Validation and Psychometric Properties of the Latin-American Spanish Version of the Hospital Survey on Patient Safety Culture Questionnaire in the Surgical Setting

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Submitted

ABSTRACT

Background

The Hospital Survey on Patient Safety Culture (HSPSC) was designed to assess staff views on patient safety in a hospital and has been translated and validated into several languages and populations. However, it is unknown whether safety culture dimensions can be transferred exclusively to surgical settings. This aim herein was to examine the psychometric properties of a Latin-American Spanish version of the HSPSC for its applicability in surgical settings.

Methods

After translation and adjustments, a web-based questionnaire was administered to 150 health care personnel at operating room in a public university-affiliated hospital in Colombia. Descriptive statistics, internal reliability, confirmatory and exploratory factor analysis, and inter-correlations among survey composites were calculated.

Results

The original 12-factor survey is not applicable in its original form. For most of the factors, internal consistency was poor and unacceptable with a Cronbach's $\alpha < 0.5$. Rather, a 9-factor, 36-item instrument showed acceptable factor loadings, internal consistency, and psychometric properties. Five factors were formed with minor changes respecting the original HSPSC. Adjusted factors emerged, like "staffing and work pressure" and "supervisor/manager expectations and actions promoting patient safety", "organizational learning – continuous improvement", and "hospital management support for safety", as well as "repeated errors and perception of safety". Internal consistency for each remaining composite met or exceeded a Cronbach's α value of 0.60. Most inter-correlations were statistically significant.

Conclusions

Psychometric analyses provided overall support for nine of the 12 initial composites of patient safety culture and 36 of the 42 initial questions. We provide the first validated HSPSC-tool for Latin America, specifically for surgical settings and hope to stimulate, hereby, its broader introduction to the clinical practice in this part of the world.

Keywords

prevention, patient safety, HSPSC, operating room

BACKGROUND

The safety culture of an organization is the product of individual and group values, attitudes, perceptions, competencies, and behavioral patterns that determine the commitment to the style and proficiency of an organization's health and safety management. [1] Patient safety is an essential component of healthcare quality; however, even with continuous alertness, health care providers face many challenges in today's healthcare environment in trying to keep patient management in a safe way.

Studying patient safety related topics can provide feedback to the healthcare systems with the possibility of implementing improvement measures based on the identification of specific problems at different areas.[2] The climate of patient safety can be measured as a surrogate and analyzed at different levels of the healthcare system, through identifying strengths and weaknesses that configure the way that healthcare professionals think, behave and approach their work.

A study involving 58 hospitals from five Latin American countries found an estimated prevalence of adverse events in 10.5% of the cases. Six percent of these events were associated with the patient's death and over 28% caused disability. Almost 60% of the total group of adverse events was avoidable. In that sense, working on prevention and encouraging a strong patient safety culture is fundamental to promote and support quality of care among health professionals.[3]

Considering the inherent risks due to the logistic challenges and invasiveness of the procedures performed, operating rooms are particularly challenging for patient safety. Unsafe surgery causes 7-million complications, resulting in 1-million deaths globally each year.[4] Several campaigns and interventions to improve patient safety in surgery have been introduced, including additional checks to confirm procedures, perioperative checklists, communication strategies, and new policies to govern the OR.[4–6] Nevertheless, collecting data on medical errors during surgery is difficult because (near) misses are often underreported or considered unavoidable complications. By using a valid and reliable measurement instrument, culture data can serve as a benchmark for hospitals to assess their performance in advancing the patient safety agenda. The Institute of Medicine states that if a safety culture exists 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 to prevent future human and system errors and, thus, promote patient safety.[7,8]

Healthcare organizations may conduct safety culture assessments for a variety of reasons. Culture assessments can be used to identify areas for improvement, get a baseline and raise awareness about patient safety; secondly, to evaluate patient safety interventions or programs and track change over time; thirdly, to conduct internal and external benchmarking; and finally, to fulfill directives or regulatory requirements, like accredita-

tion standards.[1,9] Interest in safety culture measurement in healthcare organizations has grown in parallel with the increased focus on improving patient safety. To transform culture, it is important to first measure and analyze it. Culture assessment tools create awareness and provide an understanding to develop an action plan to improve patient safety, more important in countries with limited resources.[10]

The Hospital Survey on Patient's Safety (HSPSC) by the Agency for Healthcare Research and Quality (AHRQ) consists of 42 questions and measures 12 dimensions. It was developed by Westat, under contract with AHRQ, with questions derived from a review of existing safety culture literature and instruments, including the Veterans Health Administration's Patient Safety Questionnaire and the Medical Event Reporting System for Transfusion Medicine.[11] The AHRQ instrument was piloted in 20 hospitals and the results were used to generate a list of 12 factors, which displayed high internal consistency through factor analysis (0.63 to 0.84).[12] It is being used in the US and the UK. Several countries have been using translated and validated versions of the HSPSC questionnaire.[7,13–22]

After translating a questionnaire into another language and applying it in a different setting, it is important to check its validity and reliability. Cross-country comparisons are possible, only if the psychometric properties of the validated and translated versions of the HSPSC are comparable to the original structure. To the best of our knowledge, this is the first study developed to explore the surgical safety climate in a Latin American country.

