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Association between nursing students' self-reported professionalism and patient safety competencies: A cross-sectional study

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ABSTRACT

Background & Aim: Nurses play a key role in safeguarding patients, highlighting the need to develop both technical competence and professional identity in nursing students. Although professionalism and patient safety competencies are widely studied, their association remains underexplored, particularly in Central Europe. This study examined the association between Slovak nursing students' self-reported professionalism and patient safety competencies.
Materials & Methods: A cross-sectional study was conducted among 1,017 nursing students from all nine Slovak public universities offering bachelor's and master's programs. Data were collected between February and December 2024 using a questionnaire comprising the Slovak versions of the H-PEPSS and the NPI. Descriptive statistics, the Wilcoxon Signed-Rank test, and Spearman's correlations were applied.
Results: Significant positive associations were found between professionalism and all patient safety competence domains in both academic and clinical settings (all $p \leq 0.001$), with the strongest correlations observed for *Culture of safety* (academic $\rho = 0.347$; clinical $\rho = 0.400$). After adjustment using partial Spearman correlations, *Working in teams with other health professionals* (academic $\rho\_partial = 0.112$; clinical $\rho\_partial = 0.132$) and *Culture of safety* (academic $\rho\_partial = 0.108$; clinical $\rho\_partial = 0.143$) remained independently associated with professionalism. In the academic setting, *Communicating effectively* ($\rho\_partial = 0.068$) and *Understanding human and environmental factors* ($\rho\_partial = 0.085$) also showed small independent associations. Professionalism levels were high (Md= 129.0, IQR= 116.0–142.0).
Conclusion: Professionalism and patient safety competencies are closely interconnected among Slovak nursing students. Students who report stronger professionalism also report higher safety competence. Integrating both more deliberately in nursing education may help support safer practice.

Introduction

Patient safety is universally recognized as a cornerstone of healthcare quality. As healthcare systems become increasingly complex, safe care requires not only technical proficiency but also professional values and behaviors that actively support patient safety. Nurses, as the largest group of healthcare providers and those most frequently in direct contact with patients, play a pivotal role in safeguarding patients from harm (1). Their professional actions such as recognizing risks, communicating concerns, and advocating for patients are central to preventing adverse events and promoting a culture of safety. Therefore, nursing education must equip students with both patient safety competence and a well-developed professional identity to enable safe practice (1,2).

Preparing nursing students for safe practice extends beyond technical skills. It requires fostering both patient safety competence and a strong professional identity. Professionalism in nursing is a dynamic, multidimensional construct encompassing accountability, altruism, ethical practice, lifelong learning, and commitment to the profession (2,3). These attributes form the moral and behavioral foundation through

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which patient safety competence is enacted. Accountability and the willingness to speak up about unsafe practices are especially critical links between professionalism and patient safety. Professionalism develops progressively through education, clinical experience, and socialization rather than being a fixed trait (3).

Patient safety competence is similarly multifaceted and includes teamwork, communication, risk management, human factors, responding to harm, and fostering a culture of safety. These domains, operationalized in instruments such as the Health Professional Education in Patient Safety Survey (H-PEPSS), require not only knowledge but also professional confidence and ethical responsibility to be translated into practice (4). Although professionalism and patient safety competence conceptually overlap, they are often examined separately in nursing education research. The Safety Competency Framework of the Canadian Patient Safety Institute (CPSI) (4) emphasizes that safe practice depends on both technical knowledge and professional attitudes, providing a theoretical basis for examining their association.

International evidence highlights persistent challenges in translating classroom-based safety education into clinical practice. Nursing students consistently report higher confidence in academic settings than in clinical environments. Studies from Iran and Slovenia show that hierarchical structures, fear of speaking up, and limited feedback hinder the application of safety principles during placements (5,6). Communication and interprofessional teamwork are repeatedly identified as weaker domains across contexts (7,8). These relational competencies depend heavily on professional identity, confidence, and role clarity.

Clinical learning environments may further restrict students' ability to enact safety competence. Hierarchy, lack of psychological safety, insufficient supervision, and organizational culture can inhibit safe practice (9,10). In this context, professionalism may enable students to advocate for patient safety by fostering accountability and moral courage (8,11). Students with a stronger professional identity may be more willing to raise concerns and engage in teamwork (11). Thus, professionalism may not only coexist with patient safety competence but support its application in complex clinical settings.

