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Construct Validity of the Two Safety Culture Questionnaires

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Abstract

Objective: The aim of the study was to validate the construct of two culture assessment instruments adapted and validated for the Portuguese language, the Safety Attitudes Questionnaire (SAQ) and the Hospital on Patient Safety Culture (HSOPSC).

Material and Methods: Cross-sectional, exploratory-descriptive study with quantitative approach. The two instruments were applied at the same time to all professionals working in intensive care units that met the inclusion criteria: working at least 20 hours per week and at least one month in the sector.

Results: 170 questionnaires were distributed and 127 were considered valid for the research. The professionals that participated in the study, 60 (75%) were female, most had between 1 and 5 years of time in unit 40 (50%), with institution 39 (49%) and workload between 20 and 39 hours per week 32 (40%). Still, 69 (86.3%) reported having direct contact with the patient. Regarding the validation results, we observed positive and statistically significant correlations between SAQ domains with four HSOPSC domains. In the regression analysis, all domains of the SAQ, except for Stress Perception, explained all the variables resulting from HSOPSC.

Conclusion: Based on this study it was concluded that both instruments are valid and reliable for the evaluation of safety culture. However, it is worth emphasizing that the two instruments present factors that facilitate and hinder the application of the same.

Keywords: Nursing; Intraclass; Safety

Abbreviations: SAQ: Safety Attitudes Questionnaire; HSOPSC: Hospital on Patient Safety Culture; ICC: Intraclass Correlation Coefficient; AHRQ: American Agency for Quality in Health.

Introduction

Safety culture is increasingly recognized as an important strategy and precursor needed to improve patient safety. According to the United States Institute of Medicine, safety culture can be defined as an individual and organizational behavior that continually seeks to establish a commitment to the safety and quality of services provided [1].

The first step in implementing an institution's safety culture is to evaluate it. Assessing safety culture in health facilities can reveal conditions in a work environment that lead to adverse events. This evaluation can be performed soon after interventions aimed at patient safety and as a method of monitoring the effectiveness of these interventions, in addition to increasing the awareness of professionals and patients about safety issues.

In Brazil, there are two safety culture assessment instruments translated and adapted for the Portuguese language, the Safety Attitude Questionnaire (SAQ) and the Hospital on Patient Safety Culture (HSOPSC). These two instruments are the most applied in the world for this purpose, as well as being the only safety culture evaluation instruments translated and adapted to the Portuguese language [2-4].

SAQ was built in the United States by researchers at the University of Texas, Center of Excellence for Patient Safety and has been applied in more than 500 hospitals in the United States, United Kingdom and New Zealand. This instrument has 41 items distributed on a single page and measures the perception of health professionals through six domains: Team Work Climate, Safety Climate, Job Satisfaction, Stress Perception, Management Perception, Working Conditions [2].

HSOPSC was developed and made available by the US Agency for Research and Quality of Health (AHRQ) in 2004 [5] and translated and validated for Brazil in 2013 [4], and organizational norms, reporting of adverse events, communication, supervision and management. The HSOPSC contains 50 items distributed in 12 points in item scale [5]. Since the items were written in both directions as positive and negative, the written items were partially reversed.

The validation process of a validation instrument during cross-cultural adaptation concluded that, unlike the validation process, the evidence was repeated at various times, evidencing the importance of a continuous evaluation of the instruments, since the two are reference tools for assessing safety culture.

Construct validity is based on what is really thought about the median measures. The necessary evidence for this type of evaluation can be obtained from the internal analysis of the instrument, through confirmatory factor analysis, internal consistency and its correlations with other testicles, by the preference that they are accepted as construct measures. The higher the correlations are, the more the test will be the measurement sense of the construct in question [6].

Given the availability of two instruments in the Portuguese language that evaluates the same construct, but with different characteristics, which seeks to answer as the main research questions: Is the SAQ domain convergent to the same constructs and evaluated by the HSOPSC domains? As predictive variables (domains) they explained as a result. In this sense, the Safety Study Questionnaire (SAQ) and the Hospital on Patient Safety Culture (HSOPSC).

Materials and Methods

Cross-sectional, exploratory-descriptive study with quantitative measures in intensive care units of two hospitals in Brazil. The hospitals that participated in the study were part of a larger study evaluating the culture of Brazilian hospitals [7]. The construct validation handles, the two instruments were distributed to all individuals working in the intensive care units of the hospitals participating in the study, corresponding to a sample of 170 professionals. However, 127 returned the completed instruments. The study included nurses, physicians, nursing assistants, physiotherapists, nutritionists, psychologists, pharmacists and social workers who met the inclusion criteria: less than 20 hours a week and less than a month in the sector.