The current study sought to validate a Latin-American Spanish version of the AHRQ Hospital Survey on Patient's safety questionnaire (HSPSC-LA) in a surgical setting. To this aim, we assessed psychometric properties, face validity, content validity, construct validity, and reliability of a Latin-American Spanish version of HSPSC.

METHODS

Design and study population

A cross-sectional study was carried out between 2016 and 2017 at the operating room (OR) in Hospital Universitario San José (HUSJ), a third-tier public university-affiliated hospital in the city of Popayán, Colombia. Popayán is the capital and main city of the department of Cauca; in 2010, it had an estimated population of 270,000 inhabitants and its main medical center is HUSJ. This hospital performs 11,000 surgical procedures per year, primarily in general surgery, orthopedics, gynecology/obstetrics, and plastic surgery.[23,24]

All healthcare providers and OR personnel involved in the perioperative process were included involving medical and non-medical staff (159 members). We collected all study data after the working hours.

After initial validation process, the HSPSC-LA was adapted to a computerized web-based response method arranged that every question had to be answered. Each member of the OR was invited to voluntarily participate in the study and fill out the web-based questionnaire, allowing for confidentiality and anonymity. The questionnaire did not ask for any personal identification data during the survey (neither name of identification details). The research protocol was approved by the ethics committee (Approval act 004, 16-03-2016) and had institutional permission. In addition, the questionnaire asked for direct consent from the participants. Incentives to complete the survey were not provided.

Questionnaire

Background variables

Work-related information and primary work area were not included in this study because all the participants were active OR members. Other related variables collected included how long they had been working in this OR, how many hours a week, and in which function.

Items on patient safety culture

The original HSPSC contains 42 items organized in 12 dimensions.[11] Most items on patient safety culture can be answered by using a five-point scale reflecting the agreement rate: from 'strongly disagree' (1) to 'strongly agree' (5), with a neutral category 'neither' (3). Other items can be answered by using a five-point frequency scale from 'never' (1) to 'always' (5). In addition, there are two mono-item outcome variables, ie., 1) Patient safety grade, measured with a five-point scale from 'excellent' (1) to 'failing' (5); and 2) Number of events reported, how often the respondent has submitted an event report in the past 12 months (answer categories: 'none'; '1–2 event reports'; '3–5 event reports'; '6–10 event reports'; and '11–20 event reports') (Table 1).

Translation process

Before starting the validation process, we considered a previous translation and validation into Spanish (Castilian from Spain) developed by the Sistema Nacional de Salud Español [19]. The available version of the HSPSC translated into Spanish was revised in detail. Some items were incomprehensible in Latin-American Colombian Spanish and others had translation issues due to cultural and environmental differences.

Therefore, we translated the original survey into Latin-American Colombian Spanish by following the AHRQ guidelines for translating surveys on patient safety culture

Table 1. Factors and items of the original version of the AHRQ-HSPSC.

Factor	Dimensions	Questions*
1	Teamwork Within Units	A1, A3, A4, A11
2	Supervisor/Manager Expectations & Actions Promoting Patient Safety	B1, B2, B3n, B4n
3	Organizational Learning - Continuous Improvement	A6, A9, A13
4	Management Support for Patient Safety	F1, F8, F9n
5	Overall Perceptions of Patient Safety	A10n, A15, A17n, A18
6	Feedback & Communication About Error	C1, C3, C5
7	Communication Openness	C2, C4, C6n
8	Frequency of Events Reported	D1, D2, D3
9	Teamwork Across Units	F2n, F4, F6n, F10
10	Staffing	A2, A5n, A7n, A14n
11	Handoffs & Transitions	F3n, F5n, F7n, F11n
12	Nonpunitive Response to Errors	A8n, A12n, A16n
Mono-item	Patient Safety Grade	Excellent, Very Good, Acceptable, Poor, Failing
	Number of Events Reported	

*n represents negatively worded questions.

and combined those results with the previous Spanish version.[25] These guidelines propose a team approach based on current best practices for survey translations.[25,26] To develop a well-translated HSPSC-LA, the original survey was translated into Latin-American Spanish, then it was compared and adjusted with the Spanish version and, finally, translated back into English. The entire process was done by a research team, along with a bilingual translator with professional work experience in developing surveys. Environmental, cultural, and local issues present in the questions were actively discussed by the team to reach consensus.

Face and content validity

We investigated the face and content validity of the HSPSC-LA. To obtain face validity, a group of advisors: three physicians and three nurses from the HUSJ conducted an initial review of the questionnaire. They met to review the translation, suggested changes, and decided on the most suitable translation. Thereafter, based on consensus with the research team, together determined whether the questions from the pre-final HSPSC-LA version suited the Colombian culture and if the format of the questions was conceptually equivalent to the original English questions (content validity). All information gathered was used to prepare the final version of the HSPSC-LA (Online Appendix).

