journal homepage: http://kont.zsf.jcu.cz
DOI: 10.32725/kont.2024.052

KONTAKT / Journal of nursing and social sciences related to health and illness

Original research article

Association between perceived patient safety culture, unfinished nursing care, and teamwork during the clinical placement of nursing students: a cross-sectional study

Dominika Kohanová [1] *, Andrea Solgajová [1], Katarína Žiaková [2], Radka Kurucová [2], Dana Zrubcová [1]

[1] *Constantine the Philosopher University in Nitra, Faculty of Social Sciences and Health Care, Department of Nursing, Nitra, Slovak Republic*
[2] *Comenius University in Bratislava, Jessenius Faculty of Medicine in Martin, Department of Nursing, Martin, Slovak Republic*

Abstract
Introduction: Patient safety culture is a fundamental aspect of healthcare delivery, profoundly impacted by factors such as teamwork or organizational traits. Research on unfinished nursing care has underscored its importance in relation to patient safety.
Objective: To explore the associations between perceived patient safety culture, unfinished nursing care, and the level of teamwork during the clinical placement of nursing students.
Methods: A descriptive cross-sectional study was conducted between September and December 2023 using a set of questionnaires comprising the Hospital Survey on Patient Safety Culture for Nursing Students, the Unfinished Nursing Care Survey for Students, and the Nursing Teamwork Survey. The study involved 242 Slovak nursing students.
Results: Significant associations were found between nursing students' perceptions of patient safety culture, the level of teamwork, and particular reasons for unfinished nursing care. Four dimensions of patient safety culture predicted the level of teamwork ($p < 0.05$) and explained 49.1% of the variability in the teamwork perceived during clinical placement.
Conclusion: Understanding nursing students' perceptions of patient safety culture and its influencing factors is essential for enhancing the safe provision of nursing care. Future research should continue to explore the dynamic interaction between investigated variables to inform educational and organizational interventions aimed at improving patient care outcomes.

Keywords: Nursing students; Patient safety; Safe care; Teamwork; Unfinished care

Introduction

Patient safety is rooted in the principle of preventing harm to patients, as outlined by the Institute of Medicine (IOM, 2004). The WHO (2023) defines patient safety as the absence of harm that could be prevented during the healthcare process. It encompasses a comprehensive framework of organized activities within healthcare, including culture, processes, procedures, behavior, technologies, and the overall healthcare environment, aimed at reducing risk factors, negative patient outcomes, and adverse events to protect patients from errors, infections, accidents, and injuries, thus reducing the likelihood of avoidable harm.

Nurses represent the front-line in patient care, addressing patients' biopsychosocial and spiritual needs. They are responsible for the quality of care provided and patient safety. Within the context of care quality and patient safety, the phenomenon of unfinished nursing care has gained increasing attention, negatively impacting nurses and becoming a focal point for researchers worldwide (Papastavrou and Suhonen, 2021). Research on unfinished care focuses primarily on mapping factors that influence its prevalence in different clinical settings and its impact on patient safety and quality of care. Studies frequently cite factors such as nurse-to-patient ratios, ineffective task delegation, unexpected patient load increases, resource shortages, ineffective teamwork, inadequate nurse-patient communication, and nurses' burden from non-nursing activities (e.g., Chiappinotto et al., 2022; Papastavrou and Suhonen, 2021). Another modifiable factor that influences patient safety and its culture is the level of teamwork in nursing teams (Kalisch et al., 2010). Despite skilled individuals, errors can occur in healthcare. Effective communication and teamwork are vital to ensuring quality and safe patient care and can prevent errors that may harm patients or healthcare providers (Ahsan et al., 2021). Approximately one in ten patients suffers direct harm during healthcare delivery, with almost half of these incidents being preventable (Kossaify et al., 2017). A good nursing team is professionally prepared, motivated, and adheres to realistic goals. Dysfunctional teams exhibit inefficient conflict

* **Corresponding author:** Dominika Kohanová, Constantine the Philosopher University in Nitra, Faculty of Social Sciences and Health Care, Department of Nursing, Nitra, Slovak Republic; e-mail: dkohanova@ukf.sk
http://doi.org/10.32725/kont.2024.052
Submitted: 2024-04-08 • Accepted: 2024-11-11 • Prepublished online: 2024-11-21
KONTAKT 26/4: 339–346 • EISSN 1804-7122 • ISSN 1212-4117

management, lack mutual trust, experience team instability due to shift length variations, or encounter communication issues during shift handovers. Higher levels of teamwork lead to reduced occurrences of missing nursing care (Kalisch and Lee, 2010). Patient safety, a critical global health issue, is greatly threatened by nurse and ancillary staff shortages (Stevanin et al., 2018). Due to resource constraints, care redistribution based on priority setting is necessary in daily nursing practice, leading nurses to minimize or omit certain tasks and increase the risk of negative patient outcomes (Gurková et al., 2020).

At this point, knowing that they will be the future healthcare providers, it is vital that nursing students have a clear understanding of patient safety. Patient safety is a multifaceted professional competency. It requires a foundation of understanding various terms and concepts related to safety and quality, and a focus on developing the skills and abilities necessary to provide safe and effective patient care. Therefore, it is important for future healthcare providers to recognize and agree on what constitutes errors and patient safety. Studies of students in the education of the health profession have indicated that students rarely receive explicit instruction on the concepts and principles of patient safety. They also feel unprepared to actively participate in the identification and resolution of errors in patient care. This is especially true for nursing students, as the final mandatory criterion for nursing education set by the Ministry of Health regarding patient safety and its culture is unclear, and it is challenging to blend this into the current curriculum (Lee et al., 2016).

