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Assessing Patient Safety Culture: Validation of the *Veterans Health Aministration Patient Safety Culture Survey* among Romanian Nurses

Doina Carmen MAZILU[1,2+], Claudia Elena DOBRE[1,2], Corina GAGIU[1,3], Daniela STAN[1,4], Ilona VOICU[1], Viorica NEDELCU[1,2+*]

[1] The Order of Nurses, Midwives and Medical Assistants in Romania - Bucharest Branch; JBI Romanian Centre for Nursing Research, Avrig Str., no. 12, 021575, Bucharest, Romania.
[2] "Carol Davila" University of Medicine and Pharmacy, Eroii Sanitari Blvd, no. 8, 050474 Bucharest, Romania.
[3] Clinical Hospital of Psychiatry "Prof. dr. Alexandru Obregia" - Berceni Road, no. 10, 041914, Bucharest, Romania.
[4] Clinical Hospital of Obstetrics and Gynecology "Prof. dr. Panait Sarbu", Giulesti Road, no. 5, 060251, Bucharest, Romania.
E-mails: mazilu.carmen@oammrbuc.ro; claudia.dobre@umfcd.ro; corizah@yahoo.com; daniela_stan07@yahoo.com; ilona.voicu@oammrbuc.ro; viorica.nedelcu@oammrbuc.ro
[+] Equal contribution co-first authors.

* Author to whom correspondence should be addressed; Tel.: +40 723 769 065; viorica.nedelcu@oammrbuc.ro

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Abstract
Patient safety culture is essential for improving healthcare quality and reducing medical errors. In Romania, systematic assessment of this culture remains limited, particularly among nurses, who play a key role in preventing incidents. This study aimed to culturally adapt and psychometrically validate the Romanian version of the *Veterans Health Administration Patient Safety Culture Survey* (VHA-PSCS). The process included forward and backward translation, synthesis, and expert review. Validation was conducted on a sample of 352 nurses from various healthcare settings. Construct validity was assessed through exploratory and confirmatory factor analyses, while reliability was examined using Cronbach's alpha coefficients. Factor analysis supported a three-factor structure explaining 60.57% of the total variance: (1) *Risk Identification and Error Management*, (2) *Teamwork Cohesion and Engagement*, and (3) *Manager Trust and Communication*. Confirmatory analysis indicated good model fit (CFI = 0.923; TLI = 0.911; RMSEA = 0.074). The instrument demonstrated excellent reliability (overall $\alpha = 0.948$). A 3-factor (19-item) Romanian version of the VHA-PSCS was successfully validated and can be used to measure patient safety culture among nurses, as well as in future research studies.

Keywords: Patient safety culture; Validation; Romanian nurses; Psychometrics

Introduction

The General Context

Patient safety culture is a cornerstone for any value-based and patient-oriented healthcare system, in general, and for any nursing department, in particular. The concept proved its importance especially during the pandemic period generated by SARS-COV-2, when the healthcare systems were forced to face new and serious challenges, both in terms of the act of care itself and incident reporting, as well as for work climate or healthcare personnel capacities to learn from own experiences, as studies underlined [1-3].

Even though an unanimity regarding the definition of patient safety culture does not exist, a systematic review conducted on studies published between January 2008 and May 2020, based on quantitative, qualitative, or mixed

methods [4], stressed out that most of researches refer to some common dimensions of this construct, such as: *leadership*, *teamwork and collaboration*, *perceptions of safety*, *reporting and just culture* or *prioritisation of safety*.

As in any other organizational culture case, improvement of patient safety culture necessitates long-term and systematic measures to monitor progress and guide strategic decision-making, based on regular assessments through validated instruments. But it is equally important to recognise that patient safety culture is one element not disconnected from quality management and clinical governance: its quality may directly impact outcomes, patient satisfaction, organisational performance and health of patients, as well as of healthcare practitioners.

