
Croatian Use of The Hospital Survey on Patient Safety Culture: A Psychometric Validation in A Sample of Croatian Nurses

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Abstract

Introduction. Patient safety during hospitalisation is one of the biggest concerns for hospitals worldwide and one obligation of all medical professionals is to create a safe environment for patients and prevent accidents. Approximately 50% of adverse events can be prevented with a systematic approach.

Aim. This study aimed to examine the underlying dimensions and psychometric properties of the Hospital Survey on Patient Safety Culture questionnaire in Croatian hospital settings, and to compare the results with the original questionnaire from the United States of America.

Methods. The sample consisted of 438 nurses from four Croatian university hospitals. All participants signed an informed consent document, and the questionnaires were provided to the nurses in their units by the head nurses of their departments. Data analysis was performed using IBM SPSS 25.0. Bartlett's test of sphericity and the Kaiser-Meyer-Olkin (KMO) indicator were performed with Cronbach's alpha test and sample standard deviation.

Results. All factors explain the total of 59% of variance of the measured questionnaire. Additionally, the reliability of the entire questionnaire was determined by using the internal consistency coefficient (Cronbach's alpha) on the Hospital Survey on Patient Safety Culture with 12 of 0.88 particles, which is high internal consistency reliability. Our results show that the particles that make up the questionnaire are very homogeneous according to their object of measurement.

Conclusion. The results of our study found that the survey can be applied to Croatian settings and used in hospitals. We also believe that more research on this topic is needed and is crucial for improving patient safety in hospitals. It is necessary to emphasize continuous education of nurses regarding patient safety in hospitals.

Introduction

Patient safety during hospitalisation is one of the biggest concerns for hospitals worldwide. Medical professionals such as doctors, nurses, and physiotherapists must create a safe environment for patients and prevent accidents. Approximately 50% of adverse events are judged to be preventable (1). It is believed that hospitals can affect patient safety by creating a culture of patient safety among their staff. A positive safety culture guides the many discretionary behaviours of healthcare professionals toward viewing patient safety as one of their highest priorities (2). A positive safety culture will improve a hospital's patient safety performance, which could help the organization strengthen its safety outcomes (3). If an accident happens during hospitalisation, after processing it becomes an example of learning and creating a safer environment for patients. The Institute of Medicine of the United States of America claims that if there is a safety culture where adverse events can be reported without people being blamed, they have the opportunity to learn from their mistakes and it is possible to make improvements in order to prevent future human and system errors, and thus promote patient safety (4). Patient safety, defined as the prevention of patient injury, requires solid systems that prevent errors; if they occur, they serve as a source of learning, generating a safety culture that involves all health professionals, organizations and the patients themselves (5). Of all medical professionals, it is known that nurses spend the most time with patients by caring for them, listening to their problems and fulfilling their needs. Although all health professionals play a relevant role in patient safety, nursing has a fundamental role due to its involvement in most hospital processes, making it the profession that has the clos-

est contact with patients and is a key factor in reducing adverse outcomes (6). Despite patient accidents that might occur, it is fundamental for hospitals to create unique tools for evaluation of patient safety during hospitalization. There are a few instruments available for assessing the safety culture in hospitals (7). One of these instruments is the Hospital Survey on Patient Safety Culture (HSOPSC) of the Agency for Healthcare Research and Quality (AHRQ) (8). Used in practice, the HSOPSC questionnaire can provide an insight into a specific hospital unit or a hospital in general. It should be implemented at every hospital level, from general units and ICU's to surgical units, and be easily available for healthcare workers and tracked in real time during patient hospitalization. A group of researchers explored the hospital safety culture in four European countries and the instruments they used were HSOPSC and Perceived Implicit Rationing of Nursing Care (9-11). This study aimed to validate the Hospital Survey on Patient Safety Culture questionnaire in a Croatian setting. University hospital centres and university hospitals included in this study have a strong policy on patient safety during hospitalization. Nurses are educated on creating an empathetic relationship with the patient as well as assessing their psychophysical condition. Continuous assessment of patients in wards and intensive care units kept adverse events to a minimum. The most common ones are related to the physical stability of patients which results in falls (such as in patient rooms, bathrooms or hallways). If an adverse event occurs, an official form is filled in and nurses' interventions for patient safety during ward stay are evaluated.