However, it is important to measure perceptions of patient safety culture from the perspective of nursing students, as they are directly involved in patient care during their clinical placements, providing them with first-hand experience of the healthcare environment. Their perspective offers unique insights into the day-to-day realities of patient safety culture. Additionally, students may notice issues or challenges in patient safety that more experienced healthcare professionals may overlook (Bartoníčková et al., 2023). Their fresh perspective can help identify areas for improvement before they escalate into larger problems. Finally, collecting feedback about patient safety culture can inform educational institutions about the effectiveness of their curricula and clinical training programs (Mansour, 2015). This feedback can guide education improvements to better prepare students for real-world patient care settings. Based on the evidence mentioned above, our study aimed to explore the associations between perceived patient safety culture, unfinished nursing care, and the level of teamwork during the clinical placement of nursing students.

Materials and methods

Study design

A descriptive cross-sectional study design was used to explore the associations between perceived patient safety culture, unfinished nursing care, and the level of teamwork during the clinical placement of nursing students. The study adhered to the STROBE checklist (von Elm et al., 2008) and received approval from the Ethics Committee of Jessenius Faculty of Medicine in Martin, Comenius University in Bratislava (reference number 37/2023).

Sample

The sample comprised 242 nursing students enrolled in baccalaureate nursing programs at two faculties in the Slovak Republic. Following approval to conduct the study, undergraduate nursing students were recruited using purposive sampling. The inclusion criteria stipulated that the students must have completed at least one clinical placement in a hospital setting and provided informed consent, while the exclusion criteria encompassed absenteeism due to illness or maternity leave. Of the 270 questionnaires distributed, 242 were returned, resulting in a return rate of 89.6%. All questionnaires were included in the final analysis, which yielded a total of 242 responses.

Data collection

Data collection was carried out between September and December 2023 using the questionnaire set comprised of three instruments. The Hospital Survey on Patient Safety Culture (HSOPS-NS), Unfinished Nursing Care Survey for Students (UNCS4S), and Nursing Teamwork Survey (NTS) were selected for their robust validation in assessing patient safety culture, unfinished nursing care, and teamwork, respectively. Each instrument aligns with the study's objective of examining these variables in the context of nursing students' clinical placements. The set of questionnaires were distributed using paper-pen method, with clear instructions provided to ensure standardized responses. Steps to minimize bias included anonymizing responses and ensuring voluntary participation. Additionally, training for supervisors ensured consistency in data collection procedures.

Patient safety culture was assessed using the Slovak version of the Hospital Survey on Patient Safety Culture for Nursing Students (Kohanová et al., 2023a; Ortiz de Elguea et al., 2019). The survey includes 54 items across four sections (A–D), with 49 items focused on students' perceptions of their workplace environment, such as patient safety culture, communication, and overall safety perceptions. These items are grouped into 13 dimensions, including teamwork, communication openness, error reporting, and organizational support for patient safety. Five additional items cover general safety perceptions, adverse event reporting, awareness of reporting systems, and additional comments. Responses are recorded on a 5-point Likert scale, with supplementary items using a 10-point Likert scale or dichotomous options. Different Likert scales were utilized in the Patient Safety Culture survey to capture varying degrees of agreement and to address the distinct nature of questions related to perception and event reporting (Ortiz de Elguea et al., 2019).

In this study, nursing students' perceptions of unfinished nursing care and teamwork were considered factors that influence their evaluation of patient safety culture. Unfinished nursing care was measured using the Slovak version of the Unfinished Nursing Care Survey for Students (UNC4S) (Kohanová et al., 2024; Palese et al., 2021). The tool consists of 40 items in two sections. The first section lists 22 common nursing care activities left incomplete, with respondents indicating the frequency of these omissions during their last clinical placement on a 5-point Likert scale (1 'never' to 5 'always omitted', with 'not applicable' as an option). The second section presents 18 reasons for unfinished nursing care, categorized into six subscales: communication, priority setting, nurse aide supervision, material resources, human resources, and workflow predictability. Respondents rate the significance of these reasons using a 5-point Likert scale (1 'not a significant reason' to 5 'very significant reason').

Teamwork was measured using the Slovak version of the Nursing Teamwork Survey (NTS) (Kalisch et al., 2010; Kohanová et al., 2023b), based on Salas' teamwork theory (Salas et al., 2005, 2007). The NTS comprises 33 items across five subscales: Trust, Team Orientation, Backup, Shared Mental

Model, and Team Leadership. These subscales assess various teamwork aspects, including roles, leadership, communication, adaptability, workload distribution, trust, and conflict resolution. Participants rate the frequency of team behaviors on a 1 (never) to 5 (always) scale, with intermediate values representing the percentage of time (e.g., 2 = 25%, 3 = 50%). Negatively worded items are reverse-scored, and higher scores reflect a more positive perception of teamwork.

Furthermore, in this study, several sociodemographic variables were collected, including age, unit of current clinical placement, academic year, form of study, responsibility for student during clinical placement, and expectations of the outcome of clinical placement (met, unmet).

