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Patient safety climate in operating rooms at Colombian hospitals: differences by profession and type of contract

Clima de seguridad del paciente en unidades quirúrgicas de hospitales colombianos: diferencias por profesión y tipo de contratación

Keywords: Patient safety climate, Patient safety culture, Operating rooms, HSOPS, Anesthesiologists

Palabras clave: Clima de seguridad del paciente, Cultura de seguridad, Unidades quirúrgicas, HSOPS, Anestesiólogos

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Abstract

Introduction: The safety climate (SC) measurement in the hospitals, is essential for the development of a patient safety policy (PSP). Information about SC in the operating rooms is scarce.

Objective: To measure the dimensions of SC in Colombian Operating Rooms according to characteristics of surgical staff.

Methods: Cross-sectional study. The Hospital Survey on Patient Safety and an additional module for operating rooms were administered to healthcare workers in 6 high-complexity hospitals in the Metropolitan Area of Medellín (Colombia). The positive responses percentage for each dimension was measured. Differences by profession and type of contract were analyzed.

Results: A total of 442 participants were included. The workers in the operating rooms perceive a weak SC in terms of non-punitive response to error and workload (49.4% and 59.3% positive responses, respectively). Differences were found between physicians and nurses with lower scores in nursing for dimensions related to patient care. Anesthesiologists present low scores in events reporting. There are also differences by the type of work contract.

Conclusion: Despite the PSP, the perception of a punitive culture to error, with a high workload. Recognizing differences between the groups within the surgical units helps to focus interventions strengthening the patient safety.

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Resumen

Introducción: La medición del clima de seguridad (CS) en las instituciones de salud es parte fundamental del desarrollo de una política de seguridad del paciente (PSP). Existe poca información acerca de la medición de clima de seguridad en las unidades quirúrgicas.

Objetivo: Medir las dimensiones del CS en las unidades quirúrgicas de seis instituciones de salud colombianas según las características del personal.

Métodos: Estudio de corte transversal. El cuestionario sobre seguridad del paciente en los hospitales (HSOPS) más la adición de un módulo para unidades quirúrgicas se aplicó al personal de seis hospitales de III nivel de Medellín (Colombia). Se midió el porcentaje de respuestas positivas para cada dimensión del CS. Se analizaron las diferencias por profesión y tipo de contratación.

Resultados: Se incluyeron 442 participantes. El personal de las unidades quirúrgicas percibe un CS débil en respuesta no punitiva al error y carga de trabajo (49,4 % y 59,3 % de respuestas positivas respectivamente). Se encontraron diferencias entre personal médico y de enfermería con puntajes más bajos de percepción de CS en enfermería para aquellas dimensiones relacionadas con cuidado del paciente. Los anestesiólogos presentan puntajes bajos en el reporte de eventos. Existen además diferencias según el tipo de contrato de trabajo.

Conclusiones: A pesar de la implementación de políticas de seguridad del paciente, persiste la percepción de una cultura punitiva frente al error, con una carga de trabajo elevado. El reconocimiento de las diferencias entre los grupos en las unidades quirúrgicas permitirá focalizar intervenciones que fortalezcan la seguridad del paciente.

Introduction

The *patient safety culture* can be understood as the product of shared values, attitudes, and behavioral patterns that determine the effort with which members of an organization direct their attention and action to minimizing the harm resulting from the care process.[1] Strengthening the patient safety culture is one of the pillars of patient safety policies (PSP), under the assumption that a strong culture generates safer care.[2,3] The safety climate (SC) is a measurable component of the patient safety culture that, through the use of instruments designed for its measurement, reflects the perception of safety in health institutions. Although in literature the terms *patient safety culture* and *safety climate* are used as synonyms, culture corresponds to stable processes over time while climate represents a more changing phenomena.[4]

Operating rooms handle highly complex care processes in patients with more comorbidities, which configures them as services susceptible to adverse events; however, few studies have measured SC in this scenario in Colombia.[5]

The objective of this study was to measure the dimensions of SC in the operating rooms of 6 Colombian hospitals and describe them according to the profession and the staff's type of contract.

Methods

Cross-sectional study with analytical approach.

Population

The medical and administrative staff of operating rooms (doctors, nurses, instrument assistant, pharmaceutical chemists, administrative assistants, and coordinators). High-complexity hospitals (Level 3) with surgery volumes greater than 300 procedures per month in the Metropolitan Area of Medellin (Colombia) were included. Surveys were conducted between July and October 2018. Staff with a length of service lower than 3 months and staff responsible for patient quality and safety were excluded. Sample size derived from the calculation for the validation study (420 participants).