Professionalism has also been associated with improved patient outcomes, ethical advocacy, and workforce stability (12). However, limited evidence exists on how professionalism relates to nursing students' patient safety competence, particularly during clinical training. Research using the H-PEPSS consistently demonstrates an academic–clinical gap in perceived competence (2,4,5,13,14), and lower safety competence has been linked to increased involvement in adverse events (15). These findings suggest that factors beyond knowledge acquisition, such as professionalism, may help bridge this gap (16).

Despite growing international interest, research on the relationship between professionalism and patient safety competence remains limited in Central and Eastern Europe. Although nursing education in this region has undergone reforms aligned with European Union standards, empirical evaluations of educational outcomes are scarce. In Slovakia, national evidence on how professionalism and patient safety competence interact during nursing education is lacking (16,17).

The present study addresses this gap by examining the association between Slovak nursing students' self-reported professionalism and patient safety competence. Using the validated Nurse Professionalism Inventory (16,17) and H-PEPSS (4,18), this cross-sectional study explores the relationship between these constructs to inform curriculum development and clinical mentorship practices.

Methods

Design

A cross-sectional design was employed to examine the relationship between self-reported level of professionalism and patient safety competencies among nursing

students in Slovakia. The research followed the STROBE reporting guidelines (19).

Sample

All nine public Slovak universities offering bachelor's and master's programs in nursing were approached for participation. After receiving permission to conduct the research, participants were recruited through convenience sampling from both undergraduate and graduate nursing cohorts. Participant enrollment was coordinated through designated institutional representatives, who also supplied official figures on student numbers for the summer semester of the 2023/2024 and winter semester of the 2024/2025 academic year. These data guided the number of questionnaires allocated to each university. Students absent during data collection (e.g., due to illness) were not re-contacted, which may have contributed to the observed response rate. Overall, students were eligible if they had completed at least one semester of clinical training and provided informed consent. In total, 1,734 questionnaires were distributed, of which 1,017 were returned, giving a response rate of 58.7%. Since none of the responses were excluded, the final analysis was based on all 1,017 questionnaires.

Data collection

Data were collected between February and December 2024 using a questionnaire set consisting of two instruments, which were administered in paper-and-pencil form.

The first instrument, which assessed professionalism, was the Slovak version of the *Nurse Professionalism Inventory* (NPI) (16,17). It consists of 28 items divided into five subscales: accountability (8 items), self-improvement (8 items), professional attitudes (5 items), advancement of the profession (4 items), and professional membership (3 items). This self-report tool evaluates the extent to which professionalism-related attitudes and behaviors are reflected in nursing practice. Items are rated on a 6-point Likert scale from 1 ("strongly disagree") to 6 ("strongly agree"), with higher scores indicating stronger professional identity. In previous studies, scores falling within the upper third or above two-thirds of the total scale range have commonly been interpreted as indicating a high level of professionalism (16,17). This convention was used in the present study to guide interpretation of professionalism levels, in line with established practices in research employing the NPI. The Slovak NPI has demonstrated excellent psychometric properties in previous research with nurses (Cronbach's $\alpha = 0.968$) (17), and this reliability was further supported in the current sample of nursing students, where internal consistency remained high (Cronbach's $\alpha = 0.907$).

The second instrument was the Slovak version of the *Health Professional Education in Patient Safety Survey* (H-PEPSS). The face and content validity of the translated tool have been established and published previously (18). The original English version is described in detail in the validation study and may be accessed with permission from the Canadian developers (4). The H-PEPSS contains 37 items organized into three major parts. The first part assesses knowledge and experience with clinical safety practices, such as hand hygiene, infection prevention, and safe medication administration. The second part evaluates six domains of patient safety competence, each measured in both classroom and clinical settings: working in teams with other health professionals (6 items), communicating effectively (3 items), managing safety risks (3 items), understanding human and environmental factors (3 items), recognize and respond to reduce harm (4 items), and culture of safety (4 items). The third part addresses students' confidence in raising patient safety concerns (3 items). Responses were recorded on a 5-point Likert scale ranging from 1 ("completely disagree") to 5 ("completely agree"). In accordance with previous studies, mean scores above 3.5 were interpreted as indicating that students felt confident in the respective competency domain, reflecting moderate to high perceived competence (4-7). Internal consistency for the H-PEPSS in the current study was excellent, with Cronbach's α coefficients of 0.947 for the academic

environment and 0.951 for the clinical environment.