Data screening and pre-analyses

Completeness of the data was verified. Nine respondents were excluded from the analyses because they had not fully completed the questionnaire. Only responses without missing data were analyzed.

We checked whether the inter-item correlations were sufficient through an examination of the correlation matrix. Questions belonging to the same underlying dimension will correlate, given that they measure the same aspect of patient safety culture. Items that do not correlate, or correlate with only a few other variables, are not suited for factor analysis.[27] Bartlett's test demonstrated that the inter-item correlations were sufficient: $\chi 2 = 2920.2$; $df = 861$; $p < 0.001$.

We also checked whether the opposite occurred: too much correlation between the items. Ideally, every aspect of patient safety culture uniquely contributes towards the concept of patient safety culture. A high correlation between two items means that patient safety culture aspects overlap to a large extent. The overlap in the answer patterns is about 50% when a correlation is 0.7.[27]

In addition, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was determined. This value can range from 0 to 1. A value near 1 indicates hardly any spread in the correlation pattern, enabling reliable and distinctive dimensions by factor analysis.[20] The KMO score was 0.81 above Kaiser's criterion of 0.5. These pre-analyses demonstrated that the data could be suitable for factor analysis.

Data analysis

Factor analysis defines which items are closely linked and refer jointly to an underlying dimension (or factor). Thus, the items can be reduced to the smallest possible number of concepts that still explain the largest possible part of the variance. In line with other validation related studies,[7,15–18] a confirmative factor analysis was performed (principal component analysis with oblique rotation) to investigate whether the factor structure of the original questionnaire can be used with Latin-American data.

The data were also studied with explorative factor analysis (principal component analysis with maximum likelihood approach) to examine whether another composition of items and factors would best fit the data. When establishing the number of factors, initially the eigenvalue (eigenvalue > 1: Kaiser's criterion) was taken into account, besides the extent of variance explained, the shape of the scree plot and the possibility of interpreting the factors. Then, an oblique rotation was performed to determine which items loaded most highly on which factor. Using a conservative approach, an item was considered to have sufficient contribution to the particular factor if its loading was ≥0.4. Items with low-factor loadings (<0.4) or cross-loading on multiple factors (>0.3) were removed. Finally, factor analysis was conducted on the subset of items retained.

The internal consistency of the factors was calculated with Cronbach's alpha (α), a value between 0 and 1. If different items are supposed to measure the same concept, the internal consistency (reliability) should be greater than or equal to 0.6.[27] Given that the questionnaire contains positively and negatively worded items, the negatively formulated items were first recoded to make sure that a higher score always means a more positive response.

Construct validity was studied by calculating scale scores for every factor and, subsequently, calculating Pearson correlation coefficients between the scale scores. The construct validity of each factor is reflected in moderately related scale scores. High correlations ($r > 0.7$), however, would indicate that factors measure the same concept and these factors may be combined and/or some items could be removed. In addition, correlations of the scale scores were calculated with the outcome variable: patient safety grade.

Data was summarized as proportions, means, and SD values considering their distribution. T tests were applied to compare the mean values, and $p < 0.05$ was considered statistically significant. For each positively worded item, the proportion of positive responses was calculated, that is, the percentage of respondents answering the question by checking "strongly agree" and "agree" or "always" and "most of the time".[11] All statistical analyses were performed by using SPSS Statistics for Windows, Version 24.0. Armonk, NY: IBM Corp.

RESULTS

All 159 members from the OR were asked to participate from March 2016 to May 2017 and 150 completed the survey. Nine participants (all temporary personnel) did not complete the questionnaire and were excluded from the analysis. We did not identify missing data. Therefore, 150 participants yielded a 94% response rate.

Confirmatory factor analysis

The 12 dimensions resulting from the factor analysis of the AHRQ have already been mentioned. Items forming one factor in the AHRQ study have been studied in 12 separate factor analyses, to see whether a group of items also loaded on one factor with the Latin-American data. The internal consistency was calculated for every factor and compared with the internal consistency found in the original US study (Table 2).

For each factor, the internal consistency of the Latin-American items was lower than that of the original items in the AHRQ study, except for Teamwork within units, Frequency of event reporting, and Feedback and communication about errors, which was very close. For the majority of factors, the internal consistency was poor and unacceptable with Cronbach's $\alpha < 0.5$ (Table 2). This led to carrying out an exploratory factor analysis to investigate if a factor structure exists that best fits the Latin-American data.