The study was approved by the Institutional Committee for Research Ethics of the CES University (Minutes No. 87) and by the research committees of the participating institutions.

Instrument

The Spanish version of the Hospital Survey on Patient Safety (HSOPS) developed by Agency for Healthcare Research and Quality was used.[6] This instrument is frequently used in the industry to measure SC, which is recommended in the Ministry of Health's guidelines for the implementation of the PSPs.[2] This survey consists of 42 items with 5 Likert response options that evaluate 12 dimensions: expectations and actions of service management/supervision that promote safety, organizational learning/continuous improvement, teamwork within areas, open communication attitude, feedback and communication about error, non-punitive response to error, staffing, hospital's support for patient safety, teamwork between hospital areas, shift changes, and transitions between services, general perception of safety, and frequency of events reporting. The instrument includes an item on general perception of SC.[7]

In an earlier stage of the study, the Spanish version of the HSOPS was validated. A Delphi of patient safety experts validated appearance and content. In this stage, 16 items for the surgical area were added, which resulted in a new survey of 60 items with Likert response options of 5 categories; later on, in a sample of 412 workers of 6 operating rooms, construct validation was performed using exploratory factorial analysis which resulted in a 10 dimensions version (in publication process). Table 1 shows the names of dimensions and the Cronbach's alpha obtained in the validation process. The complete items are

Table 1. Dimensions of patient safety climate survey for operating rooms[*].

Dimensions	Cronbach's α
Teamwork	0.84
Workload	0.66
Organizational learning-continuous improvement	0.81
Non-punitive response to error	0.76
Supervisor's expectations and actions to promote safety	0.7
Open communication and feedback	0.79
Frequency of events report	0.87
Transitions and transfers	0.85
Medical supplies, equipment and devices	0.85
Safe practices	0.85

[*] The internal consistency evaluated by Cronbach's α is presented.
Source: Authors.

available in the Digital Supplement 1, http://links.lww.com/RCA/A914.

Procedure

The instrument was applied to surgical staff with prior informed written consent; the survey, of an anonymous nature, was handed over for self-completion and subsequent return to the investigators by personnel unconnected to the institution.

Statistical analysis

The characteristics of the participants are presented as medians with interquartile range for the quantitative variables (after evaluation of normality with the Shapiro–Wilk test), and absolute frequencies and percentages for qualitative variables. The items were coded according to the original structure of the HSOPS; the items with negative formulation were inverted taking into account that the SC is conceived as a positive construct. Therefore, high scores mean a better perception of the SC.

The instrument was distributed by the research team staff (unconnected to the surveyed institution) to all the staff of the surveyed operating rooms.

For the measurement of the scores, the methodology recommended by the developers of the instrument was applied (the average of positive response percentage—PRP of the items of each factor).[8] Scores for each dimension are presented with a confidence interval of 95% (confidence interval [CI] 95%). Differences in scores by institution, profession and type of employment contract were analyzed. The data were analyzed in Stata version 12 (Lakeway Drive, Texas USA).

Results

A total of 442 completed questionnaires were retrieved, the survey return percentage was 77.1% with a variation among institutions of 70.6% and 87.5%. The data loss percentage per variable ranged from 0.2% and 3.8%. All participating institutions corresponded to level 3, the number of operating rooms in the surgical units varied between 4 and 9. Five institutions were private and 1 was public. The characteristics of the participating staff are presented in Table 2.

In the staff of the operating rooms, the SC perception scores (evaluated as the positive response percentage for each dimension) presented differences among institutions for all dimensions (Fig. 1).

The SC dimensions with the lowest score corresponded to "non-punitive response to error" (PRP: 49.4%) and "workload" (PRP: 52.3%), both consolidated and disaggregated. On the other hand, the new dimensions added to the instrument "medical supplies, equipment, and devices" and "safe practices" have the highest scores (86.4% and 88.7%, respectively). The results of the total and disaggregated scores can be found in the complementary digital material (Digital Supplement 2, http://links.lww.com/RCA/A915).

The institutions also showed differences in the "general perception of safety" item, with scores varying between 57.5%; CI 95% (42.9–72.1) and 94.2%; CI 95% (89.7–98.7).