In addition, a set of sociodemographic variables was collected: age, previous vocational education, study program, form of study, year of study, supervision of practice (during the last clinical placement), current clinical placement, previous experience in healthcare, outcome expectations, and satisfaction with the clinical environment. Satisfaction was assessed on a 0–10 scale, where 0 indicated "not satisfied" and 10 "very satisfied."

Data analysis

Data were analyzed using descriptive and inferential statistics using the statistical program SPSS 25.0. Sample characteristics were summarized using absolute and relative frequencies for categorical variables and means with standard deviations (M ± SD) for continuous variables.

Additionally, nonparametric tests were applied in this study because the assumptions required for parametric analyses, particularly the assumption of normality, were not met. The distribution of key continuous variables was assessed using the Kolmogorov–Smirnov test, which indicated significant deviations from normality ($p < 0.001$). In addition, several variables were derived from Likert-type scales, which are ordinal in nature. Therefore, nonparametric methods were used to provide a more appropriate and robust analysis of paired differences and associations without relying on the assumption of normally distributed data.

For professionalism and patient safety competencies, median (Md), interquartile range (IQR), minimum and maximum values were calculated. As the NPI does not define validated cut-off values for competency classification, professionalism was treated as a continuous construct in all analyses. For H-PEPPS, also median (Md) and interquartile range (IQR) were reported. Differences between self-reported competencies in the academic and clinical settings were examined using the Wilcoxon Signed-Rank test, with statistical significance set at $p < 0.05$.

Associations between professionalism subscales and patient safety competency domains were explored using Spearman's correlation coefficients (rho). Partial Spearman correlations were conducted to assess the independent association between each patient safety competency domain and professionalism while controlling for the remaining domains. Given the non-normal distribution of the data, variables were rank-transformed prior to performing Pearson partial correlations, yielding partial Spearman coefficients (ρ_partial). Statistical significance was set at $p< 0.05$.

Ethical considerations

Students were included only if they provided their informed consent. They were informed about the anonymity and credibility of the research as well as the possibility to withdraw from the research at any time. The research was carried out according to the recommendations of the Declaration of Helsinki. The study was also approved by the Ethics Committee of the Contantine the Philosopher University in Nitra, Slovakia (UKF/917/131013:002).

Results

The final sample consisted of 1,017 nursing students from Slovak universities. The majority were female (95.2%), and the average age was 22.88 years (SD = 5.31; range 18–59). Most students were enrolled in the baccalaureate program (n = 921; 90.6%) and studied full-time (n = 858; 84.7%). The sample included nursing students across all years and levels of study, with the highest proportions in the 2nd year of the bachelor's program (n = 371; 36.5%). Clinical learning environment satisfaction averaged 6.29 (SD = 2.14) on a 10-point scale. Detailed characteristics are reported in Table 1.

Table 1. Characteristics of the sample (N = 1,017)

Variable		N	%
Gender (n= 982)	Male	47	4.8
	Female	935	95.2
Previous vocational education (n= 976)	Healthcare program	701	71.4
	General program (gymnasium)	206	21.0
	Other	75	7.6
Study program (n= 983)	Baccalaureate	892	90.6
	Master	93	9.4
Form of study (n= 983)	Full-time	833	84.7
	Part-time	150	15.3
Year of study (n= 985)	1st (baccalaureate)	277	28.1
	2nd (baccalaureate)	359	36.5
	3rd (baccalaureate)	248	25.2
	4th (baccalaureate)	11	0.7
	1st (master)	35	3.6
	2nd (master)	58	5.9
Current clinical placement (n= 969)	Outpatient care	112	11.6
	Inpatient care: medical-surgical care units	561	57.9
	Inpatient care: psychiatric care units	43	4.4
	Critical-specialized services	106	10.9
	Mother-child inpatient care	115	11.9
	Long-term care setting	32	3.3
Supervision (n= 960)	Nurse educator or teacher (the nursing faculty employee)	251	26.1
	Lecturer (healthcare facility employee)	111	11.6
	Manager (e.g. nurse managers)	241	25.1
	Mentor with specific training in mentoring	205	21.4
	Team of nurses (without individual supervision)	84	8.8
	Nurse without specific training in mentoring	68	7.1
Previous work experience in healthcare (n= 982)	No	428	43.6
	Yes	554	56.4
Outcome expectations* (n= 982)	Not at all (unmet expectations)	104	10.6
	Enough	466	47.5
	Greatly	319	32.5
	Very greatly (met expectations)	93	9.5
Age (n = 976)	M = 22.88, SD = 5.31 (18-59)		
Satisfaction with clinical placement (n= 977)	M = 6.29, SD = 2.14 (1-10)		