The Romanian Healthcare Context

The Romanian healthcare system has numerous structural, organisational, and cultural challenges that make the implementation of mechanisms to enhance safety for its patients a pressing priority. Despite significant achievements in Romania through legislative changes and the accreditation of hospitals, limitations regarding the safety standards, adverse event reporting, and proactive, safety-focused organizational culture persist [5]. A systematic assessment of patient safety culture is an essential prerequisite for identifying risks, guiding targeted interventions, and sustaining measurable improvements in healthcare quality and patient outcomes [6,7]. Such assessments detect obstacles to reporting incidents, form a basis for constructing non-punitive learning environments and direct specialized interventions to improve healthcare quality as well safety. These requirements have been reinforced by laws in force and international standards, plus the operational realities in today's Romanian healthcare institutions. The absence of a strong patient safety culture allows errors and unsafe practices to persist, negatively affecting patient outcomes and healthcare performance. Evidence shows that weak safety cultures are associated with higher rates of medical errors, increased staff stress and burnout, and poorer organizational climate, while stronger cultures support learning, communication, and safer care delivery [8,9].

Nursing professionals have an important role in establishing a patient safety culture in Romania and overseas. Because nurses are the practitioners with the most direct contact with patients, they are frequently the first to find clinical risks. By adhering to clinical practices, reporting incidents, and engaging in organizational learning processes, nurses play a major role in preventing adverse events [10]. In addition, by educating the patient and working with multidisciplinary teams, they contribute to the development of a shared value system and behaviours that support a safe clinical environment [11].

For a successful evaluation of patient safety culture among nurses in Romania, a brief, easily understandable and psychometrically validated questionnaire that can be implemented in high-demand healthcare settings is required. Shorter questionnaires have better response rates [12], reduce or prevent increases in respondents' fatigue levels, and thereby enhance data quality [13]. Furthermore, translation and cultural adaptation guarantee that the instrument retains linguistic and contextual characteristics, enabling an accurate accounting of perceptions and comparative analysis across units and international studies.

The Veterans Health Administration Patient Safety Culture Survey (VHA-PSCS) is a good construct, valid and reliable [14]. The brevity of the instrument and the fact that papers suggest implementing the VHA-PSCS across diverse healthcare environments could make a valuable contribution to knowledge about patient safety culture and its impact on healthcare quality [15]. Considering its qualities, the aim of our study was to adapt and validate the Veterans Health Administration Patient Safety Culture Survey (VHA-PSCS) to Romanian culture and environment.

Materials and Methods

The Veterans Health Administration Patient Safety Culture Survey (VHA-PSCS) contains a list of 20 items, grouped in four subscales: Error Transparency and Mitigation - 3 items, Risk Identification and Just Culture - 4 items, Teamwork Cohesion and Engagement -7 items, and Supervisor Trust and Communication - 6 items [14].

Eligible Participants

The validation of the Romanian version of the VHA-PSCS was conducted on nurses participating in the 16th Annual Conference of the Bucharest Branch of the Order of Nurses, Midwives and Medical Assistants in Romania

(OAMGMAMR), 16-22 May 2025, and the eight series of the Summer School organized by the Bucharest Branch of the OAMGMAMR between July and September 2025. Participants in professional meetings represent a diverse population from various hospital departments (e.g., medical, surgical, anaesthesia and intensive care units (AICUs), emergency units, operating theatres, etc.) and medical units (dental offices, family medicine, school offices, etc.).

Workflow of the Process

The translation and cultural adaptation of the VHA-PSCS was performed according to international cross-cultural adaptation standards regarding self-report measures [16,17]. To achieve semantic and conceptual equivalence of the original study with the Romanian version and to ensure cultural relevance for the target population, the process implied three main steps:

a) Forward translation and synthesis. Two independent bilingual translators translated the original English instrument into Romanian. The translators and the research team then compared the versions, resolved discrepancies, and produced a single synthesized version, ensuring accuracy, conceptual clarity, and linguistic consistency.
b) Back-translation. The synthesized Romanian version was independently back-translated into English by two additional translators who were blinded to the original instrument. This step allowed for the verification of semantic fidelity and the identification of potential conceptual deviations. The back-translation was compared with the original version to detect inconsistencies or subtle shifts in meaning.
c) Expert review. The research team conducted a comprehensive review of all versions (original, translated, and back-translated). Discrepancies were resolved through group discussion, focusing on achieving both linguistic accuracy and cultural appropriateness. Particular attention was paid to clinical terminology, tone, and phrasing to ensure the instrument was easily understood by Romanian nurses while preserving the intent of the original items.