Differences in the safety climate by profession

In the comparison of the SC perception among nursing and surgical instrument staff vs the perception of specialist practitioners and anesthesiologists, differences were found in the scores of "teamwork" (71.1; CI 95% [65.6–76.6] for nursing vs 85.6; CI 95% [78.9–92.3] for specialists) and "workload" (44.1; CI 95% [38.1–50.1] for nursing vs. 66.2; CI 95% [57.1–75.3] for specialists), in which the nursing staff gave them lower scores. In relation to the frequency of events reporting and safe practices, anesthesiologists gave the lowest scores (Table 3). No differences in scores were found between specialists and anesthesiologists for any of the dimensions.

Differences according to type of contract

Differences were found between permanent staff and the staff who provide services; the latter, in turn, behave

Table 2. Characteristics of the participants.

Length of service in the institution/unit	Median	Interquartile range
Time in the institution in years	5	(3–10)
Time in the unit in years	5	(3–10)
Hours per week	48	(38–48)
Years of service in the profession	8	(4–14)

Position	n	%
Auxiliary nurse	162	37.07
Specialist practitioner	97	22.2
Surgical instrument assistant	55	12.59
Anesthesiologist	58	13.27
Nurse practitioner	32	7.32
Sterilization assistant	13	2.97
General practitioner	7	1.6
Administrative assistant	6	1.37
Pharmacist	4	0.92
Administration/management	2	0.46
General services	1	0.23

Work area	n	%
Surgery	335	75.8
Anesthesiology	58	13.1
Obstetrics	21	4.8
Sterilization	23	5.2
Pharmacy	4	0.9
Other	1	0.2

Contact with patients	n	%
Yes	411	94.9
No	22	5.1

Type of contract	n	%
Service provision	195	44.1
Permanent workforce	165	37.3
Trade union	52	11.8
Others	13	2.9
No response	17	3.9

Source: Authors.

similarly to workers in trade unions. The SC perception differs between staff hired for the provision of services and permanent staff for the "workload" dimensions (48.9; CI 95% [41.9–55.9] vs 65.7; CI 95% [58.5–72.9], respectively) and "supervisor/manager's expectations and actions" (71.7; CI 95% [65.4–78.0] vs. 86.5; CI 95% [81.3–91.7], respectively). Permanent staff assigned lower scores to "frequency of events reporting" when compared with the service provision staff (52.6; CI 95% [45.0–60.2] vs 68.3; CI 95% [61.8–74.8]) and a similar situation occurs with "safe practices" (80; CI 95% [73.9–86.1] vs 91.7; CI 95% [87.8–95.6]) for permanent and service provision staff, respectively (Fig. 2 and Digital Supplement 3, http://links.lww.com/RCA/A916).

When comparing the SC perception between staff who have direct contact with the patient and those who do not, no differences were found for any dimension.

Discussion

Patient SC measurements at health facilities have gained significance under the assumption that strengthening the patient safety culture could decrease adverse events. The operating rooms have specific characteristics, different from other healthcare services, so the SC may also have particular characteristics. Haytman and collaborators report lower SC scores in operating rooms when compared to other areas of the hospital.[9]

The present study identified that the perception of SC varies among institutions; those with the lowest scores in 1 dimension also had low scores in the other dimensions, which allows identifying different stages of consolidation of the patient SC among the institutions. For this reason, it is necessary to complement the aggregated analyses with comparisons among institutions.

In general, there is a lower perception of SC in the dimensions of workload and non-punitive response to error; these findings are consistent with other reports. A recent systematic review evaluated studies that measured SC using the same instrument and showed that these 2 dimensions were the most frequently described as weak.[10] The lowest SC score in the workload dimension was reported by the nursing staff; this aspect is of particular interest because indicators of staff sufficiency in services have been directly related to adverse events. A recent study in 9 countries reports that an increase in the workload for nurses in a patient increases the *odds* of postoperative mortality by 7%.[11] It is therefore necessary to delve more deeply into the factors that influence the workload in institutions and that can be modified, such as the availability of personnel and the design and organization of the work environment.[12,13] For nurses, "performance barriers" have been described which directly influence workload, safety of care and quality of working life, and which could be modified by simple interventions.[14]