An adverse event reduction policy in hospitals includes routine checking of patient identity, sex, age, drug or food allergies, etc. The best example comes from surgical wards, where the patient is asked if they understand the planned operation and where on their body it is going to be performed. It is concerning that even if all such approaches are used, many patients experience adverse events. Approximately 400,000 hospitalized patients experience some type of preventable harm each year (12). The aim of this study was to perform linguistic and psychometric validation of the Croatian version of the HSOPSC questionnaire.

Methods

Participants

The participants were registered nurses working in hospital wards in four university hospitals in the Republic of Croatia (University Hospital Centre Zagreb, University Hospital Centre Sestre milosrdnice, Clinical Hospital Dubrava and Clinical Hospital Sveti duh). Nurses were asked to participate voluntarily, and copies of the questionnaire were provided to them by their head nurse. The questionnaire was filled in by 438 nurses who signed an informed consent form. The survey was completely anonymous. The data were collected between April 2018 and November 2018. The inclusion criteria were as follows: nurses with at least one year of service and nurses working in direct patient care. The exclusion criteria were as follows: nurses in leading positions and nurses with less than one year of experience.

Ethics

The study was approved by the ethical committees of all four institutions. The research group followed all ethical principles of the Declaration of Helsinki (13).

Instrument

The Hospital Survey on Patient Safety Culture (HSOPSC) is validated by the Agency for Healthcare Research and Quality (AHRQ) and is used for assessing the safety culture for patients in hospitals (14). This survey was developed with the aim of increasing staff awareness of patient safety, assessing the current level of patient safety in hospitals, identifying strong sides and practices of patient safety culture, examining growing trends and evaluating the cultural impact on patient safety in hospitals. In 10 to 15 minutes, participants provide their opinions about patient safety issues, medical errors, and event reporting in their hospital. The survey consists of 51 questions divided into 14 sections (A to H). The questions related to section A refer to "Your Work Area/Unit", section B to "Your Supervisor/Manager", section C to "Communications", section D to "Frequency of Events Reported", section E to "Patient Safety Grade", section F to "Your Hospital", section G to "Number of Events Reported" and section H to "Background Information". Section I is left empty for the partici-

pants' comments. The questionnaire's subscales are listed in table 2. The Likert Scale ("Strongly Disagree" to "Strongly Agree" and "Never" to "Always") is most commonly used for multiple choice questions. The questionnaire was translated into Croatian and then into English. The results of the original questionnaire show that a higher score on the subscales indicates increased patient safety in hospitals.

Statistics

The principal component factor analysis with varimax rotation was used as exploratory factor analysis to verify the factor structure of the instrument. Negatively worded items were first recoded according to the manual. Bartlett's test of sphericity and the Kaiser-Meyer-Olkin (KMO) indicator show that the data are adequate for factor extraction (KMO Measure of sampling adequacy: 0.887; Bartlett's test of sphericity: $\chi^2 = 6895.231$, $df = 946$, $p < 0.001$). The reliability of the HSOPSC questionnaire was determined by using the internal consistency coefficient Cronbach's alpha. Data analysis was done using IBM SPSS 25.0 (IBM Statistics for Windows, Version 25.0. Armonk, NY:IBM Corp).

Results

The study was conducted on 438 nurses in four university hospitals in the Republic of Croatia. Table 1 shows factor structure and loadings for HSOPSC items in the Croatian sample. Table 2 shows item-total correlations and Cronbach's alpha if an item was deleted.

There were 11 factors with eigen-values above 1, but with only three factors that have substantially large eigenvalues (the first factor with eigenvalue of 9.593, and the next two factors with eigenvalues of 3.141 and 2.470). All factors explain a total of 59% of variance of measured construct. Principal Component Analysis was used to check the factoring structure of the instrument.

That is why factor analysis with a fixed number of factors was calculated. The results are shown in Table 1. Only factor loadings above minimum cut-off 0.30 are shown and sorted by size. Lowest loadings show the weakest association with the factor.

	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	F14
Staff will freely speak up if they see something that may negatively affect patient care (c2)	0.311				0.549									
In this unit, we discuss ways of preventing errors from happening again (c5)	0.401				0.528									
My supervisor/manager seriously considers staff suggestions for improving patient safety (b2)						0.759								
My supervisor/manager praises us when they sees a job done according to established patient safety procedures (b1)	0.308					0.698								
My supervisor/manager overlooks patient safety problems that happen repeatedly (b4)						0.584				0.340				
The staff worry that mistakes they make are kept in their records (a16)							0.720							
The staff feel like their mistakes are held against them (a8)							0.697							
When an event is reported, it feels like the person responsible is addressed, and not the problem (a12)							0.681							
The staff are afraid to ask questions when something does not seem right (c6)							-0.469							
We have patient safety problems in this unit (a17)								0.676						