The validation of the Romanian version of the scale involved the assessment of:

a) Construct validity*,* examined through a two-stage psychometric approach:
   - Exploratory Factor Analysis (EFA), performed using the *principal axis factoring* extraction method and *promax* rotation (SPSS, v. 31.0, [18]);
   - Confirmatory Factor Analysis (CFA), conducted using AMOS for SPSS (v. 31) to test the three-factor structure derived from EFA. Factor retention decisions were guided by commonly recommended psychometric and factor-analytic criteria [19] to ensure that the extracted structure was both statistically meaningful and theoretically interpretable. Specifically, factors were retained when they met several complementary conditions: eigenvalues greater than 1.0, visual inspection of the scree plot, adequate total variance explained, and item factor loadings of at least 0.40.
b) Model fit was evaluated using the Comparative Fit Index (CFI), Tucker–Lewis Index (TLI), and Root Mean Square Error of Approximation (RMSEA).
c) Convergent validity, examined by calculating, for each factor:
   - Average Variance Extracted (AVE)
   - Composite Reliability (CR).

Average Variance Extracted (AVE) measures how much variance of the indicators is explained by the latent construct and CR measures the internal consistency of the items associated with a construct. The calculation was performed using Excel, based on the data provided by the factor analysis (the loading coefficients for the items that make up the 3 factors), using the following formulas (simplified after [20]):

$$AVE = sum\ \lambda^2/n$$

where **λ** represents the loading coefficients of the items, and n, the number of items in the factor composition, and

$$CR = (sum\ \lambda)^2/[(sum\ \lambda)^2 + sum\ \varepsilon]$$

where **ε** represents the error variance and is calculated as 1- λ.

d) Discriminant validity, assessed by examining the inter-factor correlation matrix, and
e) Reliability. In addition to CR, Cronbach's alpha coefficients for each factor and for the entire scale where calculated, to have a supplementary conformation that the items reflect the same attribute. Take a value from 0 to 1; the level 0.70 is most frequently considered the minimum acceptable threshold.

The statistical analysis for the validation study was accomplished in October 2025.

Results

Description of the Participants

The validation of the Romanian version of the VHA-PSCS was conducted on a sample of 352 nurses: 114 who participated to the 16th Annual Conference of the Bucharest Branch of the Order of Nurses, Midwives and Medical Assistants in Romania (OAMGMAMR), 16-22 May 2025, and 238 participants to the eight series of the Summer School organized by the Bucharest Branch of the OAMGMAMR between July and September 2025. Most participants were female, with postgraduate education, ages between 41 and 50, and with over 20 years of professional experience (Table 1). A detailed participants 'demographic and professional characteristics is presented in Table 1.

Table 1. Sociodemographic characteristics of the validation sample

Characteristic	Number (%)
Sex	
Female	333 (94.6)
Male	19 (5.4)
Education	
College	7 (2.0)
Postgraduate education	200 (56.8)
Bachelor's degree	107 (30.4)
Master's degree	34 (9.7)
PhD	4 (1.1)
Age class, years	
20 – 30	19 (5.4)
31 – 40	42 (11.9)
41 – 50	158 (44.9)
51 -60	129 (36.7)
Over 60	4 (1.1)
Working in	
Hospital – Medical wards	66 (18.7)
Hospital – Surgical wards	56 (15.9)
Hospital – AICUs	56 (15.9)
Hospital – Emergency Units	8 (2.3)
Hospital – Operating Theatres	37 (10.5)
Hospital – Outpatient/Day Hospital	15 (4.3)
Hospital – Other wards	77 (21.9)
Other (e.g., dental offices, family medicine, school offices etc.)	37 (10.5)
Professional experience	
Less than 5 years	28 (7.8)
5 – 10 years	45 (12.8)
11 – 15 years	29 (8.2)
16 – 20 years	43 (12.2)
More than 20 years	207 (58.8)

Translation and Cultural Adaptation Process

The results of the translation and cultural adaptation process are presented in Table 2, which illustrates the equivalence between the original and Romanian versions following translation and back-translation, for each item across the four subscales.