Table 2. Characteristics of the factors after initial confirmatory factor analysis

Factor	No. of items	Items / Questions	Cronbach's α US data	Cronbach's α Latin American data
Teamwork within units	4	A1, A3, A4, A11	0.83	0.78
Frequency of event reporting	3	D1, D2, D3	0.84	0.78
Feedback and communication about errors	3	C1, C3, C5	0.78	0.78
Organisational learning and continuous improvement	3	A6, A9, A13	0.76	0.66
Nonpunitive response to error	3	A8, A12, A16	0.79	0.67
Supervisor/manager expectations/actions	4	B1, B2, B3, B4	0.75	0.68
Staffing	4	A2, A5, A7, A14	0.63	0.53
Hospital handoffs and transitions	4	F3, F5, F7, F11	0.80	0.77
Teamwork across hospital units	4	F2, F4, F6, F10	0.80	0.71
Hospital management support for safety	3	F1, F8, F9	0.83	0.72
Communication openness	3	C2, C4, C6	0.72	0.54
Overall perceptions of safety	4	A10, A15, A17, A18	0.74	0.48

Exploratory factor analysis

After analyzing the initial correlation matrix, we excluded one item (C6) due to poor inter-correlations (<0.3) with all items. Eleven factors were drawn by exploratory factor analysis (eigenvalues > 1.0). Two were deleted because one did not include items after rotation and another only contained one item. Five items had low factor loadings (<0.4) and were not included in the final structure (A15, A17, F2, F4, C4). Finally, a version with 9 factors and 36 items was the best solution that explained 60.5% of the variance in the responses. Table 3 shows the factor loadings after rotation.

Internal consistency was calculated for every factor (Cronbach's α). Overall, it was variable ($0.60 < \alpha < 0.84$), but all the HSPSC-LA factors have values above 0.6 (Table 3).

One of the 9 factors was similar to the original HSPSC questionnaire: "Frequency of events reported" (Cronbach's $\alpha = 0.78$). Four factors were used as in the original with the addition of one item to each: "Teamwork within units" (A2) (Cronbach's $\alpha = 0.77$), "Non-punitive response to errors" (A7) (Cronbach's $\alpha = 0.66$), "Hospital handoffs and transitions" (F6) (Cronbach's $\alpha = 0.80$), "Feedback and communication about errors" (C2) (Cronbach's $\alpha = 0.80$).

One factor was adjusted containing two original items in addition to two new ones. It was titled: "Staffing and work pressure" (B3, F9) (Cronbach's $\alpha = 0.72$). One factor, "Supervisor/Manager expectations & actions promoting patient safety" was created with less items than the original (Cronbach's $\alpha = 0.74$).

The factors, "Organizational learning – Continuous improvement" and "Hospital management support for safety" were brought together to a single new factor labelled

"Organizational learning, continuous improvement, and hospital support for safety" including seven items (Cronbach's α = 0.84). Finally, item A10 – included in the original factor, "Overall perceptions of safety" – was combined with B4 and named "Repeated errors and perception of safety" (Cronbach's α = 0.60)".

Table 3. Characteristics of the HSPSC-LA factors after exploratory factor analysis

Factor/Items and Cronbach's α	1	2	3	4	5	6	7	8	9
Factor 1. Organizational learning, continuous improvement, *and hospital support for safety* (α = 0.77)*									
F8. Actions of hospital management show that patient safety is a top priority.	0.706								
A9. Mistakes have led to positive changes here.	0.646								
F10. Hospital units work well together to provide the best care for patients.	0.622								
A13. After we make changes to improve patient safety, we evaluate their effectiveness.	0.584								
A18. Our procedures and systems are good at preventing errors from happening.	0.557								
F1. Hospital management provides a work climate that promotes patient safety.	0.533								
A6. We are actively doing things to improve patient safety.	0.471								
Factor 2. Hospital handoffs and transitions (α = 0.80)									
F11n. Shift changes are problematic for patients in this hospital.		0.746							
F7n. Problems often occur in the exchange of information across hospital units.		0.692							
F5n. Important patient care information is often lost during shift changes.		0.600							
F6n. It is often unpleasant to work with staff from other hospital units.		0.562							
F3n. Things "fall between the cracks" when transferring patients from one unit to another.		0.537							
Factor 3. Staffing *and work pressure* (α = 0.72)									
A14n. We work in "crisis mode," trying to do too much, too quickly.			0.616						
B3n. Whenever pressure builds up, my supervisor /manager wants us to work faster, even if it means taking shortcuts.			0.553						
A5n. Staff in this unit work longer hours than is best for patient care.			0.525						
F9n. Hospital management seems interested in patient safety only after an adverse event happens.			0.488						
Factor 4. Teamwork within units (α = 0.77)									
A1. People support one another in this unit.				0.757					
A3. When a lot of work needs to be done quickly, we work together as a team to get the work done.				0.712					

Table 3. Characteristics of the HSPSC-LA factors after exploratory factor analysis (continued)