Data were collected through the Safety Attitude Questionnaire (SAQ) and the Hospital on Patient Safety Culture (HSOPSC), both translated and validated for Brazil, as well as a sociodemographic characterization form. One answer to each question is a 5-point scale, including the final variation of 100, with a cut-off point of 752. The HSOPSC covers 12 dimensions of the safety culture in various sizes. It contains 50 items in total; 44 are related to safety culture and 6 items are related to personal information [4].

The study participants signed and received the Informed Consent Term. The instruments were filled in the working environment available on paper. The study was approved by the Ethics Committee of the institutions and has protocol number 985.564. All participants in the study signed the informed consent form and were guaranteed anonymity.

The collected data were inserted into a database and then processed in the R software. Each questionnaire had its results converted into scores according to the value established for each option.

To make this comparison possible, the HSOPSC scores were normalized according to the SAQ score. The calculation of the Intraclass Correlation Coefficient (ICC) was applied to evaluate the correlation between the domains, and the mixed two way model was chosen, with a 95% confidence interval. The interpretation of ICC values was based on the scale of values suggested by

Menz, et al. [8,9], which are: greater than 0.75 are considered excellent; values between 0.40-0.75 are moderate and / or satisfactory and values below 0.40 are unsatisfactory. The reliability of the instruments was measured by Cronbach's alpha and was considered 0.69, the lower limit generally accepted in exploratory research. To understand how much each predictive variable (domains) explained the outcome variables, the Regression Analysis was performed. The following variables were considered: Number of events reported in the last 12 months (Section D), Patient Safety Grade (Section E) and Overall Perceptions of Patient Safety (A10, A15, A17 e A18).

Results

For the validation of construct, the two instruments were applied at the same time, being answered by 127 professionals. Of these, 68 (75%) professionals were female, with 1 to 5 years of time in unit 59 (46.5%) and with a workload of 20 to 60 hours per week 99 (60%). Still, 115 (90.6%) professionals reported having direct contact with the patient (Table 1).

Variable		n	%
Gender	female	68	75
	male	54	22,5
	missing data	5	2,5
	Total	127	100
How long have you worked in your current hospital work area/unit	Less than 1 year	27	21,3
	1 to 5 years	59	46,5
	6 to 10 years	23	18,1
	11 to 15 years	9	7,1
	16 to 20 years	4	3,1
	21 years or more	5	3,9
	Total	127	100
Hours per week	Less than 20 hours per week	8	6,3
	20 to 39hours per week	50	39,4
	40 to 59 hours per week	49	38,6
	60 to 79 hours per week	13	10,2
	80 to 99 hours per week	2	1,6
	100 hours per week or more	2	1,6
	missing data	3	3,8
	Total	127	100
Interaction or contact with patient	Yes	115	90,6
	No	7	5,5
	Missing data	5	3,9
	Total	127	100

Table 1: Characterization of the subjects of the research.

As for the general scores of the two instruments, mean values ranged from 50 to 74.1 (SAQ) and 42.8 to 60.9 (HSOPS). For the SAQ, it is expected for a positive safety culture, scores above 75, thus considering that instrument was not observed any domain with scores above this value. However, for the HSOPSC we consider positive responses, that is, responses above 50% of partially and totally agree for each domain. According to this criterion, five of the ten HSOPSC domains presented positive responses> 50%, indicating that they are strong factors and are present in the safety culture in the studied unit (Table 2).

	Patient Safety Culture Composite	mean	SD*	Positive porcetagem*	Cronbach Alfa
HSOPSC	Supervisors/managers consider staff suggestions for Actions Promoting Patient Safety	42.8	14.6	61	0.76
HSOPSC	Organizational Learning—Continuous Improvement	60.9	17.7	57	0.51
HSOPSC	Teamwork within Units	57.8	17.5	53	0.68
HSOPSC	Feedback and Communication About Error	52.8	20.3	50	0.51
HSOPSC	Communication Openness	51.2	15.8	51	0.62
HSOPSC	Nonpunitive Response to Error	60.5	17	17	0.37
HSOPSC	Management Support for Patient Safety	48.8	15.6	48	0.65
HSOPSC	Handoffs and Transitions	43.7	20.5	44	0.78
HSOPSC	Teamwork Across Units	70	17.3	36	0.71
HSOPSC	Staffing	49.3	15.6	46	0.33
SAQ	Teamwork Climate	50	11.9	77	0.71
SAQ	Safety Climate	62.4	17.6	56.2	0.65
SAQ	Job satisfaction	74.1	17.9	70	0.73
SAQ	Stress recognition	72.9	27.2	73	0.84
SAQ	Perceptions of management units	50.1	22	31	0.8
SAQ	Perceptions of management hospital	53.7	24	40	0.74
SAQ	Working condition	65.8	24.3	61	0.73

Table 2: Presentation of mean scores and internal consistency of HSOPSC and SAQ domains.
*The positive responses refer to the sum of I agree totally and agree partially divided by the number of responses (neutral, totally and partially disagree except the absent data). SD: Standard Deviation

Regarding the internal consistency analysis, the SAQ presented good reliability, except for the Safety Climate domain, while the HSOPSC showed two domains with Alpha above 0.7 (Table 2).