Table 2. The two versions of the scale (original and Romanian)

Item	Original version	Item	Romanian version (after back-translation)
	Error Transparency and Mitigation		**Error transparency and Mitigation**
1	Mistakes have led to positive changes here.	1	Mistakes or errors that have occurred in my workplace have led to positive changes.
2	We are given feedback about changes put into place based on event reports.	2	In my workplace, feedback is provided on changes put into place based on reports of errors that have occurred.
3	We discuss ways to prevent errors from happening again in this unit.	3	In my workplace, ways to prevent errors from happening again are discussed.
	Risk Identification and Just Culture		**Risk Identification and Just Culture**
4	We take the time to identify and assess risks to patient safety.	4	In my workplace, time is allocated to identify and assess risks to patient safety.
5	I will not be punished if I report a patient safety problem or unsafe act.	5	I will not be punished for reporting a patient safety problem or unsafe procedure.
6	Safety education and training provided to me are enough to accomplish my job safely.	6	The safety education and training I have been provided is sufficient to perform my job duties safely.
7	Staff will freely speak up if they see something that may negatively affect patient care.	7	Staff are free to speak up if they observe something that could negatively affect patient care.
	Teamwork Cohesion and Engagement		**Teamwork Cohesion and Engagement**
8	Employees in my workgroup do what is right even if they feel it puts them at risk.	8	My colleagues on my teamwork do what is right, even if they feel it puts them at risk.
9	Members in my workgroup are able to bring up problems and tough issues.	9	My colleagues on my teamwork can bring up problems and difficult issues.
10	People support one another in my unit.	10	My colleagues support each other when needed.
11	People treat each other with respect in my workgroup.	11	My colleagues on my teamwork treat each other with respect.
12	The people I work with cooperate to get the job done.	12	My colleagues cooperate to get the job done.
13	Disputes or conflicts are resolved fairly in my workgroup.	13	Disputes or conflicts are resolved fairly in my teamwork.
14	My workgroup members communicate well with each other.	14	My teamwork members communicate well with each other.
	Supervisor Trust and Communication		**Manager Trust and Communication**
15	Supervisors set challenging and yet attainable performance goals for my workgroup.	15	My managers have set ambitious, yet achievable, performance goals for my work team.
16	My direct supervisor communicates the reasoning behind decisions that have an impact on my work.	16	My direct manager communicates the reasons behind decisions that impact on my work.
17	My supervisor listens to what I have to say.	17	My direct manager listens to what I have to say.
18	My supervisor treats me with respect.	18	My direct manager treats me with respect.
19	I have trust and confidence in my supervisor.	19	I have trust in my direct manager.
20	My supervisor does not engage in favoritism.	20	My direct manager does not engage in favouritism.

Construct Validity

The suitability of the data for factor analysis was first assessed using the Kaiser–Meyer–Olkin (KMO) index and Bartlett's Test of Sphericity. The KMO value of 0.936 indicated excellent sampling adequacy, while Bartlett's test ($\chi^2(190) = 4809.20, p < 0.001$) confirmed that the correlation matrix was factorable.