Data analysis

The data were analyzed using descriptive and inferential statistics computed using IBM SPSS Statistics 25.0 software. Based on the evaluation of missing data (0.2–0.3%), the high acceptability of the questionnaire set was confirmed. Descriptive statistics (mean, standard deviation, frequency, minimal and maximal values) were used for sample description and instrument analysis.

Inferential statistical tests (correlation analysis, multiple regression analysis) were used to assess relationships between patient safety culture, unfinished nursing care, and teamwork, as these methods allow for generalization beyond the sample and identify significant associations between the study variables.

The Spearman correlation coefficient (r), due to the non-normal distribution of the data as indicated by the Kolmogorov–Smirnov normality test (p = .000), was used to examine associations between individual dimensions of the patient's safety culture (mean scores of PSC dimensions) and perceptions of unfinished nursing care (mean score of UNC4S, mean scores of reasons for UNC), and the level of teamwork (mean score of NTS and its subscales).

In further analysis, multiple regression analysis was used to determine which of the patient safety culture dimensions predicted the level of teamwork (Model 1) and the prevalence of unfinished nursing care (Model 2). These dimensions served as independent variables, while the level of teamwork (mean score of the NTS) and unfinished nursing care (mean score of UNC4S) were considered dependent variables. The significance level for the results was established at $p < 0.05$.

The reliability of HSOPS-NS, UNCS4S, and NTS in terms of internal consistency was evaluated using the Cronbach alpha coefficient (α). The Cronbach's alpha values should be 0.70 or higher for newly developed instruments and 0.80 or higher for existing instruments (DeVon et al., 2007). The Cronbach's alpha values for the HSOPS-NS (α = 0.849), UNCS4S Part A (α = 0.945), UNCS4S Part B (α = 0.942), and NTS (α = 0.895) indicate strong internal consistency, demonstrating the reliability of the instruments used in the study.

Results

The sample consisted of 242 nursing students from two nursing faculties in the Slovak Republic (Table 1).

Table 1. Sample characteristics (N = 242)

Variables	N = 242	%
Unit type		
Surgical	62	27.7
Anesthesiology/intensive care unit	74	33.0
Internal	33	14.7
Other (e.g., psychiatric, pediatric, neonatal)	55	24.6
Academic year		
Second	100	41.5
Third	141	58.5
Form of study		
Full-time	194	81.2
Part-time	45	18.8
Responsibility for student		
Nurse/clinical nurse	51	21.6
Head nurse/coordinator nurse	51	21.6
Nurse teacher/clinical tutor	79	33.5
Nurse educator/lecturer (employee of the university)	27	11.4
Nursing staff/nursing team	28	11.9
Outcome expectations*		
Not at all (unmet expectations)	26	11.1
Enough	93	39.6
Greatly	89	37.9
Very greatly (met expectations)	27	11.5

Variables	M	SD	Range
Age	24.09	7.28	20–54

Note: M – mean; SD – standard deviation. * The student assesses the extent to which his/her expectations related to clinical practice have been met.

Evaluation of the patient safety culture of nursing students

The overall patient safety grade was evaluated relatively positively (6.97 ± 1.76) by nursing students. Nursing students indicated a low number of events reported by nurses during clinical placements (0.94 ± 1.65), ranging from 0 to 10. Similarly, they reported the low number of events recorded by themselves (0.19 ± 0.71), with the maximum of 5 adverse events. Nursing students perceived 'Non-punitive responses to errors' as the least positive (2.88 ± 0.78; 28.9%), while they achieved the highest score in the subscale Communication Openness' (3.46 ± 0.72; 55.2%). However, nursing students did not evaluate any of the dimensions of the patient safety culture above the necessary level of 75% (Table 2), as recommended by the Agency for Healthcare Research and Quality (AHRQ) (Ammouri et al., 2015).

Associations between perceived patient safety culture, unfinished nursing care, and the level of teamwork

Weak to strong correlations were found between the evaluation of the patient safety culture of nursing students and other variables (mean score of the NTS and its subscales, mean score of UNC reasons: communication, priority setting, nurses' aides and supervision, and human resources). Table 3 shows weak to moderate correlations between PSC dimensions and teamwork (mean score of the NTS), with the strongest positive correlation observed in the 'Teamwork within units' dimension (r = 0.604, $p < 0.01$). Additionally, moderate correlations were found between 'Supervisor/manager expectations & actions promoting patient safety' (r = 0.480, $p < 0.01$), 'Organizational learning/continuous improvement (r = 0.546, $p < 0.01$), 'Overall perceptions of patient safety' (r = 0.423, $p < 0.01$), 'Feedback & communication about error' (r = 0.441, $p < 0.01$), 'Communication openness' (r = 0.444, $p < 0.01$), and 'Indicator of good praxis' (r = 0.471, $p < 0.01$). With an increase in teamwork, the evaluation of patient safety culture also increases.

