compassion in different educational and healthcare systems. Finally, subsequent studies should incorporate objective measures of clinical performance alongside subjective self-reported assessments, thereby providing a more robust and triangulated understanding of the link between technical proficiency and the delivery of compassionate, patient-centered care.

Conclusions

This study shows that although undergraduate nursing students know patient safety protocols, their ability to provide caring and compassionate services is vulnerable to stressors found in the clinical setting. These findings indicate that variables such as age and marital status (personal attributes) have a strong impact on a student's professional development. These findings indicate that emotional maturity and lived experiences are the building blocks for safety and caring.

Safety of patients and caring for patients are shown to be connected, multidimensional constructs. The "ripple effect" demonstrated in the data suggests that patient safety and caring can and should be taught in the same course.

To advance nursing education, it is essential that future research and practice focus on validating longitudinal assessments of compassion and implementing pedagogical strategies that bridge the gap between technical safety knowledge and humanistic patient care. Ultimately, by embedding both systems-based thinking and emotional intelligence into the student experience, nursing programs can better prepare graduates to provide care that is not only clinically secure but profoundly compassionate.

Abbreviations

ANOVAAnalysis of variance

CIConfidence interval

CVIContent validity index

H-PEPSSHealth Professional Education in Patient Safety Survey

HSDHonestly significant difference

ICNInternational Council of Nurses

I-CVIItem-level content validity index

MMean

MEsMedication errors

PSCPatient safety culture

RRange

S-CVIScale-level content validity index

SDStandard deviation

SPSSStatistical Package for the Social Sciences

Declarations

Ethics approval and consent to participate

The Ethics Committee for Research at King Faisal University approved this project before data collection (KFU-REC-2025-MAY-ETHICS3415). The researchers adhered to the Declaration of Helsinki in conducting this research work. Electronic informed consent was obtained from all participants prior to survey completion.

Consent for publication

Not applicable.

Availability of data and materials

The datasets generated and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

A.M.A.: Conceptualization, Formal analysis, Investigation, Methodology, Visualization, Writing – original draft, Writing – review & editing. Y.S.A.: Data curation, Investigation, Project administration, Writing – original draft, Writing – review & editing. T.A.: Supervision, Writing – review & editing. M.A.A.: Investigation, Resources, Visualization, Writing – review & editing. S.M.Y.: Investigation, Writing – review & editing. M.N.A.: Data curation, Investigation, Writing – review & editing. R.A.A.A.: Investigation, Writing – original draft, Writing – review & editing. H.A.S.A.: Investigation, Validation, Writing – original draft, Writing – review & editing. M.S.M.S.: Software, Supervision, Writing – review & editing. M.F.: Formal analysis, Resources, Software, Supervision, Validation, Writing – review & editing. M.G.M.: Conceptualization, Formal analysis, Investigation, Methodology, Project administration, Writing – original draft, Writing – review & editing. M.G.M. and A.M.A. take full responsibility for the data, the analyses and interpretation, and the conduct of the research, and have full access to all of the data. All authors have read and approved the manuscript.

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Clinical Trial Number

Not applicable

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