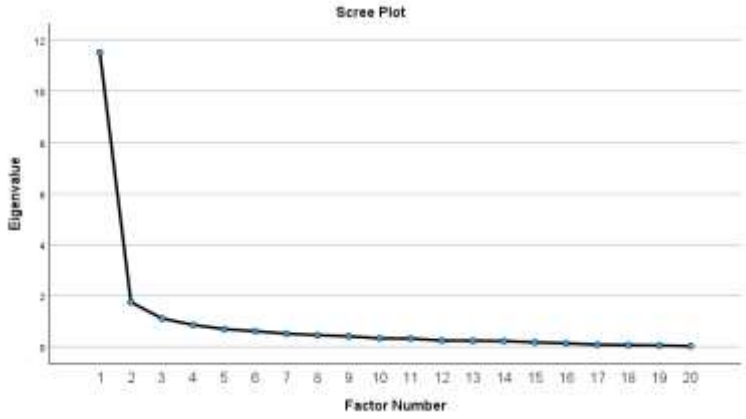

Figure 1. The Scree Plot for the 20 items version of the scale

The scree plot (Figure 1) and eigenvalue criteria supported a **three-factor structure**, which accounted for **60.57% of the total variance**. One item with a loading below 0.40 was removed, because such a loading indicates a weak association with the underlying construct measured by the factor. The elimination of this item is expected to improve the scale's psychometric properties by strengthening internal consistency, enhancing construct validity, and ensuring that the remaining items more accurately represent the intended latent dimension. The result was a 19-item version of the scale (Table 3).

Table 3. Factor Loadings

Nr.	Item	*Factor*		
		1	*2*	*3*
1	Mistakes or errors that have occurred in my workplace have led to positive changes.	0.655		
2	In my workplace, feedback is provided on changes put into place based on reports of errors that have occurred.	0.762		
3	In my workplace, ways to prevent errors from happening again are discussed.	0.760		
4	In my workplace, time is allocated to identify and assess risks to patient safety.	0.652		
5	I will not be punished for reporting a patient safety problem or unsafe procedure.	0.555		
6	The safety education and training I have been provided is sufficient to perform my job duties safely.	0.488		
7	Staff are free to speak up if they observe something that could negatively affect patient care.	0.511		
8	My colleagues on my teamwork do what is right, even if they feel it puts them at risk.	eliminated		
9	My colleagues on my teamwork can bring up problems and difficult issues.		0.423	
10	My colleagues support each other when needed.		0.760	
11	My colleagues on my teamwork treat each other with respect.		0.851	
12	My colleagues cooperate to get the job done.		0.978	
13	Disputes or conflicts are resolved fairly in my teamwork.		0.466	
14	My teamwork members communicate well with each other.		0.702	
15	My managers have set ambitious, yet achievable, performance goals for my work team.			0.531
16	My direct manager communicates the reasons behind decisions that impact on my work.			0.733
17	My direct manager listens to what I have to say.			0.850
18	My direct manager treats me with respect.			0.877
19	I have trust in my direct manager.			0.947
20	My direct manager does not engage in favouritism.			0.894

The three retained factors were:

a) Risk Identification and Error Management - RIEM (named by the research team) – Items 1–7,
b) Teamwork Cohesion and Engagement - TCE (as in the original version) – Items 9–14,
c) Manager Trust and Communication - MTC (as in the original version) – Items 15–20.

The model (Figure 2) demonstrated an acceptable fit to the data, supporting the construct validity of the 19-item, three-factor structure of the Romanian VHA-PSCS (Table 4).