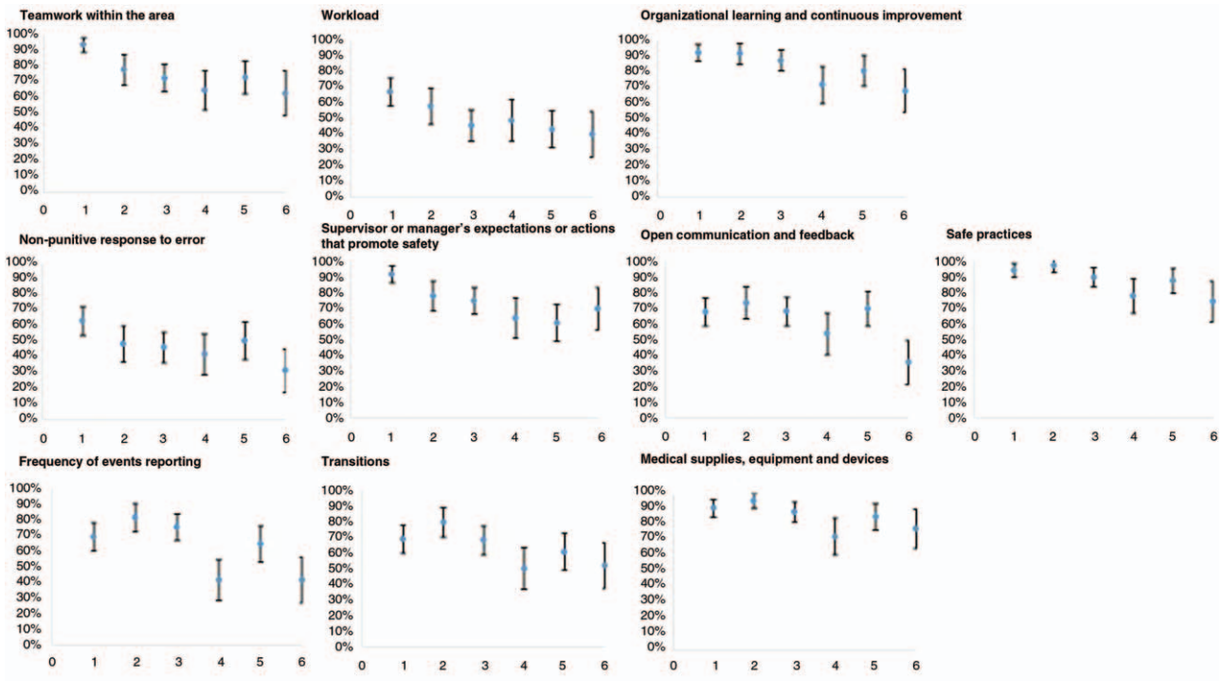

Figure 1. Safety climate perception scores per institution.
Source: Authors.

The SC scores for the "non-punitive response to error" dimension, although with no differences among groups analyzed, were consistently low; a study conducted in 92 hospitals in the United States using another measurement instrument identifies this as one of the most problematic dimensions[15]; additionally, 2 recent observational studies report this dimension of SC as the weakest[16,17]; similar results have been described in other countries[18–20] and in

Table 3. Safety climate scores per profession.

Dimension	Nursing/Instrument assistants	Specialists	Anesthesiologists
Teamwork within the area	71.1 [65.6–76.6]	85.6 [78.9–92.3]	83.4 [73.8–93.0]
Workload	44.1 [38.1–50.1]	66.2 [57.1–75.3]	63.1 [50.7–75.5]
Organizational learning and continuous improvement	84.4 [80.0–88.8]	82.7 [75.4–90]	81.3 [71.3–91.3]
Non-punitive response to error	44.7 [38.7–50.7]	57.7 [48.2–67.2]	54.2 [41.4–67.0]
Supervisor or manager's expectations and actions that promote safety	74 [68.7–79.3]	72.4 [63.8–81.0]	84.8 [75.6–94.0]
Open communication and feedback	64.7 [58.9–70.5]	63.5 [54.2–72.8]	61.4 [48.9–73.9]
Frequency of event reporting	70.1 [64.6–75.6]	61.1 [51.7–70.5]	49.4 [36.5–62.3]
Transitions	62.9 [57.1–68.7]	71.4 [62.7–80.1]	61.3 [48.8–73.8]
Medical supplies, equipment, and devices	87.5 [83.5–91.5]	84 [77–91]	84.8 [75.6–94.0]
Safe practices	92 [88.7–95.3]	86.2 [79.6–92.8]	76.7 [65.8–87.6]
General perception of safety	85.4 [81.1–89.7]	85.3 [78.5–92.1]	86.2 [77.3 95.1]

Source: Authors.