* The student assesses the extent to which his/her expectations related to clinical practice have been met

Self-reported professionalism among nursing students

Self-reported professionalism scores indicated generally high levels across all subscales (Table 2). The highest score was observed for Accountability (Md= 42.0, IQR= 39.0-45.0), while the lowest was for Self-improvement (Md= 32.0, IQR= 26.0-38.0). The overall NPI score with a median score of 129.0 (IQR = 116.0-142.0) also indicated high perceptions of professionalism among nursing students.

Self-reported patient safety competencies

Median scores for all patient safety competence domains were 4.00 in both academic and clinical settings, indicating generally high perceived competence (Table 3). In the academic setting, median scores ranged from 4.00 (IQR 3.33–4.66) across domains. Similarly, in the clinical setting, medians were consistently 4.00, with slightly wider variability observed in some domains, particularly *Managing safety risks* (IQR 3.33–4.66). Comparisons between settings using the Wilcoxon Signed-Rank Test showed significantly higher ratings in the academic setting for *Working in teams with other health professionals* (t= 5.195, p≤ 0.001), *Communicating effectively* (t= 5.002, p≤ 0.001), *Managing safety risks* (t= 6.966, p≤ 0.001), *Understanding human and environmental factors* (t= 4.645, p ≤ 0.001), and *Culture of safety* (t = 2.733, p ≤ 0.001). No significant difference was observed for recognize and respond to reduce harm (t= 0.654, p = 0.503).

Table 2. Self-reported level of professionalism among nursing students (N = 1,017)

Professionalism of nursing students	Min.	Max.	Md	IQR	Cronbach alfa (α)
Subscale 1: Accountability	8	48	42.0	39.0-45.0	0.681
Subscale 2: Self-improvement	8	48	32.0	26.0-38.0	0.812
Subscale 3: Professional attitude	5	30	22.0	16.0-25.0	0.760
Subscale 4: Advancement of nursing profession	4	24	18.0	15.0-20.0	0.794
Subscale 5: Professional membership	3	18	16.0	14.0-18.0	0.635
Overall NPI score	28	168	129.0	116.0-142.0	0.907

Legend: Min. = minimum; Max. = maximum; Md = median; IQR = interquartile range; Cronbach's α = reliability coefficient.

Table 3. Self-reported competencies in patient safety among nursing students (N = 1,017)

Self-reported competencies in patient safety	Academic setting	Clinical setting	Comparison between classroom and clinical settings		
	Md (IQR)	Md (IQR)	Wilcoxon Signed-Rank Test		
			t	p	95% CI
Working in teams with other health professionals	4.00 (3.50-4.33)	4.00 (3.50-4.33)	5.195	≤ 0.001*	0.06-0.15
Communicating effectively	4.00 (3.33-4.33)	4.00 (3.33-4.33)	5.002	≤ 0.001*	0.07-0.16
Managing safety risks	4.00 (3.66-4.66)	4.00 (3.33-4.66)	6.966	≤ 0.001*	0.12-0.21
Understanding human and environmental factors	4.00 (3.33-4.33)	4.00 (3.33-4.33)	4.645	≤ 0.001*	0.06-0.14
Recognize and respond to reduce harm	4.00 (3.50-4.50)	4.00 (3.50-4.50)	0.654	0.503	0.03-0.06
Culture of safety	4.00 (3.50-4.25)	4.00 (3.50-4.25)	2.733	≤ 0.001*	0.16-0.21

Legend: Md (IQR) = median (interquartile range); t = Wilcoxon test statistic; p = significance level; 95% CI = 95% confidence interval* $p \leq 0.001$

Associations between self-reported professionalism and patient safety competencies

Correlation analysis revealed significant positive relationships between all professionalism subscales and patient safety competence domains in both academic and clinical settings (all p≤ 0.001). Spearman's correlation coefficients (rho) ranged from 0.175 to 0.355 in the academic setting and from 0.205 to 0.400 in the clinical setting, indicating small to moderate effect sizes.

The strongest associations were observed between overall NPI score and *Working in teams with other health professionals* (academic rho = 0.355; clinical rho = 0.390), *Communicating effectively* (academic rho = 0.342; clinical rho = 0.373), and *Culture of safety* (academic rho = 0.347; clinical rho= 0.400). Associations were consistently stronger in the clinical setting (Table 4).

