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ORIGINAL PAPER

Nursing students' assessment of patient safety competencies: a pilot study

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Abstract

Aim: To investigate how nursing students assess their competencies in patient safety in the Czech Republic. *Design:* A pilot study. *Methods:* Data collection was carried out from January to April 2023 using the Health Professional Education in Patient Safety Survey instrument through the Google Forms® platform. The sample consisted of nursing students from seven faculties in the Czech Republic (n = 145). Descriptive and inductive statistics in the statistical program SPSS 25.0 were used in data analysis. *Results:* Nursing students were more confident in both academic and clinical settings in the subscale of Managing safety risks (M = 3.85), and less confident in the subscale of Culture of safety (M = 3.54). Significant differences in assessment of competencies were found in three dimensions when academic and clinical settings were compared. Numerous associations were also demonstrated between patient safety dimensions and sociodemographic data, with the greatest impact on clinical factors. *Conclusion:* Evaluation of patient safety competencies is a key element in increasing quality and safe care in general. Integrating sociocultural aspects of patient safety into the nursing curriculum is crucial. The main focus should be on patient safety culture education.

Keywords: competence, nursing education, nursing student, patient safety.

Introduction

Patient safety (PS) is an essential attribute of healthcare. The World Health Organization (World Health Organization [WHO], 2021) defines this safety as *"a framework of organized activities that creates cultures, processes, procedures, behaviors, technologies, and environments in health care that consistently and sustainably lower risks, reduce the occurrence of avoidable harm, make error less likely, and reduce impact of harm when it does occur"*. Patient safety has become a highly topical issue in recent years, with up to 12% of patients admitted to hospital in EU member states put at risk by healthcare delivery (Official Journal of the European Union, 2009). Given the global threat to PS, the incorporation of the issue into the education of healthcare professionals is increasingly debated, with regulation tending to be implemented primarily in the medical field (Kirwan et al., 2019).

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As nurses are the largest group of healthcare professionals (estimated at 27.9 million worldwide; Buchan et al., 2022), they play a vital role in PS (Feng et al., 2008; Stavrianopoulos, 2012). Nurses' close relationship with patients (Listyowardojo et al., 2012), their key role in the implementation of effective PS strategies (Slater et al., 2012), the implementation of changes and strengthening of best practices in the context of increasing PS (Vaismoradi et al., 2011), and the pitfalls in this first line of defense (DeBourgh, 2012) have been emphasized over the years. The education of nurses in this issue is as important as education in medicine, yet it is under-addressed within European countries (Kirwan et al., 2019). In the competency framework published by the European Federation of Nurses (EFN), it is required that, in terms of competencies in quality of care and PS, future nurses should be able to: create and maintain a safe environment for care delivery by using quality assurance and risk management strategies; use appropriate tools to assess and identify actual and potential risks; and be able to register safety concerns and communicate them to relevant authorities

(European Federation of Nurses Associations, 2015). However, a study conducted as part of the RANCARE project in 27 European countries revealed that PS education is often not specified in nursing curricula. In addition, while instrumental procedures such as infection control, hand washing, medication administration, transfusion (Kirwan et al., 2019) or fall prevention (Lee et al., 2020), or aspects of occupational health safety (Boucaut & Cusack, 2016) are taught in the context of PS, human factors and sociocultural aspects of safety are not taught or are hidden in the curriculum. As a result, students do not necessarily acquire these aspects and, consequently, their competencies in relation to the provision of safe care may not be adequately developed.

In terms of measuring PS, several tools have been validated internationally (Bartoníčková et al., 2022). However, the most widely used for the assessment of PS competencies is the Canadian Health Professional Education in Patient Safety Survey (H-PEPSS; Ginsburg et al., 2012). Although the instrument is intended for all student healthcare professionals, its utility in nursing has increased over the past decade (e.g., Bressan et al., 2016; Chen et al., 2019; Taskiran et al., 2020). Given the importance of measuring nursing students' competencies internationally, the aim of our study was to investigate how nursing students in the Czech Republic assess their competencies in PS.

Aim

The study aimed to investigate how nursing students in the Czech Republic assess their competency in PS.

Methods

Design

We adopted a pilot study design. The study was carried out according to the STROBE checklist.