	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	F14
Our procedures and systems are good at preventing errors from happening (a18)	0.406							0.498						
Patient safety is never sacrificed to get more work done (a15)			0.314					0.482					0.437	
Please give your work area/unit in this hospital an overall grade on patient safety (e1)								-0.397						
After we make changes to improve patient safety, we evaluate their effectiveness (a13)	0.316				0.360			0.365						
The staff in this unit work longer hours than is best for patient care (a5)									0.726					
We work in "crisis mode", trying to do too much, too quickly (a14)							0.320		0.605					
We have enough staff to handle the workload (a2)	0.402								0.555					
Whenever pressure builds up, my supervisor/manager wants us to work faster, even if it means taking shortcuts (b3)										0.765				
We use more agency/temporary staff than is best for patient care (a7)											-0.842			
It is just by chance that more serious mistakes do not happen around here (a10)												0.814		
The staff feel free to question the decisions or actions of those with more authority (c4)					0.356								0.677	

	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	F14
In the past 12 months, how many event reports have you submitted? (g1)														0.908
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.														

Factor analysis was performed on 14 factors according to the authors of the original scale. (Table 1.) The first factor is partially in line with expectations - all 4 particles (a1, a3, a4 and a11) are mostly saturated with this factor, which the authors call *Teamwork within units*. However, our results in this factor also contain two additional particles (a6 and a9), which should actually belong to the *Organizational Learning – Continuous Improvement* factor along with a13. The second extracted factor most closely matches the author's subscale *Handoffs & Transitions* (f3, f5, f7, f11), with the addition of the particle f6, which originally belonged to the ninth subscale, *Teamwork Across Units*. The third extracted factor combines two subscales, *Management Support for Patient Safety* and *Teamwork Across Units*, although the last 3 particles show low saturation with the second extracted factor, and the particles f2 and f9 also show low saturation with the tenth extracted factor.

The fourth factor is completely consistent with the author's eighth subscale, *Frequency of Events Reported*. The fifth factor corresponds to the *Feedback & Communication About Error* (c1, c3, c5), with the addition of c2, which otherwise belongs to *Communication Openness*. The sixth factor contains particles of the second subscale, *Supervisor/Manager Expectations & Actions Promoting Patient Safety* (b1, b2, b4), while particle b3 (*Whenever pressure builds up, my supervisor /manager wants us to work faster, even if it means taking shortcuts*) here stands out in a separate tenth factor. The seventh factor is saturated with particles of the subscale *Nonpunitive Response to Errors* (with the addition of the particle b4, which otherwise belongs to the subscale *Supervisor/Manager Expectations & Actions Promoting Patient Safety*, and particle c6, from the subscale *Communication Openness*). The eighth factor contains particles of the *Overall Perceptions of Patient Safety*

Table 2. **Hospital Survey on Patient Safety Culture questionnaire's subscales on the Croatian sample**

Subscale	Mean	N	Std. Deviation	Min	Max
Teamwork Within Units	14.42	438	3.027	4	20
Supervisor/Manager Expectations & Actions Promoting Patient Safety	14.06	438	2.936	4	20
Organizational Learning - Continuous Improvement	10.53	438	1.891	3	15
Management Support for Patient Safety	8.90	438	2.245	3	15
Overall Perceptions of Patient Safety	14.04	438	2.548	4	20
Feedback & Communication About Error	10.45	438	2.411	3	15
Communication Openness	10.02	438	2.100	4	15
Frequency of Events Reported	8.47	438	3.078	3	15
Teamwork Across Units	12.91	438	2.364	4	20
Staffing	11.04	438	2.361	4	19
Handoffs & Transitions	14.53	438	2.685	5	20
Nonpunitive Response to Errors	8.71	438	2.256	3	15
Patient Safety Grade	2.21	438	0.824	1	5
Number of Events Reported	1.59	438	1.031	1	6

subscale, with a lack of particle a10, which makes a separate 12th factor, and the addition of particles e1 (which otherwise forms a separate item *Patient Safety Grade*) and particles a13 (originally in the subscale *Organizational Learning – Continuous Improvement*). The ninth factor corresponds best to the *Staffing* subscale, although here particle 7 is singled out in a separate factor 11 instead of being grouped into this one. Particle c4 is also singled out in a separate factor instead of being within the *Communication Openness* subscale. Some results were negative, but

the rotated version of data analysis provided better results and that is why it is shown in this study.