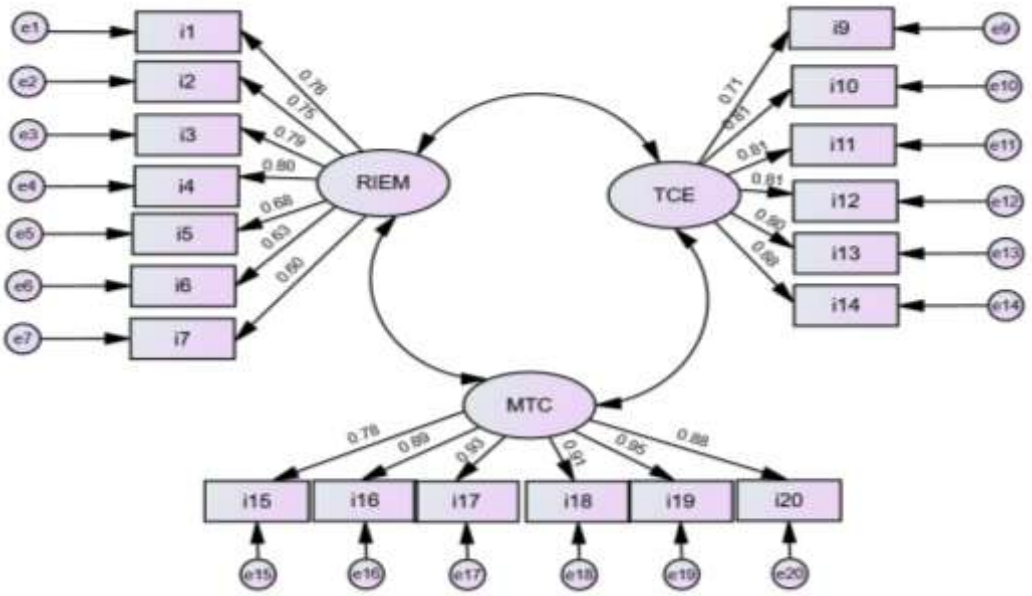

Figure 2. CFA 3-Factor Model Diagram

Table 4. CFA fit measures

Comparative Fit Index (CFI)	Tucker–Lewis Index (TLI)	Root Mean Square Error of Approximation (RMSEA)	RMSEA 90% CI
0.923	0.911	0.0736	0.0656 – 0.0817

Convergent Validity

Average Variance Extracted values ranged from 0.41 to 0.60, indicating acceptable convergence, while CR values exceeded the 0.70 threshold, demonstrating good internal consistency (Table 5).

Table 5. Average Variance Extracted (AVE) and Composite Reliability (CR) values for the 3 factors

Factor	AVE	CR
(a)	0.41	0.82
(b)	0.45	0.82
(c)	0.60	0.89

Discriminant Validity

All correlations were below 0.70, indicating that **the factors are related but distinct constructs** (Table 6).

Table 6. Inter-factors correlation matrix

Factor	1	2	3
(a)	-	0.67	0.64
(b)		-	0.69
(c)			-

Reliability

Cronbach's alpha values ranged from 0.847 to 0.945 across factors, with an overall scale alpha of 0.948 (95% CI [0.940, 0.956]), confirming **excellent reliability** (Table 7).

Table 7. Reliability statistics

Factor/scale	Cronbach's alfa	Cronbach's alfa 95% CI
(a)	0.847	0.821 – 0.871
(b)	0.908	0.892 – 0.925
(c)	0.945	0.935 – 0.954
Scale	0.948	0.940 – 0.956

Discussion

The Romanian version of the VHA-PSCS was successfully validated. The Romanian version of the VHA-PSCS emerged from this study as a psychometrically sound instrument for assessing patient safety culture among nurses in Romania, with its three dimensions—Risk Identification and Error Management, Teamwork Cohesion and Engagement, and Manager Trust and Communication—reflecting core components essential to fostering a safe clinical environment.

In Romania, interest in research on patient safety is relatively new. There are few studies regarding the validation of scales designed to measure patient safety culture [21] or, as well as research that uses them to measure or compare various specific hospital/healthcare environments [22], but no one dedicated or using VHA-PSCS. There are, also, some mass-media articles to promote the topic [23] or articles that approach the patient's safety as important organizational culture element in particular healthcare contexts (e.g. [24]).

Given the relative novelty of the original instrument, not many comparisons can be made with validation studies from other countries. However, after the original validation, subsequent research has applied the survey in implementation and mixed-methods studies within VHA settings, further confirming its relevance and alignment with qualitative indicators of safety culture and its utility for evaluating system-level initiatives such as high-reliability organization strategies [25].

The adapted 19-item, three-factor version of VHA-PSCS demonstrated strong construct validity (see Tables 3 and 4), satisfactory convergent and discriminant validity (Tables 5 and 6), and excellent reliability indices (Table 7).