Table 2. Dimensions of patient safety culture

Safety culture dimensions	M ± SD	Percentage of positive responses*
PSC1	3.42 ± 0.75	50.1%
PSC2	3.46 ± 0.74	51.1%
PSC3	3.33 ± 0.70	44.9%
PSC4	3.25 ± 0.69	42.5%
PSC5	3.45 ± 0.60	47.8%
PSC6	3.34 ± 0.76	46.9%
PSC7	3.46 ± 0.72	55.2%
PSC8	3.02 ± 0.97	33.3%
PSC9	3.16 ± 0.62	37.8%
PSC10	2.94 ± 0.64	31.6%
PSC11	2.96 ± 0.41	33.2%
PSC12	2.88 ± 0.78	28.9%
PSC13	3.33 ± 0.66	38.9%

Note: M – mean; SD – standard deviation. PSC1 – Teamwork within units; PSC2 – Supervisor/manager expectations & actions promoting patient safety; PSC3 – Organizational learning/continuous improvement; PSC4 – Management support for patient safety; PSC5 – Overall perceptions of patient safety; PSC6 – Feedback & communication about error; PSC7 – Communication openness; PSC8 – Frequency of events reported; PSC9 – Teamwork across units; PSC10 – Staffing; PSC11 – Handoffs & transitions; PSC12 – Non-punitive responses to errors; PSC13 – Indicator of good praxis.
* The values represent the percentage of positive responses, indicating the proportion of students who agreed with each statement (option 4 and 5 on the Likert scale).

Unfinished nursing care (mean score of UNCS4S) was not significantly associated with PSC dimensions. A few reasons for unfinished nursing care were significantly but weakly correlated with individual dimensions of PSC, more specifically 'Staffing' and 'Non-punitive responses' to errors. With the decrease in the evaluation of the UNC reasons, the evaluation of patient safety culture dimensions increases. Generally, with fewer reasons for the appearance of UNC, nursing students perceive a better evaluation of the patient safety culture during their clinical placements.

In addition, multiple regression was used to predict the level of teamwork and the prevalence of unfinished nursing care based on various dimensions of Patient Safety Culture (PSC). This analysis allowed us to assess the contribution of each independent variable (e.g., 'Communication Openness', 'Organizational Learning') to the predicted teamwork score and unfinished nursing care score (Table 4). Model 1 (R^2 = 0.518; Adj R^2 = 0.491; F = 18.634; p < 0.000) revealed four significant predictors of the level of teamwork during clinical placement among PSC dimension ('Teamwork within units'; 'Overall perceptions of patient safety'; 'Non-punitive responses to errors'; 'Indicator of good praxis'). These dimensions of the PSC explained 49.1% of the variability in the perceived level of teamwork during clinical placement. Nursing students who achieved a better score in the evaluation of PSC dimensions, more specifically 'Teamwork within units' (β = 0.363, p < 0.01), 'Overall perceptions of patient safety' (β = 0.115, p ≤ 0.048), 'Non-punitive responses to errors' (β = 0.115, p ≤ 0.003), and 'Indicator of good praxis' (β = 0.160, p ≤ 0.011), also reported better evaluation of the level of teamwork during clinical placement. Model 2 (R^2 = 0.038; Adj R^2 = –0.018; F = 0.679; p = 0.783) did not reveal significant predictors of the prevalence of unfinished nursing care.

Table 3. Correlations between the PSC dimensions and other variables (*N* = 242)

Dimensions of the PSC	Mean score of the NTS	Mean score of the NTS1 (Trust)	Mean score of the NTS2 (Team orientation)	Mean score of the NTS3 (Backup)	Mean score of the NTS4 (Shared mental model)	Mean score of the NTS5 (Team leadership)	Mean score of UNC4S	Mean score of UNC reasons: Communication	Mean score of UNC reasons: Priority setting	Mean score of UNC reasons: Nurses' aides supervision	Mean score of UNC reasons: Material resources	Mean score of UNC reasons: Human resources	Mean score of UNC reasons: Workflow predictability
PSC1	0.604**	0.593**	0.292**	0.494**	0.487**	0.368**	0.049	0.059	–0.051	0.054	0.049	–0.046	0.027
PSC2	0.480**	0.380**	0.299**	0.403**	0.406**	0.334**	–0.023	0.031	0.013	0.021	0.055	0.006	0.003
PSC3	0.546**	0.550**	0.260**	0.438**	0.437**	0.356**	0.021	0.077	0.038	0.066	0.010	–0.031	–0.039
PSC4	0.053	0.117	–0.199**	0.073	0.112	0.150*	0.031	–0.004	0.009	0.001	0.032	0.060	0.040
PSC5	0.423**	0.355**	0.291**	0.362**	0.391**	0.220**	–0.90	–0.009	–0.085	–0.117	0.040	–0.003	0.025
PSC6	0.441**	0.404**	0.152*	0.341**	0.430**	0.350**	0.043	–0.015	–0.046	–0.022	0.053	0.005	0.000
PSC7	0.444**	0.350**	0.241**	0.373**	0.428**	0.243**	0.010	0.051	–0.032	0.006	0.052	–0.027	0.000
PSC8	0.240**	0.304**	0.005	0.237**	0.144*	0.261**	0.107	–0.071	–0.043	–0.078	–0.025	–0.022	–0.048
PSC9	0.269**	0.282**	0.157*	0.198**	0.225**	0.198**	–0.045	–0.013	0.015	–0.082	–0.022	–0.042	–0.031
PSC10	0.146*	0.105	0.286**	0.058	0.107	–0.020	0.021	–0.042	–0.156*	–0.134*	–0.053	–0.188**	–0.119
PSC11	–0.023	–0.007	0.023	–0.013	–0.048	0.039	0.067	0.005	0.064	0.028	–0.003	–0.027	–0.033
PSC12	0.228**	0.172**	0.402**	0.121	0.057	0.063	0.005	–0.185**	–0.184*	–0.164*	–0.119	–0.139*	–0.035
PSC13	0.471**	0.464**	0.210**	0.383**	0.414**	0.311**	0.076	–0.004	–0.084	–0.085	0.061	–0.073	0.011

Note: PSC1 – Teamwork within units; PSC2 – Supervisor/manager expectations & actions promoting patient safety; PSC3 – Organizational learning/continuous improvement; PSC4 – Management support for patient safety; PSC5 – Overall perceptions of patient safety; PSC6 – Feedback & communication about error; PSC7 – Communication openness; PSC8 – Frequency of events reported; PSC9 – Teamwork across units; PSC10 – Staffing; PSC11 – Handoffs & transitions; PSC12 – Non-punitive responses to errors; PSC13 – Indicator of good praxis. * p < 0.05; ** p < 0.01.