Factor/Items and Cronbach's α	1	2	3	4	5	6	7	8	9
A4. In this unit, people treat each other with respect.				0.606					
A11. When one area in this unit gets really busy, others help out.				0.518					
A2. We have enough staff to handle the workload.				0.423					
Factor 5. Nonpunitive response to error (α = 0.66)									
A12n. When an event is reported, it feels like the person is being written up, not the problem.					0.571				
A16n. Staff worry that mistakes they make are kept in their personnel file.					0.569				
A8n. Staff feel like their mistakes are held against them.					0.494				
A7n. We use more agency/temporary staff than is best for patient care.					0.448				
Factor 6. Feedback and communication about error (α = 0.80)									
C2. Staff will freely speak up if they see something that may negatively affect patient care.						0.687			
C3. We are informed about errors that happen in this unit.						0.655			
C1. We are given feedback about changes put into place based on event reports.						0.596			
C5. In this unit, we discuss ways to prevent errors from happening again.						0.442			
Factor 7. Frequency of events reported (α = 0.78)									
D3. When a mistake is made that could harm the patient, but does not, how often is this reported?							0.960		
D2. When a mistake is made, but has no potential to harm the patient, how often is this reported?							0.631		
D1. When a mistake is made, but is caught and corrected before affecting the patient, how often is this reported?							0.416		
Factor 8. Supervisor/Manager expectations & actions promoting patient safety (α = 0.74)									
B1. My supervisor/manager says a good word when he/she sees a job done, according to established patient safety procedures.								0.939	
B2. My supervisor/manager seriously considers staff suggestions for improving patient safety.								0.483	
Factor 9. Repeated errors and perception of safety (α = 0.60)									
A10n. It is just by chance that more serious mistakes don't happen around here.									0.493
B4n. My supervisor/manager overlooks patient safety problems that happen over and over.									0.472

* Underlines represent modifications of the Factor's titles from the original.

Table 4 presents the correlation between mean values, scale scores, and intercorrelations among factors prepared to assess construct validity. The highest correlations were those between Factor 1 and Factor 6 (r = 0.547), but no exceptionally high correlations were noted. The highest correlation with patient safety grade was for the factor, "Organizational learning, continuous improvement, and hospital support for safety" (r = 0.492).

Table 4. Mean values, correlation with patient safety grade and intercorrelations of the factors

Factor	Mean	SD	Patient safety grade	1	2	3	4	5	6	7	8	9
Factor 1. Organizational learning, continuous improvement, and hospital support for safety	3.62	0.63	0.492	1								
Factor 2. Hospital handoffs and transitions	3.12	0.71	0.392	0.421	1							
Factor 3. Staffing and work pressure	2.95	0.80	0.382	0.388	0.446	1						
Factor 4. Teamwork within units	3.53	0.65	0.347	0.520	0.232	0.376	1					
Factor 5. Nonpunitive response to error	2.96	0.73	0.223	0.126*	0.325	0.452	0.265	1				
Factor 6. Feedback and communication about error	3.19	0.81	0.445	0.547	0.316	0.334	0.334	0.243	1			
Factor 7. Frequency of events reported	3.21	0.80	0.369	0.471	0.245	0.247	0.251	0.159*	0.495	1		
Factor 8. Supervisor/Manager expectations & actions promoting patient safety	3.35	0.87	0.348	0.412	0.199	0.406	0.400	0.203	0.402	0.266	1	
Factor 9. Repeated errors and perception of safety	3.51	0.81	0.261	0.274	0.337	0.410	0.343	0.385	0.192	0.172	0.171	1

Note. All correlations were below r^2=0.7. Correlation between Factors 2 and 8, 5 and 8, 6 and 9, 7 and 9, and 8 and 9 are significant at $p < 0.05$. The remaining correlations are significant at $p < 0.01$. *Not significant.

Survey findings

In all, 84 medical doctors participated (n = 84, 56%) including specialists (n = 51), residents (n = 22), and general practitioners (n = 11). In addition, 28 nurses and nursing assistants (19%), 12 surgical assistants (8%), 9 pharmacy personnel (6%), 7 administrative services (4.7%), 7 cleaning personnel (4.7%), and 3 X-ray technicians (2%); 132 (88%) participants had direct contact with patients in the OR.

Healthcare personnel working hours ranged from four to 98 per week; 57 participants (38%) work less than 40 h per week, 60 from 41 to 59 h per week (40%), and 33 more than 61 h per week (22%), (mean = 42 h per week, SD = 20). Length of employment varied,

with 53.3% having worked for 5 years or less at the OR, and 31% having professional experience of 10 years or longer.

The overall patient safety culture score was 79% (SD = 12%). The overall score means were 78±12% for doctors, 83±11% for nurses/nurses assistants, and 68±12% for surgical assistants. Scores were lower in personnel with direct contact with patients at 78%, compared with administrative staff at 84% (MD = -5.6% 95%CI -11% - -5% p = 0.073). There were no relation of patient safety culture score with profession or length of employment.

Over half of the healthcare personnel (62%) have never reported medical errors or incidents relating to patient safety during the last year. All personnel have reported a mean of 2.3 incidents during the last year except doctors with a mean of reporting of 0.8 events and a median of zero (p = 0.002).

The highest percentage of positive responses was obtained by the factors "Teamwork within units" and "Organizational Learning—Continuous Improvement" (70%), whereas the lowest were "Staffing" (37%), "Nonpunitive response to error" (34%), and "Communication openness" (30%).