As a valid and adapted tool, the Romanian version could be used in various ways, in research, as well as a tool easy to be used for assessment of organizational culture in Romanian healthcare units. As any other instrument designated to assess a complex construct, it does not cover all aspects of the social reality the construct reflects. However, it could facilitate an important step to be taken in developing and promoting a safety-patient oriented culture in Romanian healthcare facilities. Thus, it could be proved as a relevant and useful instrument to increase the interest for this theme and its importance in Romanian healthcare context, as well as a good starting point for organizational change strategies.

As strengths of this study, it could be mentioned the follows:

a) Cultural and Linguistic Relevance – The rigorous translation and adaptation process ensured semantic and conceptual equivalence, enhancing the validity and applicability of the instrument within the Romanian cultural and clinical context.
b) Robust Psychometric Validation – The study employed both exploratory and confirmatory factor analyses, as well as reliability and validity testing, providing solid evidence for the instrument's construct validity and internal consistency.
c) Diverse Sample – Including a wide range of professional backgrounds and demographic characteristics strengthened the generalizability of the findings, offering a comprehensive view of patient safety culture among Romanian nurses.

The study had, also, some limitations:

a) Sample Diversity Across Settings – Although the sample size was substantial, it was predominantly hospital-based. Further research in other healthcare settings (e.g., primary care, community services) would enhance the generalizability of the results.
b) Self-Reporting Bias – As with most survey-based studies, responses may have been influenced by individual perceptions and social desirability, potentially affecting the accuracy of the data.
c) Cross-Sectional Design – The cross-sectional nature of the study did not allow for the evaluation of test–retest reliability, limiting conclusions about the instrument's stability over time. A longitudinal study is taken into consideration by the authors, to address this gap.

d) Because the sample was a convenience one, and not necessary reflected the age, education, and professional experience of the general population of the Romanian nurses, the validation results could be affected by this aspect; it is therefore recommended to replicate the study on a probabilistic sample, stratified according to criteria such as age, professional experience, and level of training.

Future research will focus on testing the scale across diverse healthcare contexts and professional groups in Romania, examining measurement invariance, and exploring its sensitivity to organizational interventions and policy changes. Longitudinal studies would be particularly valuable to determine how safety culture evolves and how improvements relate to clinical and organizational outcomes. From an implementation perspective, integrating the instrument into routine quality-improvement and accreditation processes, as well as leadership and staff training programs, could enhance its practical impact. Overall, the validated Romanian VHA-PSCS provides a foundation for systematic monitoring and continuous development of patient safety culture in the Romanian healthcare context.

Conclusions

The VHA-PSCS for Romanian nurses has been validated and presented as a psychometrically robust tool for measuring patient safety culture in Romania. The three identified dimensions - *Risk Identification and Error Management*, *Teamwork Cohesion and Engagement*, and *Manager Trust and Communication* - capture key aspects of patient safety culture that are crucial for promoting a safe clinical environment.

List of Abbreviations: AICUs - Anaesthesia and intensive care units; AVE - Average Variance Extracted; CFA - Confirmatory Factor Analysis; CFI - Comparative Fit Index; CI - Confidence Interval; CR - Composite Reliability; EFA - Exploratory Factor Analysis; MTC- Manager Trust and Communication; OAMGMAMR - Order of Nurses, Midwives and Medical Assistants in Romania; RIEM - Risk Identification and Error Management; RMSEA - Root Mean Square Error of Approximation; TCE - Teamwork Cohesion and Engagement; TLI - Tucker-Lewis Index; VHA-PSCS - Veterans Health Administration Patient Safety Culture Survey; WHO - World Health Organization

Author Contributions: DCM coordinated the research and development of the manuscript; **VN** defined the research's aim and design; **CED** participated in the design of the study; **CG and DS** carried out the data collection; **IV** performed the statistical analysis. All authors contributed to the interpretation of the results and critically review the manuscript. All authors read and approved the final manuscript.

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Ethics Statement: All participants were informed, before the research started, that their participation is anonymous, entirely voluntary, and, by completing the questionnaire**,** they consent to participation, to the statistical processing of the answers provided, and to the development and publication of scientific papers based on these answers.

Data Availability Statement: Not applicable.

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Conflict of Interest: The authors declare no conflict of interest.

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