Cronbach's alpha was used as indicator of internal consistency. The reliability of total HSOPSC with 44 items is .88, which is very satisfactory. Table 3 shows item-total correlations and change in Cronbach's alpha if an item was deleted. In this Croatian validation the structure does not match exactly with the original HOSCPSC. Factor analysis demonstrated that in our study, based on Croatian settings, particles factorize differently.

Table 3. **Item-total correlations and Cronbach's alpha if an item was deleted**

	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
People support one another in this unit	0.554	0.869
We have enough staff to handle the workload	0.362	0.872
When a lot of work needs to be done quickly, we work together as a team to get the work done	0.503	0.870
In this unit, people treat each other with respect	0.569	0.869
The staff in this unit work longer hours than is best for patient care	-0.047	0.879
We are actively doing things to improve patient safety	0.533	0.870
We use more agency/temporary staff than is best for patient care	-0.111	0.881
The staff feel like their mistakes are held against them	0.371	0.872
Mistakes have led to positive changes here	0.418	0.872
It is just by chance that more serious mistakes don't happen around Here	0.135	0.877
When one area in this unit gets really busy, others help out	0.472	0.870
When an event is reported, it feels like the person responsible is being addressed, and not the problem	0.433	0.871
After we make changes to improve patient safety, we evaluate their effectiveness	0.450	0.871
We work in "crisis mode", trying to do too much, too quickly	0.350	0.873
Patient safety is never sacrificed to get more work done	0.495	0.870
The staff worry that mistakes they make are kept in their records	0.349	0.873
We have patient safety problems in this unit	0.377	0.872
Our procedures and systems are good at preventing errors from happening	0.477	0.871
My supervisor/manager praises us when they see a job done according to established patient safety procedures	0.532	0.869

	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
My supervisor/manager seriously considers staff suggestions for improving patient safety	0.553	0.869
Whenever pressure builds up, my supervisor/manager wants us to work faster, even if it means taking shortcuts	0.186	0.875
My supervisor/manager overlooks patient safety problems that happen over and over	0.491	0.870
We are given feedback about changes put into place based on event reports	0.427	0.871
The staff will freely speak up if they see something that may negatively affect patient care	0.544	0.869
We are informed about errors that happen in this unit	0.476	0.871
The staff feel free to question the decisions or actions of those with more authority	0.287	0.874
In this unit, we discuss ways to prevent errors from happening again	0.589	0.868
The staff are afraid to ask questions when something does not seem right	-0.356	0.885
When a mistake is made, but is caught and corrected before affecting the patient, how often is this reported?	0.377	0.872
When a mistake is made, but has no potential to harm the patient, how often is this reported?	0.328	0.873
When a mistake is made that could harm the patient, but does not, how often is this reported?	0.369	0.872
Please give your work area/unit in this hospital an overall grade on patient safety	-0.473	0.884
Hospital management provides a work climate that promotes patient safety	0.512	0.870
Hospital units do not coordinate well with each other	0.333	0.873
Things "fall between the cracks" when transferring patients from one unit to another	0.398	0.872
There is good cooperation among hospital units that need to work together	0.499	0.871
Important patient care information is often lost during shift changes	0.404	0.872
It is often unpleasant to work with staff from other hospital units	0.295	0.874
Problems often occur in the exchange of information across hospital units	0.385	0.872
The actions of hospital management show that patient safety is a top priority	0.493	0.870
Hospital management seems interested in patient safety only after an adverse event happens	0.361	0.873
Hospital units work well together to provide the best care for patients	0.432	0.872
Shift changes are problematic for patients in this hospital	0.329	0.873
In the past 12 months, how many event reports have you filled out and submitted?	0.090	0.877

The reliability of subscales is shown; two of them (*Patient Safety Grade* and *Number of Events Reported*) have only 1 item, so Cronbach's alpha cannot be calculated.

Most of the correlations do not exceed 0.4, but there are very low, which indicates that some subscales are different from the content of the total HSOPSC measuring instrument, such as Scale 14, with which all scales are zero-correlated. This can be explained in two ways: first, only one question is in the "scale", and secondly, the question is related to specific behaviour, i.e., frequency, and the rest relate to attitudes and assessments more subject to subjective impression, so they are methodologically different.