DISCUSSION

The safety culture environment is considered the most important barrier to improving patient care safety.[28] The starting point for developing a safety culture should be the evaluation of the current culture by using an appropriate, validated, and setting-adjusted instrument.[7,28] This study examined the psychometric properties of the HSPSC-LA. We found that the original US 12-factor survey is not applicable to the Colombian personnel in a surgical setting. Rather, a 9-factor, 36-item instrument showed acceptable factor loadings and internal consistency.

Our results suggest that with appropriate translation into Latin-American Spanish, slight modifications and adaptation, the HSPSC performs adequately in surgical settings in Colombia. The construct validity was satisfactory for all factors and moderate correlations among them show that no two factors measure the same construct. In addition, all factors correlated positively with the outcome variable patient safety grade. Our findings are consistent with previous studies supporting that the HSPSC requires adaptation and setting adjustments to meet minimum psychometric criteria.[17,29,30]

The internal consistency of the nine factors exhibited good to satisfactory Cronbach's α scores (>0.60). Small shifts of items were noted across factors; two original factor titles were modified to improve their understandability and six questions were excluded from the original HSPSC. These changes could be explained by underlying differences with the original language, cultural environment, and specific setting of use of the questionnaire. This HSPSC-LA version has been developed and evaluated in a surgical setting,

whereas the original one included all areas in hospitals in the US. This could alter the importance of some items that describe interaction among units and teamwork across units.

Five original factors received items from other ones, suggesting a simplification of the original domains in the HSPSC-LA. Internal similarities in personnel from a single hospital area could explain this finding. Original factors "Organizational learning - Continuous improvement" and "Hospital management support for safety" have formed together a single new factor with seven items that seem to be linked. Personnel at hospitals in Colombia consider hospital management and their support as the main source of improvement and information about safety and this may differ in other developed countries.[31–33]

The factor "Supervisor/Manager expectations and actions promoting patient safety" lost question B3, which refers mainly to work pressure and working fast. In the HSPSC-LA, B3 was included with items of "Staffing". We interpret that personnel consider that work pressure is quite related with the number of people available in the OR. This may be the case of this hospital and certainly, limited staff is a situation present in some hospitals in developing countries. This perception is consistent with its potential effect on safe care.[34,35]

A new factor was formed by items B4 and A10. The first one referred to repeated errors by manager/supervisor and the second one to the effect of chance on more serious mistakes. Personnel perceive a close relationship between repetitive errors – as a source of unsafe practices – and the manager/supervisor responsibility in the response to them. Parand et al., systematically reviewed the literature to assess the role of hospital managers in quality and patient safety. They found evidence that managers' time spent and work can influence quality and safety clinical outcomes, processes, and performance at hospital level.[36] In addition, poor relationships between doctors and managers affect staff and patients' care and seem to be associated with the long-term failure of organizations to thrive.[37]

The percentage of positive scores for individual domains were higher than US results.[38] "Teamwork across units" had low positive responses (48%). This agrees with others, suggesting that interaction between units/departments could be perceived as a source of unsafe practices.[39,40] Personnel appeared unhappy to work with colleagues in other units but reported good teamwork within their own units.[18] The OR has strong interactions and communication with areas like intensive care units or the emergency department. Teamwork is a crucial part for the improvement of patient safety, and personnel should be encouraged and supported in their efforts to establish good relationships with people working in other units.[18]

An important finding was the low rate of reporting of incidents. Participants without any report during the past year exceeded 50%. This estimate was lower than the 84%

described in Turkey[18], but much higher than 40% reported in Dutch hospitals.[7] Fear of reprisal in a punitive system has been identified as a determinant of reluctance to report adverse events.[14] Recently, Elmontsri M. et al., presented a systematic review about the status of patient safety culture in Arab countries in which they identified that non-punitive response to error is seen as a serious issue that needs to be improved. Healthcare professionals in Arab countries tend to think that a 'culture of blame' still exists that prevents them from reporting incidents.[41] This situation is similar in Latin America where only few report events and still staff feels that their mistakes and reported events could be used against them, configuring punitive systems.[42,43]

While most individual institution reporting systems would have a limited volume of reports and insufficient power to draw statistically valid conclusions about certain events, they could be valuable to management and educators by identifying problems. Merely one report of a near miss could identify a critical situation and lead to quality improvement.[44] The Iberoamerican study of adverse events (IBEAS study) has enabled us to grasp the situation of patient safety and harmful incidents in certain hospitals in Latin America.[3] Critical areas of improvement detected in this study include 1) implementation of a non-blaming system to report adverse events, 2) enhancement of non-punitive policies with respect to error reporting, 3) promotion of open communication, and 4) promotion of management support of safety culture. However, active reporting has yet to be established in the sector, starting from our health care educational system in which students feel uncomfortable speaking up about patient safety issues and feel lack of confidence in their skills to manage safety risks.[45]

Our results show that administrative staff (without direct patient contact) have a higher perception of safety than those with direct contact. Probably, they look upon care and safety more through their role as potential patients than as care providers and, thus, are less concerned. Although administrative staff are always considered an important part of the safety culture system, studies are scarce regarding their role in perioperative safety.