Partial Spearman correlation analyses were conducted to examine the unique association between each patient safety competence domain and professionalism while controlling for the remaining safety domains. In the academic setting, *Working in teams with other health professionals* remained significantly associated with professionalism after adjustment ($\rho\_partial = 0.112$, $p \leq 0.001$). *Communicating effectively* also demonstrated a small but significant independent association ($\rho\_partial = 0.068$, $p = 0.035$), as did *Understanding human and environmental factors* ($\rho\_partial = 0.085$, $p = 0.009$) and *Culture of safety* ($\rho\_partial = 0.108$, $p \leq 0.001$). In contrast, *Managing safety risks* ($\rho\_partial = -0.005$, $p = 0.879$) and *Recognize and respond to reduce harm* ($\rho\_partial = 0.001$, $p = 0.981$) were no longer significantly associated with professionalism after controlling for the other domains. All significant associations were small in magnitude.

In the clinical setting, *Working in teams with other health professionals* remained significantly associated with professionalism after adjustment (ρ_partial= 0.132, p≤ 0.001). *Culture of safety* also demonstrated a significant independent association (ρ_partial= 0.143, p≤ 0.001). *Communicating effectively* showed a borderline significant association (ρ_partial= 0.062, p= 0.050). In contrast, *Managing safety risks* (ρ_partial= −0.020, p= 0.533), *Understanding human and environmental factors* (ρ_partial = 0.058, p = 0.071), and *Recognize and respond to reduce harm* (ρ_partial= 0.015, p= 0.634) were not significantly associated with professionalism after controlling for the other domains. All significant associations were small in magnitude.

Table 4. Association between self-reported level of professionalism and patient safety competencies in academic and clinical setting among nursing students (N = 1,017)

Academic setting	Accountability	Self-improvement	Professional attitude	Advancement of nursing profession	Professional membership	Overall NPI score
Working in teams with other health professionals	0.306**	0.308**	0.264**	0.243**	0.279**	0.355**
Communicating effectively	0.262**	0.293**	0.276**	0.254**	0.259**	0.342**
Managing safety risks	0.241**	0.228**	0.208**	0.175**	0.227**	0.275**
Understanding human and environmental factors	0.261**	0.265**	0.288**	0.211**	0.270**	0.322**
Recognize and respond to reduce harm	0.234**	0.255**	0.249**	0.183**	0.224**	0.294**
Culture of safety	0.274**	0.282**	0.314**	0.229**	0.247**	0.347**
Clinical setting						
Working in teams with other health professionals	0.341**	0.355**	0.312**	0.252**	0.306**	0.390**
Communicating effectively	0.301**	0.339**	0.289**	0.254**	0.272**	0.373**
Managing safety risks	0.284**	0.288**	0.267**	0.205**	0.266**	0.333**
Understanding human and environmental factors	0.279**	0.314**	0.290**	0.266**	0.311**	0.364**
Recognize and respond to reduce harm	0.282**	0.287**	0.278**	0.239**	0.306**	0.343**
Culture of safety	0.308**	0..330**	0.330**	0.299**	0.311**	0.400**

** p ≤ 0.001

Discussion

This study examined the association between self-reported professionalism and patient safety competencies among Slovak nursing students. Results aligned with international literature while also contributing new empirical evidence from Central Europe, a region still underrepresented in discussions of patient safety and professionalism (6,13). By situating our results within broader international research, several important insights emerged regarding the persistent academic–clinical gap, the relational foundations of professionalism, and the global challenge of preparing nurses who are both technically competent and professionally grounded.

One of the most notable results of this study was the discrepancy between students' ratings of competence in classroom versus clinical settings. Slovak students, consistent with peers in Iran (5), Slovenia (6), South Korea (2), and Switzerland (13), expressed stronger confidence in their classroom learning compared to its application in practice. This convergence across regions suggests that the academic–clinical gap is not a localized weakness of curricula but a systemic challenge inherent to the transition from theoretical knowledge to practical application within complex healthcare environments. Our study revealed that discrepancies were most pronounced in teamwork, communication, and safety culture, while recognition and response to harm remained relatively stable. This echoes findings from Saudi Arabia (7), Iran (8), and

China (14,15), where students consistently reported greater confidence in technical or procedural safety skills (e.g., infection prevention, incident response) compared to relational competencies. Taken together, these results underscore that while technical tasks can be practiced and reinforced individually, relational competencies are contingent upon organizational culture, mentorship, and team dynamics. Without deliberate structures to cultivate inclusive teamwork and safety culture, students may leave clinical placements confident in technical skills but underprepared for collaborative and communicative aspects of safe practice (20).