Sample

All universities (n = 16) that provide education in bachelor and master nursing programs were invited to participate in the study. After permission had been granted by the heads of nursing departments, nursing students were selected using the purposive sampling method. Students were included if they had completed at least one semester of clinical practice and if they provided informed consent. Contrarily, students were excluded if they were on maternity leave or were on an Erasmus exchange study during data collection. The sample size was calculated based on the number of nursing students in the Czech Republic. The most recent statistical results available are from 2016, with 3,456 students attending undergraduate studies and 352 students attending graduate studies at that time (Institute of Health Information and Statistics of the Czech Republic, 2017). Therefore, based on this, the minimum sample size should be at least 382 respondents. However, to conduct the pilot study, the minimum sample should be between 25% to 50% of the sample size of the main study (Tseng & Sim, 2021). Thus, for the purposes of our pilot study, a minimum of 96 respondents was calculated based on a minimum of 25%.

Data collection

The study was carried out between January and April 2023. The competencies of nursing students in PS were evaluated using the H-PEPSS (Ginsburg et al., 2012). Consent for the use of the instrument and its linguistic validation in the Czech context were obtained from Professor Ginsburg in June 2021 via email. The instrument was linguistically validated in Czech using the validation process of Wild et al. (2005). The instrument was tested in accordance with all the steps necessary to ensure cultural and linguistic equivalence. Apart from the process itself (translation into the target language and back-translation by two independent translators; comparison of translated versions and their combination into a single version; and the creation of the final version of the tool based on the consensus of the research team), face validity assessment was performed by six doctoral students in nursing from a faculty in the Czech Republic. The questionnaire had to comply with the following criteria: clarity, simplicity and logicality, and arrangement of items. Incomprehensible items were modified as recommended. According to the assessment, the H-PEPSS was finally considered suitable for measuring PS competencies in nursing students.

The H-PEPSS is divided into three parts, containing a total of 37 elements. The time to complete it is estimated to be approximately 12 minutes. The first part of the tool includes four items measuring clinical aspects of safety related to safe clinical practice in general, hand hygiene, infection control, and safe medication practices. The core of the instrument consists of 23 items grouped into six dimensions. Work in teams with other healthcare professionals (six items), Communicating effectively (three items), Managing safety risks (three items), Understanding human and environmental factors (three items), Recognize and respond to reduce harm (four items) and Culture of safety (four items). Both sections of the instrument are divided into two parts, which

separately assess what students have learned in the academic setting and what they have learned in the clinical setting. Each item in the core instrument begins with the statement *"I feel confident in what I have learned about..."*. The second part of the instrument contains seven items related to broader PS issues. The third part consists of three items that address how comfortable respondents feel when speaking up about PS. A 5-point Likert scale (1 – completely disagree, 2 – disagree, 3 – do not know, 4 – agree, 5 – completely agree) is used to provide evaluation. The average score is calculated in the first part for each dimension of the academic and clinical assessments separately, and the overall scores of these dimensions can then be used to compare the two sections. In the initial test of the instrument, the original version was demonstrated to have adequate psychometric properties, with high internal consistency for each dimension ($\alpha = 0.81–0.85$; Ginsburg et al., 2012). In the Czech version of the instrument, the Cronbach alpha for the academic setting was 0.95 and for the clinical setting 0.93.

Sociodemographic data included in the original version of the H-PEPSS instrument includes items related to the study program, year of study, previous education, age, gender, and previous experience with PS education (Ginsburg et al., 2012). Based on a review of the literature, these data were supplemented with additional data, as follows: educational program, current clinical placement, study form, practice supervision, and previous nursing care experience (without relation to clinical practice during study).

After written consent had been obtained from the heads of nursing faculties, and the benefits and potential risks had been explained to the respondents (with emphasis on the anonymity of the findings), a link was sent to the heads, which they were requested to distribute to the target group of respondents. Data were collected using a web-based Google Forms® platform. The steps to complete the data were explained in the Introduction section, including a statement about voluntary, anonymous, and confidential participation. Students were also asked to give their consent to participate in the study and to indicate whether they had completed at least one semester of clinical practice. If these requests were met, the students were directed to complete data on their self-reported competencies in PS.

Data analysis

Data were analyzed in SPSS 25.0 statistical software using descriptive and inferential statistics. The missing data ranged from 0.1 to 0.3%, indicating high acceptability of H-PEPSS. Questionnaires that contained missing data were excluded from the subsequent analysis (n = 6). Only fully completed questionnaires were used in further data analysis.