Self-report instruments are commonly used, although weaknesses are widely recognized. Some tests are long and tedious and respondents simply lose interest and do not answer questions accurately. Additionally, people are sometimes not the best judges of their own behavior and try to hide true feelings, thoughts, and attitudes.[18] In contrast with this approach, we used an online web-based version of the questionnaire with a high rate of completeness compared with previous reports.[13,15,22] Survey response rates have been declining over the past decade and web-based questionnaires could replace traditional paper questionnaires with minor effects on response rates and at lower costs.[46,47] This could be an alternative to improving adherence, preventing bias, and aiding in the practical usefulness of the HSPSC.

There are limitations to consider when interpreting these results. The incomplete transferability of the 12 factors of the original HSPSC remains a limitation to compare with other areas worldwide and the source of those differences is worth discussing. Our findings provide an initial assessment of the participating OR. Further research should include a larger sample size across multiple surgical and perioperative facilities in other Colombian or Latin American hospitals to confirm the underlying structure of the HSPSC-LA in surgical settings. Finally, strong cultural differences could potentially reduce the external validity of our results but not their usefulness. We hypothesize that the main differences in the psychometric properties of this instrument compared with the original HSPSC are not due to language differences but due to the setting in which it is used.

In conclusion, this work provides the first validated surgical HSPSC tool for Latin America and hope to stimulate, hereby, its broader introduction to the clinical practice in this part of the world. Change starts with the feeling of a need to change. This questionnaire could provide a baseline of the surgical safety climate, monitor changes on time, and assess interventions aiming to improve surgical safety culture.

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CONFLICT OF INTEREST STATEMENT

None declared.

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APPENDIX

Table 1. Original HSPSC questionnaire translated to Spanish

Included items	Code
El personal se apoya mutuamente en esta unidad.	A1
Tenemos suficiente personal para hacer todo el trabajo.	A2
Cuando tenemos mucho trabajo, colaboramos todos como un equipo para poder terminarlo.	A3
En esta unidad nos tratamos todos con respeto.	A4
A veces, no se puede proporcionar la mejor atención al paciente porque la jornada laboral es agotadora.	A5
Tenemos actividades dirigidas a mejorar la seguridad del paciente.	A6
En ocasiones no se presta la mejor atención al paciente porque hay demasiado personal temporal.	A7
Si los compañeros o los superiores se enteran de que has cometido algún error, lo utilizan en tu contra.	A8
Cuando se detecta algún fallo en la atención al paciente se llevan a cabo las medidas apropiadas para evitar que ocurra de nuevo.	A9
Es sólo por casualidad que no ocurren errores más serios en esta unidad.	A10
Cuando alguien está sobrecargado de trabajo, suele encontrar ayuda en los compañeros.	A11
Cuando se detecta algún fallo, antes de buscar la causa, buscan un "culpable".	A12
Los cambios que hacemos para mejorar la seguridad del paciente se evalúan para comprobar su efectividad.	A13
Trabajamos bajo presión para realizar demasiadas cosas muy rápidamente.	A14
La seguridad del paciente nunca se sacrifica por hacer más trabajo.	A15
Cuando se comete un error, el personal teme que eso quede en su hoja de vida.	A16
Tenemos problemas con la seguridad de los pacientes en esta unidad.	A17
Nuestros procedimientos y sistemas son efectivos para la prevención de errores en la atención del paciente.	A18
Mi superior o jefe expresa su satisfacción cuando intentamos evitar riesgos en la seguridad del paciente.	B1
Mi superior o jefe tiene en cuenta, seriamente, las sugerencias del personal para mejorar la seguridad de los pacientes.	B2
Cuando aumenta la presión del trabajo, mi superior o jefe pretende que trabajemos más rápido, aunque se pueda poner en riesgo la seguridad del paciente.	B3
En la atención de los pacientes, mi superior o jefe no hace caso de los problemas de seguridad que se repiten una y otra vez.	B4
La Dirección de este hospital brinda un ambiente laboral que promueve la seguridad del paciente.	F1
Las unidades de este hospital no se coordinan bien entre ellas.	F2
La información de los pacientes se pierde cuando éstos se transfieren de una unidad a otra.	F3
Hay buena cooperación entre las unidades del hospital que necesitan trabajar juntas.	F4
Durante los cambios de turno, a menudo se pierde información importante del cuidado del paciente.	F5

Table 1. Original HSPSC questionnaire translated to Spanish (continued)