Psychological safety provides a useful lens for interpreting these results. Across global contexts, students frequently describe clinical environments as hierarchical, intimidating, or punitive, which in turn discourages open communication, error reporting, and active participation (9). In European studies, persistent physician–nurse hierarchies limit students' willingness to speak up (11,21,22), while African studies highlight resource constraints, overburdened staff, and limited supervision as barriers to supportive clinical education (23). The moderate satisfaction scores with Slovak clinical placements in our sample suggest that students face similar conditions – environments that may prioritize efficiency over learning, authority over openness, and compliance over collaboration. These dynamics are not trivial. When psychological safety is absent, students may disengage, avoid asking clarifying questions, or remain silent in the face of unsafe practices. This not only undermines their learning but also risks perpetuating a culture of silence within healthcare (24). Thus, the academic–clinical gap is not merely about a failure of transfer from classroom to clinic; it reflects deeper cultural and organizational shortcomings that inhibit the enactment of competence. Addressing this requires a reorientation of clinical education away from passive observation and toward active participation in teams that model transparency, error disclosure, and collaborative problem-solving (22).

Importantly, correlation analyses revealed consistent positive associations between professionalism and all patient safety competency domains in both academic and clinical settings. The strongest zero-order correlations were observed for teamwork and culture of safety, indicating that students who perceived themselves as stronger in these domains also reported higher professionalism. After controlling for overlap among safety domains using partial Spearman correlations, teamwork and culture of safety remained independently associated with professionalism in both settings. In the academic setting, communication and understanding human and environmental factors also demonstrated small independent associations, whereas other domains were not significant after adjustment. These findings suggest that professionalism is most closely linked to relational and cultural dimensions of patient safety rather than purely procedural competencies. The independent association of teamwork with professionalism aligns with the relational nature of nursing practice. Students who experience themselves as effective team members may internalize professional values such as accountability, advocacy, and ethical responsibility (20). Evidence from Austria (11) and Japan (16) similarly indicates that professional identity develops through social interaction and collaborative learning environments rather than through isolated skill acquisition.

The independent association between culture of safety and professionalism in both settings further emphasizes the importance of supportive learning environments. When students perceive that errors can be discussed openly and that patient safety is a shared responsibility, professional identity may be reinforced through lived experience. Conversely, environments characterized by hierarchy and silence may inhibit the integration of professional values into practice (26).

Communication demonstrated only a small independent association in the academic setting and was borderline in clinical practice. This pattern suggests that students may conceptually understand communication as a

professional value but encounter contextual barriers that limit its enactment in clinical environments. Similar patterns of "student silence" have been reported in Australia (27), Europe (6,11), and the Middle East (28), highlighting a global challenge in translating communication training into empowered professional behavior.

Overall, our findings reinforce the view that professionalism is not a static individual trait but a context-sensitive construct shaped by relational and organizational experiences (10,29). The small magnitude of partial correlations further indicates that professionalism is multifactorial and influenced by broader educational and social processes beyond individual safety domains. From an educational perspective, professionalism cannot be cultivated solely through theoretical instruction. Experiential strategies such as interprofessional simulation, structured mentorship, and reflective debriefing may strengthen both patient safety competence and professional identity by embedding learning within psychologically safe team contexts (30).

Several limitations must be acknowledged. The cross-sectional design precludes causal inferences. Self-reported measures may be inflated by social desirability bias, and the 58.7% response rate introduces potential nonresponse bias. Finally, the study did not include objective measures of competence or professional behavior, which future research should incorporate.

Conclusion

This study provides strong evidence that professionalism and patient safety competencies are deeply intertwined. Slovak nursing students reported high levels of both constructs, yet academic–clinical discrepancies and low ratings in communication and teamwork mirror global patterns. Teamwork and culture of safety emerged as the strongest predictors of professionalism, confirming that professional identity is shaped by relational and cultural factors rather than technical skills alone. These results argue for international reforms that integrate professionalism and safety in curricula, expand structured mentorship, and foster psychologically safe clinical environments. By positioning professionalism and patient safety as interconnected global priorities, nursing education can better prepare graduates who are not only technically competent but also ethically grounded, collaborative, and empowered to deliver safe, high-quality care in diverse healthcare systems worldwide.