The Kolmogorov-Smirnov test was used to verify the normal distribution of the data and, based on the result ($p \leq 0.05$), nonparametric tests (Mann-Whitney and Kruskal-Wallis) were used to test differences between dimensions regarding PS competencies and sociodemographic data, for both academic and clinical settings. Differences in competency scores of nursing students in academic and clinical settings were tested using the paired samples t-test. The t-test was chosen since it uses the means of the two samples, which at a higher sample size have an approximately normal distribution due to the central limit theorem. The variance of these samples was verified before using the F test.

Results

The questionnaire was completed by 153 nursing students from seven nursing faculties in the Czech Republic. Eight students indicated that they had not completed at least one semester of clinical practice in a hospital and, therefore, were excluded from the analysis. In total, 145 nursing students were included in this study. Sample characteristics are reported in Table 1.

Evaluation of self-reported dimensions of PS competencies by nursing students

Self-reported PS competencies of nursing students in the Czech Republic are described in Table 2. In the academic setting, these students were most confident in what they learned about Managing safety risks (73.33%), whereas in the clinical setting, they were more confident in their knowledge of Recognize and respond to reduce harm (72.40%). In the academic setting, nursing students were less confident in their knowledge of Safety culture (56.20%), and in the clinical setting, with their knowledge of the Communicating effectively dimension (57.00%). Across the two types of settings, the Managing safety risks dimension received the highest rating ($M = 3.85$) and the Culture of safety dimension received the lowest ($M = 3.54$). The t-test for the paired samples showed that there were statistically significant higher mean scores in the clinical setting with respect to Recognize and respond to reduce harm ($p = 0.000$), and Culture of safety ($p = 0.040$) than in the academic setting.

Table 1 Sample characteristics

Variable			n = 145 (%)
General			
Age	< 21 years		45 (31.0)
	21–25 years		86 (59.3)
	26–30 years		7 (4.8)
	31–40 years		1 (0.7)
	41–50 years		5 (3.4)
	> 50 years		1 (0.7)
Gender	women		136 (93.8)
	men		9 (6.2)
Educational			
Study program	general nursing		128 (85.5)
	pediatric nursing		7 (5.5)
	other		13 (9.0)
Educational program	bachelor's degree		134 (92.4)
	master's degree		11 (7.6)
Form of study	full-time		123 (84.8)
	part-time		22 (15.2)
Year of study	bachelor's degree	1st	51 (38.1)
		2nd	42 (31.3)
		3rd	41 (30.6)
	master's degree	1st	8 (72.7)
		2nd	3 (27.3)
Length of educational program	1		1 (0.7)
	2		11 (7.6)
	3		133 (91.7)
Previous education	high school education		132 (91.0)
	higher vocational school		1 (0.7)
	bachelor's degree		12 (8.3)
	master's degree		0 (0.0)
Prior experience in PS education	yes		11 (9.4)
	no		106 (90.6)
Clinical			
Current clinical placement	outpatient care: day clinics, primary care and rehabilitation		7 (4.8)
	inpatient medical-surgical care		82 (56.6)
	critical-special services, intensive care, accident and emergency, and the OR*		21 (14.5)
	mother-child inpatient care: maternity and pediatrics, obstetrics, gynecology		16 (11.0)
	residential care units, elderly homes		10 (6.9)
	other areas		9 (6.2)
Supervision of practice	lecturer or teacher (nursing faculty employee)		13 (9.0)
	mentor with specific training in mentoring		46 (31.7)
	nurse without specific training in mentoring		86 (59.3)
Previous experience in providing nursing care	yes		64 (44.1)
	no		81 (55.9)

** OR – operating room*

A statistically significant higher score was achieved in the academic setting for Managing safety risks ($p = 0.033$). With regard to factors affecting nursing students' self-reported competencies in PS dimensions, statistically significant differences were found concerning several variables (Table 3).

Clinical safety, broader PS issues, and comfort when speaking up about PS

In terms of the evaluation of the four general aspects of clinical practice, nursing students reported that they were more confident in both settings regarding Hand hygiene (90.3%), followed by Safe mediation practices (85.9%), Safe clinical practice in general (82.1%) and Infection control (82.05%). For broader PS issues, the most highly rated clinical aspects of PS (e.g., hand hygiene, transferring patients, medication safety) were well covered in their study program (83.5%), the lowest rated was consistency in how PS issues were handled by different preceptors in the clinical setting (40.7%). Regarding comfort when speaking up about PS, only 17.2% of nursing students felt comfortable about approaching a person they saw engaging in unsafe care practice in the clinical setting. Alarmingly, more than half of the students stated that reporting a PS problem would result in negative repercussions for the person reporting it (Table 4).