Discussion

The aim of this study was to perform linguistic and psychometric validation of the Croatian version of the HSOPSC questionnaire. The HSOPSC survey has been translated into 24 languages in 45 countries in order to measure patient safety culture in their own healthcare organizations (15). Factor analysis determined that all preconditions for factor extraction were met and based on exploratory analysis using the Principal Component Analysis. Three of eleven factors have substantially large eigenvalues on a unidimensional scale. We also noticed that the reliability on some subscales is fairly low, but all factors explain the total of 59% of variance of measured construct.

Smits et al. found a variance of 57.1% in their study on psychometric properties of the HSOPSC questionnaire in Dutch hospital settings (1). The question set from Factor 1: *Teamwork within departments* mostly matches those from a psychometric evaluation conducted on a Palestinian sample by Najjar et al. (16).

Cronbach's alpha in our study is 0.88, showing high reliability. This refers to the reliability of internal consistency, so it can be concluded that the particles that make up the questionnaire are very homogeneous according to their object of measurement. This can be compared with Najjar et al. (16), whose Cronbach alpha was 0.087, as well as Nie et al. (17), whose Cronbach alpha was 0.84. It can be concluded that the reliability of the adapted questionnaire is satisfactorily high and comparable to the original version. However, it should be noted that for two subscales (*Patient Safety Grade* and *Number of Events Reported*), Cronbach's alpha could not be calculated. Also,

some subscales are different from the content of the total HOSP measuring instrument, such as Scale 14, with which all scales are zero-correlated.

In their evaluation of the HSOPSC questionnaire conducted in Sweden, Hedsköld et al. found that the instrument can be used in both hospital and primary care settings after minor adjustments of wording (18). Future studies should use the HSOPSC in Croatian settings for primary care.

Conclusion

The purpose of this study was to translate and validate the HSOPSC questionnaire. The results of the study show that the questionnaire can be applied to Croatian settings and used in hospitals. We also believe that more research on this topic is needed and is crucial for improving patient safety in hospitals. Although we managed to adapt this questionnaire for Croatian hospital settings, it is important to continue nurses' education about patient safety during hospitalization and the prevention of adverse events.

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UPORABA ANKETNOG ISTRAŽIVANJA O SIGURNOSTI PACIJENATA U BOLNICAMA NA HRVATSKOM JEZIKU: PSIHOMETRIJSKA VALIDACIJA NA UZORKU HRVATSKIH MEDICINSKIH SESTARA

Sažetak

Uvod. Sigurnost pacijenata tijekom hospitalizacije predstavlja jednu od najvećih briga bolnicama diljem svijeta. Obveza je svih medicinskih stručnjaka stvoriti sigurno okruženje za pacijente i spriječiti nesreće. Približno 50 % nuspojava može se spriječiti sustavnim pristupom.

Cilj. Cilj ove studije bio je ispitati temeljne dimenzije i psihometrijska svojstva upitnika Hospital Survey on Patient Safety Culture u hrvatskim bolničkim uvjetima te usporediti rezultate s izvornim upitnikom iz Sjedinjenih Američkih Država.

Metode. Uzorak se sastoji od 438 medicinskih sestara iz četiri kliničke bolnice. Svi sudionici potpisali su dokument o informiranom pristanku, a upitnike su medicinskim sestrama u njihovim jedinicama dostavile glavne sestre njihovih odjela. Analiza podataka provedena je s pomoću softvera IBM SPSS 25.0. Bartlettov test sferičnosti i Kaiser-Meyer-Olkinov (KMO) indikator izvedeni su s Cronbachovim alfa testom i standardnom devijacijom uzorka.

Rezultati. Svi čimbenici objašnjavaju ukupno 59 % varijance izmjerenog upitnika. Pouzdanost upitnika određena je primjenom internog koeficijenta konzistentnosti (Cronbachov alfa) na Hospital Survey on Patient Safety Culture s 12 čestica od 0,88, što je visoka interna pouzdanost konzistentcije. Naši rezultati pokazuju da su čestice koje čine upitnik vrlo homogene prema objektu mjerenja.

Zaključak. Rezultati našeg istraživanja pokazali su da se upitnik može primijeniti u hrvatskim uvjetima i upotrebljavati u bolnicama. Također vjerujemo da je potrebno više istraživanja na ovu temu i da je to ključno za poboljšanje sigurnosti pacijenata u bolnicama. Potrebno je naglasiti kontinuiranu edukaciju medicinskih sestara o sigurnosti pacijenata u bolnicama.

Ključne riječi: njega, HSOPSC, sestrinstvo, pacijent, sigurnost, validacija