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Conflict of interest

The authors report there are no competing interests to declare.

References

1. Moshiri E, Abbaszadeh A, Shahcheragh SH. Prioritizing just culture: A call to action for patient safety. Nursing Practice Today. 2025;12(2):117-119. doi: 10.18502/npt.v12i2.18334
2. Kim J, Lee M, Hong E. Evaluating the outcomes of patient safety education programs in nursing education: a scoping review. BMC Nursing. 2025;24:273. doi:10.1186/s12912-025-02858-8
3. Cao H, Cao Z, Mao Y, Li L, Song Y, He X, Wu Y, Chen Y, Wang Q, Yang H. A qualitative study on nursing professionalism: safeguarding life through a conceptual model. BMC Medical Education. 2025;25(1):1127. doi:10.1186/s12909-025-07595-9
4. Ginsburg L, Castel E, Tregunno D, Norton PG. The H-PEPSS: an instrument to measure health professionals' perceptions of patient safety competence at entry into practice. BMJ Quality & Safety. 2012;21(8):676–84. doi:10.1136/bmjqs-2011-000601
5. Farokhzadian J, Eskici GT, Molavi-Taleghani Y, Akin S, Nayeri ND. Nursing students' patient safety competencies in the classroom and clinical settings: a cross-sectional study. BMC Nursing. 2024;23:47. doi:10.1186/s12912-024-01708-3
6. Gradišnik M, Fekonja Z, Vrbnjak D. Nursing students' handling of patient safety

incidents during clinical practice: A retrospective qualitative study. Nurse Education Today. 2024;132:105993. doi:10.1016/j.nedt.2023.105993

7. Alquwez N, Cruz JP, Alshammari F, Felemban EM, Almazan JU, Tumala RB, Alabdulaziz HM, Alsolami F, Silang JPBT, Tork HMM. A multi-university assessment of patient safety competence during clinical training among baccalaureate nursing students: a cross-sectional study. Journal of Clinal Nursing. 2019;28(9–10):1771–81. doi:10.1111/jocn.14790

8. Vaismoradi M, Tella S, Logan PA, Khakurel J, Vizcaya-Moreno F. Nurses' adherence to patient safety principles: a systematic review. International Journal of Environmental Research and Public Health.2020;17(6):2028. doi:10.3390/ijerph17062028

9. Alrasheeday AM, Alkubati SA, Alqalah TAH, Alrubaiee GG, Alshammar B, Almazan JU, Abdullah SO, Loutfy A. Nursing students' perceptions of patient safety culture and barriers to reporting medication errors: A cross-sectional study. Nurse Education Today. 2025;146:106539. doi:10.1016/j.nedt.2024.106539

10. Lee SE, Lee JW. Effects of hierarchical unit culture and power distance orientation on nurses' silence behavior: the roles of perceived futility and hospital management support for patient safety. Journal of Nursing Management. 2024;2024:6564570. doi:10.1155/jonm/6564570

11. Hoffmann M, Schwarz CM, Schwappach D, Banfi C, Palli C, Sendlhofer G. Speaking up about patient safety concerns: view of nursing students. BMC Health Services Research. 2022;22(1):1547. doi:10.1186/s12913-022-08935-x

12. Jiang J, Liu M, Li Y, Gao H, Tian L. Nursing professionalism: A scoping review of implementation level, evaluation instruments, influential factors, and intervention strategies. Journal of Nursing Management. 2024;2024:7272296. doi:10.1155/2024/7272296

13. Boloré S, Fassier T, Guirimand N. Effect of an interprofessional simulation program on patient safety competencies of healthcare professionals in Switzerland: A before and after study. Journal of Educational Evaluation for Health Professionals. 2023;20:25. doi:10.3352/jeehp.2023.20.25

14. Chen L, Huang F, Yuan X, Song J, Chen L. An assessment of the reliability and factorial validity of the Chinese version of the Health Professional Education in Patient Safety Survey (H-PEPSS). Frontiers Psychology. 2019;10:2183. doi:10.3389/fpsyg. 2019.02183

15. Zhang X, Wang F, Wang Q, Liu Y, Li J. The link between patient safety competence and adverse events among master of nursing students: a cross-sectional mixed-methods study. BMC Nursing. 2024;23:539. doi:10.1186/s12912-024-02213-3