Table 4. Predictors of the perception of individual PSC dimensions (*N* = 242)

PSC dimensions	The level of teamwork (mean score of the NTS)		Perceptions of unfinished nursing care (mean score of UNC4S)	
Model	(R^2 = 0.518; Adj R^2 = 0.491; F = 18.634; p < 0.000)		(R^2 = 0.038; Adj R^2 = -0.018; F = 0.679; p = 0.783)	
	β	*p*	β	*p*
(Constant)	–	0.014	–	0.721
PSC1	0.363	<0.01**	0.047	0.594
PSC2	0.055	0.371	–0.080	0.352
PSC3	0.106	0.097	0.023	0-797
PSC4	–0.041	0.408	0.053	0.447
PSC5	0.115	0.048*	–0.121	0.139
PSC6	0.071	0.265	–0.014	0.877
PSC7	0.090	0.163	0.040	0.658
PSC8	–0.035	0.528	0.036	0.637
PSC9	0.007	0.902	–0.122	0.110
PSC10	–0.039	0.465	0.043	0.562
PSC11	0.051	0.304	0.094	0.179
PSC12	0.157	0.003*	0.009	0.900
PSC13	0.160	0.011*	0.074	0.406

Note: β – Standardized Beta coefficient; Sig. – significance. PSC1 – Teamwork within units; PSC2 – Supervisor/manager expectations & actions promoting patient safety; PSC3 – Organizational learning/continuous improvement; PSC4 – Management support for patient safety; PSC5 – Overall perceptions of patient safety; PSC6 – Feedback & communication about error; PSC7 – Communication openness; PSC8 – Frequency of events reported; PSC9 – Teamwork across units; PSC10 – Staffing; PSC11 – Handoffs & transitions; PSC12 – Non-punitive responses to errors; PSC13 – Indicator of good praxis. * $p \leq 0.05$; ** $p < 0.001$.

Discussion

Investigating the structure of patient safety culture from nursing students' viewpoints is crucial because, although they contribute to patient safety during clinical placement, they are temporary team members not fully assimilated into organizational culture or influenced by years of experience, unlike nurses (Bagnasco et al., 2022; Steven et al., 2020). In recent years, the COVID-19 pandemic increased student involvement in clinical settings and placed them in a unique position. This period underscored the importance of improving patient safety education and providing psychological support, as noted in previous studies (Bianchi et al., 2016; Dziurka et al., 2022).

This study is one of the first to explore the perceptions of nursing students regarding patient safety culture, teamwork, and unfinished nursing care. While previous studies have focused primarily on the views of practicing nurses, this research adds new insights by examining how students – who are not yet fully assimilated into organizational culture – perceive these crucial aspects of healthcare. Unlike experienced nurses, students bring fresh perspectives to patient safety issues, and their observations provide valuable information about the culture they are entering. This study's findings highlight the importance of enhancing patient safety education for students, particularly in areas like error reporting and teamwork, which are often underemphasized in standard curricula. These contributions are vital for shaping future safety practices and integrating students more effectively into patient safety initiatives (Ortiz de Elguea et al., 2019).

Similar to the findings of Li et al. (2021), overall, nursing students rated patient safety positively but expressed concerns about the reporting of adverse events. Particularly troubling was the minimal reporting of adverse events by students providing direct nursing care during clinical placements, with even fewer reports made independently. This problem of underreporting among nursing students was identified as early as 2014 in China, suggesting underlying fears of repercussions and guilt, as well as potential gaps in knowledge or access to reporting systems (Stevanin et al., 2018). Reluctance to report persisted during the pandemic, reflecting a larger challenge observed among qualified nurses, where errors are often viewed as taboo, fostering a culture of fear, and hindering learning and improvement (Bartoníčková et al., 2023).

Furthermore, nursing students did not achieve the recommended level of 75% in any dimension of PSC, suggesting a similar pattern to studies conducted with nurses (e.g., Ammouri et al., 2015; Bartoníčková et al., 2023). It has been suggested that integrating patient safety education into clinical practice for nursing students could positively impact their perception of patient safety in their future careers (Kong et al., 2019). The dimensions with the lowest rating involved 'Non-punitive responses to errors' and 'Staffing'. On the contrary, the dimension of 'Communication Openness' received the highest rating, probably due to its role in promoting transparency, facilitating learning, improving patient care, aligning with cultural norms, and meeting professional standards (Bartoníčková et al., 2023; Ortiz de Elguea et al., 2019).