Regarding the Infraclass Correlation Coefficient, SAQ presented significant ICC 0.63 for all domains, considering moderate to excellent reproducibility. The HSOPSC showed ICC ranging from 0.33 to 0.91 significant for six domains and reproducibility ranging from poor to excellent (Table 3).

	Patient Safety Culture Composite	ICC	Anova
SAQ	Teamwork climate	0.68	<0.05
SAQ	Safety Climate	0.63	<0.05
SAQ	Job satisfaction	0.67	<0.05
SAQ	Stress recognition	0.84	<0.05
SAQ	Perceptions of management units	0.78	<0.05
SAQ	Perceptions of management hospital	0.76	<0.05
SAQ	Working condition	0.72	<0.05
HSOPSC	Supervisors/managers consider staff suggestions for Actions Promoting Patient Safety	0.75	<0.05
HSOPSC	Organizational Learning—Continuous	0.46	<0.05
HSOPSC	Teamwork within Units	0.59	<0.05
HSOPSC	Feedback and Communication About Error	0.5	<0.05
HSOPSC	Communication Openness	0.59	<0.05

HSOPSC	Nonpunitive Response to Error	0.36	NS*
HSOPSC	Management Support for Patient Safety	0.65	NS*
HSOPSC	Handoffs and Transitions	0.77	<0.05
HSOPSC	Teamwork Across Units	0.53	<0.05
HSOPSC	Staffing	0.33	NS*
HSOPSC	Number of Events Reported	0.91	NS*
HSOPSC	Patient Safety Grade	0.38	<0.05

Table 3: Intraclass coefficient and ANOVA of the domains.
*NS-not significant

For construct validation, we considered the significant correlations between the domains of the two instruments, that is, the degree to which the measures of two instruments are related positively. Thus, when the domains of the two instruments were correlated, it was observed that almost all SAQ domains correlated with four domains and with all the variables resulting from HSOPSC (Table 4). The only domain of SAQ that did not correlate with any HSOPSC domain was Stress perception.

Domains SAQ	Domains HSOPSC	Outcome variables
Teamwork climate	Teamwork within Units, Organizational Learning-Continuous, Feedback and Communication About Error	Patient Safety Grade and Number of Events Reported
Safety climate	Organizational Learning-Continuous e Feedback and Communication About Error	Patient Safety Grade, Overall Perceptions of Patient Safety and Number of Events Reported
Job satisfaction	-	Number of Events Reported
Perceptions of management units	Teamwork within Units	Patient Safety Grade
Perceptions of management hospital	Organizational Learning-Continuous e Feedback and Communication about Error e Management Support for Patient Safety	Number of Events Reported
Working condition	Management Support for Patient Safety	Patient Safety Grade

Table 4: Correlation between SAQ and HSOP domains.

To understand how much each predictive variable (domains) explained the outcome variables (Number of events reported in the last 12 months, Patient Safety Grade and Overall Perceptions of Patient Safety) was performed the Regression analysis. It was observed that the SAQ predictive variables explained between 22 and 33% of the variables: Number of events reported, Patient Safety Grade and Overall Perceptions of Patient Safety with statistical significance, while HSOPSC explained two variables: Patient Safety Grade and Overall Perceptions of Patient Safety (Table 5).

Predictive variable	Outcome variable		
	Number of Events Reported	Patient Safety Grade	Overall Perceptions of Patient Safety
Teamwork climate	0.35 (0.01)	0.34 (<0.01)	
Safety climate	0.46(0.01)	0.36(<0.01)	
Job satisfaction	0.32(0.01)		
Perceptions of management hospital	0.31(<0.05)	0.35(<0.05)	
Working condition		0.36 (<0.05)	
Organizational Learning—Continuous	-		0.37 (<0.05)
Nonpunitive Response to Error	-		0.49(<0.05)
Handoffs and Transitions	-		0.24(<0.05)

Table 5: Regression analysis of predictive variables and outcome.