16. Ichikawa N, Yamamoto-Mitani N, Takai Y, Tanaka M, Takemura Y. Understanding and measuring nurses' professionalism: development and validation of the Nurses' Professionalism Inventory. Journal of Nursing Management. 2020;28(7):1607–18. doi:10.1111/jonm.13116

17. Kurucová R, Kohanová D, Žiaková K. Self-report of nurse professionalism and factors affecting it: a cross-sectional study. Journal of Nursing Administration. 2023;53(9):467–73. doi:10.1097/NNA.0000000000001317

18. Kohanová I, Sollárová E. Nursing students' self-reported competencies in patient safety: preliminary results. Zdravotnícke Listy. 2025;13(1):50–7.

19. von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP; STROBE Initiative. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. Journal of Clinical Epidemioly. 2008;61(4):344-9. doi:10.1016/j.jclinepi.2007.11.008

20. Geoghan Marold SM, Strouse SM, Butcher D. Professional identity in nursing: A narrative review of the ISPIN definition and domains usage. SAGE Open Journal of Nursing. 2025;11:23779608251335240. doi:10.1177/23779608251335240

21. Bartoníčková D, Kohanová D, Cakirpaloglu SD, Steven A, Žiaková K. Exploring nursing students' perspectives on patient safety culture in clinical settings: A mixed-method study. Journal of Clinical Nursing. 2025;34(7):2702–17. doi:10.1111/jocn.17812

22. van Dongen D, Guldenmund F, Grossmann I, Groeneweg J. Classification of influencing factors of speaking-up behaviour in hospitals: A systematic review. BMC Health Services Research. 2024;24(1):1657. doi:10.1186/s12913-024-12138-x

23. Alhassan A, Sencherey VL, Bobuafor C, Berchie GO, Abraham SA. Practices and challenges of supervision and delegation in nursing in Africa: A scoping review. BMC Nursing. 2025;24(1):1094. doi:10.1186/s12912-025-03683-9

24. Carrillo I, Skoumalová I, Bruus I, Klemm V, Guerra-Paiva S, Knežević B, Jankauskiene A, Jocic D, Tella S, Buttigieg SC, Srulovici E, Madarasová Gecková A, Põlluste K, Strametz R, Sousa P, Odalovic M, Mira JJ. Psychological safety competency training during the clinical internship from the perspective of health care trainee mentors in 11 pan-European countries: Mixed methods observational study. JMIR Medical Education. 2024;10:e64125. doi:10.2196/64125
25. Cornett M, Palermo C, Ash S. Professional identity research in the health professions: A scoping review. Advances in Health Sciences Education: Theory and Practice. 2023;28(2):589–642. doi:10.1007/s10459-022-10171-1
26. Mbalinda SN, Najjuma JN, Mubuuke AG, Kamoga L, Musoke D. Understanding and barriers to formation of professional identity among current and recent graduates of nursing and midwifery in two universities in a low-resource setting: A qualitative study. Research Square. 2023;rs.3.rs-3423723. doi:10.21203/rs.3.rs-3423723/v1
27. Fagan A, Lea J, Parker V. Student nurses' strategies when speaking up for patient safety: A qualitative study. Nursing & Health Sciences. 2021;23(2):447–55. doi:10.1111/nhs.12831
28. Al-Daken L, Lazarus ER, Al Sabei SD, Alharrasi M, Al Qadire M. Perception of nursing students about effective clinical teaching environments: a multi-country study. SAGE Open Journal of Nursing. 2024;10:23779608241233146. doi:10.1177/23779608241233146
29. Wei H, Haddad LM, Nwokocha TA, Powers M, Wei A, Carroll Q, Ballard N. Organizational culture and roles in promoting nurse specialty certifications: A qualitative study in the United States. International Journal of Nursing Sciences. 2023;10(2):189–98. doi:10.1016/j.ijnss.2023.03.003
30. Krishna LKR, Kwok HYF, Ravindran N, Tan XY, Soh J, Wan DWJ, Rajalingam V, Lua JK, Leong EYM, Low TY, Chan AW, Lim CJN, Ng YK, Thenpandiyan AA, Lim AYD, Tse LN, Pl S, Rajanala SP, Leong JR, Quah ELY, et al. A systematic scoping review of mentoring support on professional identity formation. BMC Medical Education. 2024;24(1):1380. doi:10.1186/s12909-024-06357-3