Open communication and a blame-free culture are critical components of patient safety. When healthcare professionals feel safe to report errors without fear of retribution, it fosters a learning environment conducive to improvement and patient safety. This principle applies to nursing students, who, as temporary team members during clinical placements, need a

supportive atmosphere to communicate openly and report adverse events without fear of blame (Bagnasco et al., 2022; Steven et al., 2020). However, blame culture still prevails in many settings, inhibiting students' willingness to report errors due to concerns about punishment, guilt, or fear of repercussions, as seen in earlier studies (Stevanin et al., 2018). Addressing these barriers is crucial to cultivating an open communication culture where mistakes are viewed as learning opportunities, not failures. Doing so can enhance both the learning environment and patient safety.

Blame culture, from the point of view of nursing students, reflects a pervasive atmosphere.

In this study, statistically significant associations were found between nursing students' perceptions of patient safety culture and the level of teamwork measured by the NTS. Effective teamwork fosters open and clear communication among members of the healthcare team, including nursing students (Bartoníčková et al., 2023). Additionally, improved communication enhances the exchange of vital patient information, reduces errors, and promotes a culture of safety (Hoffmann et al., 2022). Nursing students who experience strong teamwork are more likely to collaborate closely with other healthcare professionals, such as physicians, pharmacists, and allied health staff. This collaborative approach ensures comprehensive patient care and improves safety by leveraging the expertise of each team member (Karlsen et al., 2023). Additionally, in a cohesive team environment, nursing students feel supported by their peers and superiors, allowing them to voice concerns, seek help, and contribute to patient safety initiatives without fear of reprisal. This supportive atmosphere encourages proactive error reporting and continuous improvement efforts (Kyriacou Georgiou et al., 2021). Furthermore, a positive teamwork environment provides nursing students with valuable learning opportunities, including exposure to diverse perspectives, constructive feedback, and mentorship from experienced healthcare professionals (Çatal et al., 2024). This enriching learning environment cultivates a culture of continuous learning, adaptation, and innovation, ultimately enhancing patient safety practices. In general, teamwork plays a crucial role in shaping the perception of patient safety culture among nursing students by fostering effective communication, collaboration, support, shared responsibility, and a conducive learning environment (Bartoníčková et al., 2023; Karlsen et al., 2023).

Unfinished nursing care, also known as missed nursing care, refers to essential tasks or interventions that are not completed due to factors such as time constraints, staffing shortages, or competing priorities (Palese et al., 2021). While missed care is a significant concern in healthcare settings and can adversely affect patient outcomes, this study did not find a significant association between unfinished nursing care and nursing students' perceptions of patient safety culture.

One potential reason for this lack of significant association could be the limited exposure nursing students have to the full scope of unfinished care and its broader implications during clinical placements. Nursing students often prioritize learning clinical skills and decision-making rather than fully grasping the organizational consequences of unfinished care. Their clinical experiences may focus more on specific tasks rather than understanding the systemic issues that contribute to missed care. Consequently, students may not yet appreciate how incomplete care affects patient safety outcomes (Palese et al., 2021). This aligns with previous research suggesting that students may not fully comprehend the direct impact of unfinished care on patient safety unless they observe the negative consequences firsthand (Chiappinotto et al., 2022; Palese et al., 2021).

Additionally, nursing curricula tend to emphasize the development of clinical competencies over a deep exploration of patient safety culture, including the effects of unfinished care. While students may be exposed to discussions about patient safety, their education may not yet provide enough depth on how systemic factors like staffing shortages or time pressures contribute to incomplete care. This gap in education likely diminishes their ability to see the connection between unfinished nursing care and patient safety culture (Bagnasco et al., 2022).

Moreover, the clinical environments in which students are placed may not offer sufficient insight into the long-term implications of unfinished care, such as its impact on patient outcomes, staffing morale, or the broader healthcare system. Students often have limited roles and responsibilities within these environments and are not always privy to post-discharge care or long-term patient follow-up, which are often where the consequences of missed care become most evident. Thus, their ability to connect missed care to patient safety culture may be inherently constrained by their limited experience and the transient nature of their clinical placements (Palese et al., 2023).

From an educational perspective, this highlights a need to integrate lessons on unfinished care and its effects into nursing curricula more comprehensively. Doing so would help raise students' awareness of the systemic factors contributing to missed care and its significance in shaping a culture of safety. By fostering a deeper understanding of how unfinished care compromises patient safety, nursing programs can better prepare students to recognize and address these issues in their future professional practice (Bagnasco et al., 2022; Chiappinotto et al., 2022).

Given the increasing involvement of students in clinical care, particularly during the COVID-19 pandemic, it is imperative to strengthen patient safety education in nursing programs. The findings suggest that integrating patient safety principles more effectively into the curriculum could help address gaps in understanding the broader implications of care omissions. For example, simulation-based learning that includes scenarios of unfinished nursing care and its impact on patient outcomes could improve students' awareness and decision-making in real clinical environments (Bagnasco et al., 2022). Additionally, interventions aimed at creating a non-punitive error reporting system in healthcare settings, particularly for students, could encourage greater openness and reporting. Providing structured feedback on reported events can also help students understand the importance of their contributions to patient safety.

Future research should explore the impact of integrating patient safety education into clinical practice on students' long-term perceptions of patient safety culture. Studies could also investigate how simulation training influences error reporting behavior and teamwork in diverse healthcare settings. Additionally, examining how students' perceptions of unfinished nursing care evolve as they transition from students to practicing nurses could provide valuable insights into the role of education in shaping safety practices over time.