Table 2 Dimensions of self-reported PS competencies by nursing students (n = 145)

Self-reported PS dimensions	Academic setting		Clinical setting		Comparison between academic and clinical settings		
	M ± SD	% of positive responses	M ± SD	% of positive responses	Paired t-test		
					t	p	95 % CI
Work in teams with other health professionals	3.67 ± 0.77	62.90	3.70 ± 0.77	65.63	-0.605	0.546	-0.15– 0.08
Communicating effectively	3.58 ± 0.80	58.43	3.53 ± 0.88	57.00	0.809	0.420	-0.07–0.16
Managing safety risks	3.91 ± 0.75	73.33	3.79 ± 0.79	66.47	2.158	0.033*	0.10–0.23
Understanding human and environmental factors	3.66 ± 0.75	62.53	3.76 ± 0.74	68.23	-1.968	0.051	-0.21–0.00
Recognize and respond to reduce harm	3.63 ± 0.75	62.05	3.84 ± 0.71	72.40	-4.151	0.000**	-0.31–0.11
Culture of safety	3.49 ± 0.88	56.20	3.60 ± 0.78	59.33	-2.071	0.040*	-0.22–0.01

**p ≥ 0.05; **p ≥ 0.01; % of positive responses – Agree / Strongly Agree*

Table 3 Differences in the evaluation dimensions of self-reported PS competencies based on sociodemographic variables

Self-reported PS dimensions		General			Educational							Clinical	
		Age	Gender	Study program	Educational program	Form of study	Year of study	Length of educational program	Previous education	Prior experience of PS education	Current clinical placement	Clinical practice management / Supervision	Previous experience in providing nursing care
Work in teams with other health professionals	AS	0.020*	0.749	0.314	0.711	0.006**	0.349	0.638	0.308	0.077	0.602	0.056	0.282
	CS	0.283	0.745	0.821	0.534	0.037*	0.695	0.279	0.220	0.000**	0.006**	0.200	0.024*
Communicating effectively	AS	0.122	0.185	0.066	0.673	0.088	0.112	0.326	0.188	0.074	0.150	0.083	0.010*
	CS	0.049*	0.931	0.518	0.296	0.041*	0.293	0.158	0.197	0.021*	0.048*	0.219	0.001**
Managing safety risks	AS	0.730	0.249	0.516	0.841	0.237	0.511	0.771	0.579	0.018*	0.581	0.148	0.272
	CS	0.206	0.709	0.724	0.566	0.738	0.993	0.243	0.197	0.010*	0.012*	0.201	0.033*
Understanding human and environmental factors	AS	0.067	0.428	0.702	0.797	0.003**	0.590	0.475	0.234	0.020*	0.005**	0.277	0.404
	CS	0.134	0.706	0.951	0.597	0.022*	0.673	0.538	0.230	0.003**	0.000**	0.710	0.120
Recognize and respond to reduce harm	AS	0.038*	0.714	0.415	0.833	0.004**	0.115	0.418	0.231	0.043*	0.123	0.464	0.542
	CS	0.072	0.171	0.816	0.976	0.013*	0.506	0.260	0.230	0.031*	0.024*	0.083	0.152
Culture of safety	AS	0.091	0.827	0.510	0.290	0.007**	0.328	0.302	0.070	0.006**	0.012*	0.017*	0.123
	CS	0.076	0.422	0.041*	0.066	0.032*	0.826	0.052	0.043*	0.003**	0.034*	0.213	0.021*

**p > 0.05; **p > 0.01; AS – academic setting; CS – clinical setting*

Table 4 Other aspects of PS perceived by nursing students (n = 145)