Discussion

The characterization of the professionals who participated in the study is similar to the results of other studies that showed the female gender as the predominant gender [10,11], who have been working for at least five years in the institution [12], with a weekly workload of 20-60 hours and with direct contact with the patient [10,12,13]. Gender is not a factor that can be associated with results in the safety culture. However, work experience time and the link with the institution indicate that health professionals are very knowledgeable about their work and may have positive safety attitudes [14].

The mean scores of the HSOPSC domains ranged from 42.8 to 70 on a scale of 0 to 100. Of note were the domains, Teamwork with the highest average and Expectations and actions to promote the safety of supervisors and managers with the lowest average. These results diverge, in part, from the data identified in the report of the American Agency for Quality in Health (AHRQ), which, after applying this instrument to thousands of health professionals, showed that the teamwork in the units presented a better result and a non-punitive response the error was the one that presented the worst result [7]. This domain was also the one with the lowest percentage of positive responses in other studies emphasizing that the actions of supervisors and managers considering the employees' suggestions for improving patient safety is still a failure in the institutions studied [15-17]. The results of SAQ are similar to those identified in the studies with this instrument in which they present the domain Satisfaction in the Work as the best evaluated and the domain Management perception as the domain of unfavorable evaluation [10,18,19].

Health institutions committed to patient safety policies can improve nurses' job satisfaction by developing the quality of their work. It is considered that the leadership styles of the supervisors and managers can imply in opposite effect, reducing the autonomy and suppressing the professional satisfaction of the nurses. To avoid this, hospital managers must demonstrate positive attitudes in order to promote patient safety and professional satisfaction [20,21].

Internal consistency analysis using Cronbach's Alpha presented similar results to other studies in relation to the domains of SAQ and HSOPSC [4,22-24]. The degree of reproducibility of the SAQ (ICC> 0.63) was moderate to excellent, which means that the variation between the professionals' responses to this instrument was small.

For construct validation, we considered the significant correlations between the domains of the two instruments, that is, the degree to which the measures of two instruments are related positively [5]. Thus, a positive association was observed between six SAQ domains with four domains and all variables resulting from HSOPSC. The only domain of SAQ that showed no correlation was Stress perception. This means that the two instruments can evaluate similar constructs and can be used before and after interventions that improve outcomes for the patient.

In general, the ICC of the domains presented statistically significant correlations. (SAQ), Work Conditions (SAQ), Supervisor Safety Promotion Expectations and Actions (HSOPSC), Pass on duty (HSOPSC) and reported (HSOPSC) presented a statistically

significant association, considered excellent reproducibility.

The domain Teamwork Climate (SAQ) was significantly correlated with five HSOPSC domains, namely: Learning, Teamwork of the unit, Feedback, Degree of safety and Frequency of reported events. This correlation makes sense since good quality of the relationship and collaboration among team members occurs when there are positive changes and learning from the reported events, when team members support each other, treat each other with respect and work together as a team. The other HSOPSC domains had positive correlations for one or two SAQ domains. Similar results were identified in the study by Etchegaray and Thomas [25] that demonstrated the predictive reliability and validity in both SAQ and HSOPSC instruments.

The regression analysis allowed us to understand how much each predictive variable (domains) explains the outcome variables. The three HSOPSC variables explained all SAQ domains, with emphasis on the domains of Safety, Teamwork Climate, Work Satisfaction and Hospital Management Perception that were explained by all outcome variables. While two variables result General Degree of Security and General Perception of Security, they explained HSOPSC domains.

The evaluation of the reliability and validity of the two instruments was consistent with previous studies that evaluated the psychometric characteristics of the two instruments [3,4,25]. However, this was the first construct validation survey with the two brazilian instruments that evaluate safety culture, so it is emphasized the need for more research with additional safety culture results to elucidate the strengths and weaknesses of the two instruments. It was observed that almost all domains of SAQ are correlated with some domains of HSOPSC and all variable outcomes. In addition, all variables resulting from the HSOPSC explain the domains of the SAQ.

Conclusion

It was concluded that both instruments are valid and reliable for evaluating the safety culture. It is worth emphasizing that the two instruments present factors that facilitate and hinder their application. The SAQ has a single page and has been evaluated by health professionals as a quick and practical tool to fill out, but does not have outcome evaluation items and suggestions space. The HSOPSC is a long six-page instrument, a characteristic identified as an impeding factor by many professionals, reflecting the low adherence of professionals in this study. It should be highlighted that this instrument presents variables that allow the evaluation of results, indicators that can complement and confirm the evaluated constructs. In addition to possessing a space for the writing of suggestions. The two culture evaluation questionnaires available in the Portuguese language can be useful tools in the initial diagnosis of the institution's safety culture and assist managers in decision making.

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