Study limitations

Although the framework of the cross-sectional study offers valuable initial insights into the viewpoints of nursing students regarding patient safety culture and its influencing factors, it is essential to interpret these findings with caution

due to inherent limitations. These constraints include possible biases, such as selection bias and social desirability bias. Although providing valuable insight, the limited sample size of the study constrains the generalizability and robustness of the conclusions. Subsequent research endeavours using larger and more diverse sample sizes would alleviate these limitations and provide a more comprehensive understanding of the relationship between patient safety culture and various variables, including teamwork and incomplete nursing care, during nursing students' clinical placements.

Conclusion

This study aimed to explore the associations between perceived patient safety culture, unfinished nursing care, and the level of teamwork during the clinical placement of nursing students. Efforts to improve patient safety culture among nursing students during clinical placements require a multifaceted approach. Strategies should prioritize improving the reporting of adverse events by educating students, simplifying procedures, and fostering a supportive environment. Additionally, interventions should focus on promoting non-punitive responses to errors, fostering communication openness, and addressing underlying factors affecting patient safety culture, such as teamwork dynamics and staffing challenges. Creating opportunities for effective teamwork within clinical placements through interprofessional education and simulation-based training is crucial to cultivating a collaborative environment conducive to patient safety.

Author contribution

All listed authors confirm that they participated in the development of the manuscript in the following ways: conception and design or analysis and interpretation of the data; drafting the article or critically revising it for important intellectual content, and final approval of the version to be published.

Funding

The study was supported by the KEGA project no. 040UK-4/2023 Safe Provision of Nursing Care.

Ethical aspects and conflict of interest

The authors have no conflict of interest to declare.

References

1. Ahsan A, Setiowati L, Wieke Noviyanti L, Rahmawati IN, Ningrum EH, Putra KR (2021). Nurses' team communication in hospitals: A quasi-experimental study using a modified TeamSTEPPS. J Public Health Res 10(2): 2157. DOI: 10.4081/jphr.2021.2157.
2. Ammouri AA, Tailakh AK, Muliira JK, Geethakrishnan R, Al Kindi SN (2015). Patient safety culture among nurses. Int Nurs Rev 62(1): 102–110. DOI: 10.1111/inr.12159.
3. Bagnasco A, Zanini M, Catania G, Aleo G, Turunen H, Tella S, et al. (2022). Learning From Student Experience: Development of an International Multimodal Patient Safety Education Package. Nurse Educ 47(4): E75–E79. DOI: 10.1097/NNE.0000000000001138.
4. Bartoníčková D, Kohanová D, Žiaková K (2023). Patient safety culture during Covid-19 pandemic as perceived by nursing students on their clinical placements. Cent Eur J Nurs Midwifery 14(2): 852–859. DOI: 10.15452/cejnm.2022.13.0026.
5. Bianchi M, Bressan V, Cadorin L, Pagnucci N, Tolotti A, Valcarenghi D, et al. (2016). Patient safety competencies in undergraduate nursing students: a rapid evidence assessment. J Adv Nurs 72(12): 2966–2979. DOI: 10.1111/jan.13033.
6. Çatal AT, Cebeci F, Uçak A (2024). Intern nursing students' perceptions of patient safety culture and their experiences with factors affecting the safety of care in hospital settings: A mixed method study. Nurse Educ Today 135: 106120. DOI: 10.1016/j.nedt.2024.106120.
7. Chiappinotto S, Papastavrou E, Efstathiou G, Andreou P, Stemmer R, Ströhm C, et al. (2022). Antecedents of unfinished nursing care: a systematic review of the literature. BMC Nurs 21(1): 137. DOI: 10.1186/s12912-022-00890-6.
8. DeVon HA, Block ME, Moyle-Wright P, Ernst DM, Hayden SJ, Lazzara DJ, et al. (2007). A psychometric toolbox for testing validity and reliability. J Nurs Scholarsh 39(2): 155–164. DOI: 10.1111/j.1547-5069.2007.00161.x.
9. Dziurka M, Machul M, Ozdoba P, Obuchowska A, Kotowski M, Grzegorczyk A, et al. (2022). Clinical Training during the COVID-19 Pandemic: Experiences of Nursing Students and Implications for Education. Int J Environ Res Public Health 19(10): 6352. DOI: 10.3390/ijerph19106352.
10. Gurková E, Kalánková D, Kurucová R, Žiaková K (2020). Assessment of patient safety climate by nurses in Slovak Public and private hospitals. J Nurs Manag 28(7): 1644–1652. DOI: 10.1111/jonm.13120.
11. Hoffmann M, Schwarz CM, Schwappach D, Banfi C, Palli C, Sendlhofer G (2022). Speaking up about patient safety concerns: view of nursing students. BMC Health Serv Res 22(1): 1547. DOI: 10.1186/s12913-022-08935-x.
12. IOM – Institute of Medicine (US) Committee on Data Standards for Patient Safety; Aspden P, Corrigan JM, Wolcott J, Erickson SM, eds (2004). Patient safety: achieving a new standard for care. Washington (DC): National Academies Press (US), 550 p.
13. Kalisch BJ, Lee KH (2010). The impact of teamwork on missed nursing care. Nurs Outlook 58(5): 233–241. DOI: 10.1016/j.outlook.2010.06.004.
14. Kalisch BJ, Lee H, Salas E (2010). The development and testing of the nursing teamwork survey. Nurs Res 59(1): 42–50. DOI: 10.1097/NNR.0b013e3181c3bd42.
15. Karlsen T, Hall-Lord ML, Wangensteen S, Ballangrud R (2023). Bachelor of nursing students' experiences of a longitudinal team training intervention and the use of teamwork skills in clinical practice-A qualitative descriptive study. Nurs Open 10(8): 5616–5626. DOI: 10.1002/nop2.1806.
16. Kohanová D, Gurková E, Kirwan M, Žiaková K, Kurucová R (2024). Nursing students' perceptions of unfinished nursing care: A cross-sectional study. Nurse Educ Pract 76: 103942. DOI: 10.1016/j.nepr.2024.103942.
17. Kohanová D, Holubová D, Žiaková K, Bartoníčková D (2023a). Factors affecting the evaluation of patient safety culture from the nursing students' perspective: A cross-sectional study. Zdrav Listy 11(2): 7–13. DOI: 10.3390/healthcare10101889.
18. Kohanová D, Solgajová A, Lušňáková M, Bartoníčková D (2023b). The level of teamwork and associated factors in the selected hospitals from the nurses' perspective: A cross-sectional study. Nurs Practice Today 10(4): 364–373. DOI: 10.18502/npt.v10i4.14082.
19. Kong LN, Zhu WF, He S, Chen SZ, Yang L, Qi L, et al. (2019). Attitudes towards patient safety culture among postgraduate nursing students in China: A cross-sectional study. Nurse Educ Pract 38: 1–6. DOI: 10.1016/j.nepr.2019.05.014.
20. Kossaify A, Hleihel W, Lahoud JC (2017). Team-based efforts to improve quality of care, the fundamental role of ethics, and the responsibility of health managers: monitoring and management strategies to enhance teamwork. Public Health 153: 91–98. DOI: 10.1016/j.puhe.2017.08.007.
21. Kyriacou Georgiou M, Merkouris A, Hadjibalassi M, Sarafis P, Kyprianou T (2021). Correlation Between Teamwork and Patient Safety in a Tertiary Hospital in Cyprus. Cureus 13(11): e19244. DOI: 10.7759/cureus.19244.