		M ±SD	% of positive responses
Clinical safety			
Safe clinical practice in general	academic setting	4.04 ± 0.87	82.8
	clinical setting	4.06 ± 0.88	81.4
Hand hygiene	academic setting	4.48 ± 0.83	90.3
	clinical setting	4.33 ± 0.90	90.3
Infection control	academic setting	4.11 ± 0.86	84.1
	clinical setting	4.03 ± 0.97	80.0
Safe medication practices	academic setting	4.36 ± 0.88	88.3
	clinical setting	4.20 ± 0.98	83.5
How are broader PS issues addressed in health professional education?			
As a student, the scope of what was 'safe' for me to do in the practice setting was very clear to me.		3.76 ± 0.95	72.4
There is consistency in how patient safety issues were dealt with by different preceptors in the clinical setting.		3.26 ± 0.97	40.7
I had sufficient opportunity to learn and interact with members of interdisciplinary teams.		3.43 ± 1.14	58.7
I gained a solid understanding that reporting adverse events and close calls can lead to change and can reduce reoccurrence of events.		3.90 ±1.03	77.3
Patient safety was well integrated into the overall program.		3.67 ± 0.89	66.9
Clinical aspects of patient safety (e.g., hand hygiene, transferring patients, medication safety) were well covered in our program.		4.10 ± 0.89	83.5
"System" aspects of patient safety were well covered in our program (e.g., aspects of the organization, management, or the work environment including policies, resources, communication and other processes).		3.36 ± 0.97	48.9
Comfort speaking up about patient safety			
In clinical settings, discussion around adverse events focuses mainly on system-related issues, rather than focusing on the individual(s) most responsible for the event.		3.36 ± 0.90	50.3
In clinical settings, reporting a patient safety problem will result in negative repercussions for the person reporting it.		3.36 ± 1.00	53.1
If I see someone engaging in unsafe care practice in the clinical setting, I feel safe to approach them.		2.39 ± 1.17	17.2

% of positive responses – Agree / Strongly Agree

Discussion

This is the first study in the Czech Republic to use the H-PEPSS to assess the competencies of nursing students in PS. The purpose of the study was to evaluate the competencies of nursing students in the Czech Republic. The study examined the differences between the assessment of PS dimensions in academic and clinical settings and revealed associations with sociodemographic data.

The H-PEPSS tends to be the most commonly used instrument in terms of the evaluation of PS competencies by nursing students in quantitative studies in both academic and clinical settings. Its reliability in terms of internal consistency has been demonstrated, for example, in the USA ($\alpha = 0.96$; Weatherford & Viverios, 2015), China (for the academic setting $\alpha = 0.95$; for the clinical setting $\alpha = 0.96$; Chen et al., 2019), and Italy (for the academic setting $\alpha = 0.94$; for the clinical setting domain $\alpha = 0.94$; Stevanin et al., 2015), which is comparable to our results.

In terms of the general aspects of clinical safety, it can be argued that nursing students in the Czech Republic rated their competencies relatively highly, which compares to a number of international studies (e.g. Lukewich et al., 2015; Rebeschi, 2020; Suliman, 2019; Usher et al., 2017). Within each dimension of sociocultural aspects of PS, Managing safety risks was the most highly rated dimension, which was also the case among nursing students in China (Huang et al., 2020), while in other countries, it was Communicating effectively (Stevanin et al., 2015; Sümen et al., 2022). In a purely clinical setting, Recognize and respond to reduce harm was the most highly rated dimension (Alquwez et al., 2019), similarly to our study, along with Culture of Safety (Alquwez et al., 2019), which, however, achieved low scores in the Czech Republic. In fact, this dimension received the lowest ratings by nursing students in the Czech Republic in both types of settings, which was also the case in Canada (Raymond et al., 2016). In international studies, Recognize and respond to reduce harm is most frequently reported as a problematic dimension (e.g., Rebeschi, 2020; Suliman, 2019; Usher et al., 2017). Other negatively-rated dimensions have included Understanding human and environmental factors (e.g., Huang et al., 2020; Usher et al., 2017) and Work in teams (e.g. Dimitriadou et al., 2021; Raymond et al., 2016). In clinical settings, the Communicating effectively dimension tends to be the most problematic (e.g., Alquwez et al., 2019;

Huang et al., 2020), which our study did not refute. Thus, it can be argued that this area may also pose problems for students in practice.

In terms of statistically significant differences in the evaluation of PS by nursing students within academic and clinical settings, such differences were identified in three dimensions overall. In two cases, the students rated their competence better in the clinical setting. Better scores in the Recognize and respond to reduce harm dimension were observed in Canada as they were in the Czech Republic (VanDenKerkhof et al., 2017). In contrast, the dimension of Managing safety risks tends to be better rated in the clinical setting (e.g., Duhn et al., 2012; Rebeschi, 2020), yet in our research the opposite was indicated, and students rated this dimension better in the academic setting. Most studies, however, report overall higher scores on the acquisition of PS competencies in academic settings compared to our results (e.g., Dimitriadou et al., 2021; Huang et al., 2020; Suliman, 2019).