Included items	Code
A veces es incómodo o desagradable trabajar con personal de otras unidades.	F6
A menudo surgen problemas en el intercambio de información entre unidades de este hospital.	F7
Las acciones de la dirección de este hospital muestran que la seguridad del paciente es una de sus prioridades.	F8
La dirección del hospital sólo se interesa por la seguridad del paciente cuando ya ha ocurrido un evento adverso.	F9
Las unidades del hospital trabajan bien entre ellas para proveer el mejor cuidado para los pacientes.	F10
Surgen problemas en la atención de los pacientes como consecuencia de la entrega de turno.	F11
Cuando notificamos algún incidente, nos informan sobre qué tipo de cambios o ajustes se han llevado a cabo.	C1
Cuando el personal ve algo que puede afectar negativamente a la atención que recibe el paciente, habla de ello con total libertad.	C2
Se nos informa sobre los errores que se cometen en esta unidad.	C3
El personal puede cuestionar con total libertad las decisiones o acciones de sus superiores.	C4
En esta unidad, hablamos sobre formas de prevenir los errores para que no se vuelvan a cometer.	C5
El personal tiene miedo de hacer preguntas cuando algo no parece estar bien.	C6
Se reportan los errores que son descubiertos y corregidos antes de que afecte al paciente.	D1
Cuando se comete un error, pero no tiene el potencial de dañar al paciente, ¿qué tan frecuentemente es reportado?	D2
Cuando se comete un error que pudiese dañar al paciente, pero no lo hace, ¿qué tan a menudo es reportado?	D3

Table 2. HSPSC-LA version of the questionnaire after exploratory factor analysis

Included items	Code
El personal se apoya mutuamente en esta unidad.	A1
Tenemos suficiente personal para hacer todo el trabajo.	A2
Cuando tenemos mucho trabajo, colaboramos todos como un equipo para poder terminarlo.	A3
En esta unidad nos tratamos todos con respeto.	A4
A veces, no se puede proporcionar la mejor atención al paciente porque la jornada laboral es agotadora.	A5
Tenemos actividades dirigidas a mejorar la seguridad del paciente.	A6
En ocasiones no se presta la mejor atención al paciente porque hay demasiado personal temporal.	A7
Si los compañeros o los superiores se enteran de que has cometido algún error, lo utilizan en tu contra.	A8
Cuando se detecta algún fallo en la atención al paciente se llevan a cabo las medidas apropiadas para evitar que ocurra de nuevo.	A9
Es sólo por casualidad que no ocurren errores más serios en esta unidad.	A10
Cuando alguien está sobrecargado de trabajo, suele encontrar ayuda en los compañeros.	A11
Cuando se detecta algún fallo, antes de buscar la causa, buscan un "culpable".	A12
Los cambios que hacemos para mejorar la seguridad del paciente se evalúan para comprobar su efectividad.	A13
Trabajamos bajo presión para realizar demasiadas cosas muy rápidamente.	A14
Cuando se comete un error, el personal teme que eso quede en su hoja de vida.	A16
Nuestros procedimientos y sistemas son efectivos para la prevención de errores en la atención del paciente.	A18
Mi superior o jefe expresa su satisfacción cuando intentamos evitar riesgos en la seguridad del paciente.	B1
Mi superior o jefe tiene en cuenta, seriamente, las sugerencias del personal para mejorar la seguridad de los pacientes.	B2
Cuando aumenta la presión del trabajo, mi superior o jefe pretende que trabajemos más rápido, aunque se pueda poner en riesgo la seguridad del paciente.	B3
En la atención de los pacientes, mi superior o jefe no hace caso de los problemas de seguridad que se repiten una y otra vez.	B4
La Dirección de este hospital brinda un ambiente laboral que promueve la seguridad del paciente.	F1
La información de los pacientes se pierde cuando éstos se transfieren de una unidad a otra.	F3
Durante los cambios de turno, a menudo se pierde información importante del cuidado del paciente.	F5
A veces es incómodo o desagradable trabajar con personal de otras unidades.	F6
A menudo surgen problemas en el intercambio de información entre unidades de este hospital.	F7
Las acciones de la dirección de este hospital muestran que la seguridad del paciente es una de sus prioridades.	F8
La dirección del hospital sólo se interesa por la seguridad del paciente cuando ya ha ocurrido un evento adverso.	F9

Table 2. HSPSC-LA version of the questionnaire after exploratory factor analysis (continued)

Included items	Code
Las unidades del hospital trabajan bien entre ellas para proveer el mejor cuidado para los pacientes.	F10
Surgen problemas en la atención de los pacientes como consecuencia de la entrega de turno.	F11
Cuando notificamos algún incidente, nos informan sobre qué tipo de cambios o ajustes se han llevado a cabo.	C1
Cuando el personal ve algo que puede afectar negativamente a la atención que recibe el paciente, habla de ello con total libertad.	C2
Se nos informa sobre los errores que se cometen en esta unidad.	C3
En esta unidad, hablamos sobre formas de prevenir los errores para que no se vuelvan a cometer.	C5
Se reportan los errores que son descubiertos y corregidos antes de que afecte al paciente.	D1
Cuando se comete un error, pero no tiene el potencial de dañar al paciente, ¿qué tan frecuentemente es reportado?	D2
Cuando se comete un error que pudiese dañar al paciente, pero no lo hace, ¿qué tan a menudo es reportado?	D3

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