22. Lee NJ, Jang H, Park SY (2016). Patient safety education and baccalaureate nursing students' patient safety competency: A cross-sectional study. Nurs Health Sci 18(2): 163–171. DOI: 10.1111/nhs.12237.
23. Li H, Kong X, Sun L, Zhu Y, Li B (2021). Major educational factors associated with nursing adverse events by nursing students undergoing clinical practice: A descriptive study. Nurse Educ Today 98: 104738. DOI: 10.1016/j.nedt.2020.104738.
24. Mansour M (2015). Factor analysis of nursing students' perception of patient safety education. Nurse Educ Today 35(1): 32–37. DOI: 10.1016/j.nedt.2014.04.020.
25. Ortiz de Elguea J, Orkaizagirre-Gómara A, Sánchez De Miguel M, Urcola-Pardo F, Germán-Bes C, Lizaso-Elgarresta I (2019). Adapting and validating the Hospital Survey on Patient Safety Culture (HSOPS) for nursing students (HSOPS-NS): A new measure of Patient Safety Climate. Nurse Educ Today 75: 95–103. DOI: 10.1016/j.nedt.2019.01.008.
26. Palese A, Chiappinotto S, Bayram A, Sermeus W, Suhonen R, Papastavrou E (2023). Exploring unfinished nursing care among nursing students: a discussion paper. BMC Nurs 22(1): 272. DOI: 10.1186/s12912-023-01445-z.
27. Palese A, Chiappinotto S, Canino E, Martinenghi G, Sist R, Milani L, et al. (2021). Unfinished Nursing Care Survey for Students (UNCS4S): A multicentric validation study. Nurse Educ Today 102: 104908. DOI: 10.1016/j.nedt.2021.104908.
28. Papastavrou E, Suhonen R (2021). Impacts of rationing and missed nursing care: Challenges and sollutions. Springer International Publishing, 201 p.
29. Salas E, Rosen MA, King H (2007). Managing teams managing crises: principles of teamwork to improve patient safety in the Emergency Room and beyond. Theor Issues Ergon Sci 8(5): 381–394. DOI: 10.1080/14639220701317764.
30. Salas E, Sims DA, Burke CS (2005). Is there a "Big Five" in teamwork? Small Group Res 36(5): 555–599. DOI: 10.1177/1046496405277134.
31. Stevanin S, Palese A, Bressan V, Vehviläinen-Julkunen K, Kvist T (2018). Workplace-related generational characteristics of nurses: A mixed-method systematic review. J Adv Nurs 74(6): 1245–1263. DOI: 10.1111/jan.13538.
32. Steven A, Wilson G, Turunen H, Vizcaya-Moreno MF, Azimirad M, Kakurel J, et al. (2020). Critical Incident Techniques and Reflection in Nursing and Health Professions Education: Systematic Narrative Review. Nurse Educ 45(6): E57–E61. DOI: 10.1097/NNE.00000000000007.
33. von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP; STROBE Initiative (2008). The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. J Clin Epidemiol 61(4): 344–349. DOI: 10.1016/j.jclinepi.2007.11.008.
34. WHO – World Health Organization (2023). Patient safety. [online] [cit. 2024-02-24]. Available from: https://www.who.int/news-room/fact-sheets/detail/patient-safety