Regarding associations with general sociodemographic data, internationally, these have included year of study (e.g. Lukewich et al., 2015; Stevanin et al., 2015; Usher et al., 2017), gender (e.g. Alquwez et al., 2019; Sümen et al., 2022), and country / region of origin (e.g., Dimitriadou et al., 2021; Huang et al., 2020). In our study, agreement with these data was not demonstrated. The age of the nursing students was the predominant factor; associations with other general data have not yet been established in the Czech setting. In terms of educational sociodemographic variables, a statistically significant relationship was demonstrated with the individual dimensions of self-reported competencies, particularly regarding form of study and previous education. However, the most significant associations were revealed in the context of prior experience of PS education, as confirmed by many international studies demonstrating the effect of education on PS ratings overall (Lee & Dahinten, 2023; Torkaman et al., 2022). In terms of clinical factors, current clinical placement and previous experience in providing nursing care were found to have the most significant associations. Supervision of clinical practice only influenced evaluation of Culture of safety in the academic setting. The impact of supervision on the evaluation of patient safety culture in the Czech environment during the Covid-19 pandemic was also reported in the study by Bartoníčková et al. (2023), using a different instrument. Several international studies have indicated an impact on competence assessment with regard to experience of adverse events (e.g. Huang et al., 2020; Stevanin et al., 2015; Sümen et al., 2022).

With regard to how broader PS issues are addressed in healthcare professional education in the Czech Republic, the clinical aspects of PS were well covered in the study program. Meanwhile, internationally, more students reported that the scope of what was “safe” was clear to them (Huang et al., 2020; Raymond et al., 2016; Usher et al., 2017). Low scores for the item regarding consistency in how PS issues were handled by different preceptors in the clinical setting (e.g. Huang et al., 2020; Usher et al., 2017) were also identified in our study. In common with Czech nursing students, low scores were given in the comfort when speaking up domain for the item regarding how comfortable students felt about approaching a person they saw engaging in unsafe care practices in the clinical setting (e.g., Usher et al., 2017; VanDenKerkhof et al., 2017).

With increasing concerns about PS in healthcare worldwide, nursing education in PS can be considered a key element to include in nursing curricula (Stevanin et al., 2015), which is also evidenced in our research, especially regarding evaluation within the academic setting.

The study has several limitations. First, it is only a pilot study that should be expanded in the future. The data were collected from only 145 nursing students; thus, the results cannot be generalized. Secondly, the H-PEPSS has not yet been adequately tested in terms of psychometric properties in Czech practice. In further analysis, we recommend verifying the structure of the instrument through confirmatory factor analysis and, possibly, conducting content validity of the instrument, given that only face validity was used as part of the validity verification in the methodological procedure. Another important aspect is that students use the H-PEPSS to assess their self-perceived competencies in PS, which creates a potential for bias and socially desirable responses. A final limitation is that the students were at different grade levels; first-year students of the bachelor degree program in general nursing were also included (after completion of clinical practice), which could potentially have influenced the results.

Conclusion

Considering the relevance of the issue worldwide, the first study conducted in the Czech Republic to evaluate the competencies of nursing students provided important results. Czech nursing students are most confident in their competence

of Managing safety risks and least confident about Culture of safety. Statistically significant differences were found in all three dimensions, with students rating their acquisition of competence in PS more highly in the clinical setting, indicating the absence of sociocultural teaching aspects in the academic setting. In view of these results, but also given that the topic of PS is still hidden in nursing curricula in Europe and that important sociocultural aspects of safety are often not sufficiently implemented in the curriculum, it is necessary to pay adequate attention to this topic, especially in an academic context. Factors influencing nursing students' self-reported PS competencies were also identified. The greatest impact was identified in relation to prior experience with PS education, in all dimensions. The current clinical placement, as well as the form of study and previous experience in providing nursing care have a significant effect on evaluations. Further factors need to be identified and effective interventions should be implemented thereafter. By increasing the competency of nursing students in PS, overall patient safety can be increased. Education is a key element in this process. Meanwhile more research is needed in this area.

Ethical aspects and conflict of interest

The study was approved by the institutional board review (UPOL-18644/FZV-2023). The authors declare no conflict of interest.

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Author contributions

Conception and design (DB, DK), data collection (KB, MB), data analysis and interpretation (DB, DK), manuscript draft (DB, DK, LM), critical review of the manuscript (DB, DK, LM, KŽ), final approval of the manuscript (DB, DK, LM, KB, MB, KŽ).

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