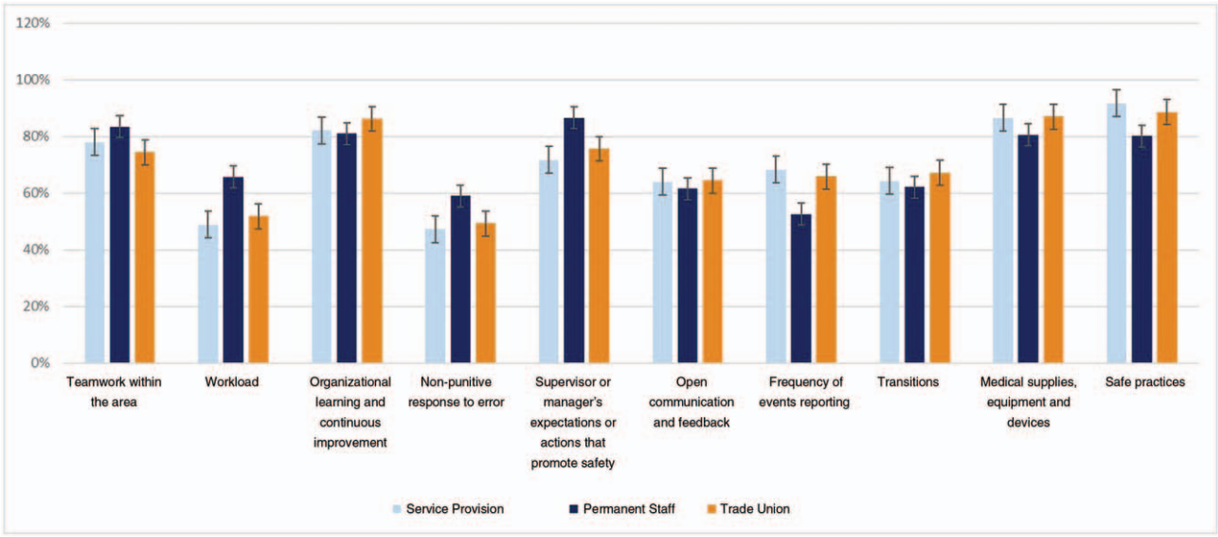

Figure 2. Safety climate perception scores per type of contract.
Source: Authors.

Colombia.[21,22] Voluntary reporting systems have been used as a strategy for measuring adverse events and are an important input in our area for patient safety units.[2,23,24] A high perception of punitive response to error has been related to low performance of these systems; although the perception of individuals by itself is not an indicator of the frequency of the adverse event, this finding suggests the importance of strengthening a non-punitive climate and evaluating its effect on the frequency of adverse events reporting.[25,26]

The analysis per profession and type of contract suggests that the "problematic" dimensions within the groups are persistently the same as in the consolidated one, which makes it possible to identify opportunities for improvement with general interventions applicable to the entire service. Furthermore, the differences according to staff characteristics facilitate the design of strategies focused on groups.

Nurses give SC lower scores regarding aspects directly related to care activity, which can be related to their caregiver profile and activities; on the other hand, anesthesiologists have low frequency of events reporting and give low scores to the implementation and evaluation of safe practices. Similar behaviors have been described by other studies.[15,17] Differences in the perception of SC between permanent and the service provision staff could be related to the sense of belonging, stability, and work incentives for different hiring modalities. It is necessary to deepen the meaning of these findings by means of studies with a qualitative focus.

Although in Colombia it is advisable to carry out periodic SC measurements, the authors are unaware of studies in which operating rooms are specifically evaluated; moreover, the present study presents the results after a process of validation and measurement of psychometric properties of the instrument. Additional strengths of the study lie in the high return rate of the survey and in the application of the instrument by outside personnel, which reduces response bias due to hierarchical influence.

There are however some limitations: staff who did not respond may have a different perception of a SC; conversely, extrapolation to instructions with different characteristics (e.g., other levels of care) may be limited. The differences found in the scores according to profession and type of contract could be related to other factors such as time in the profession, type of hospital, working conditions, and so on. Additional studies may evaluate these factors. Alternatively, assessing the perception of SC with surveys based on purely quantitative measurements could simplify and limit the study of a broader phenomenon, such as the development of a safety culture.[27]

Finally, it is necessary to clarify that SC perception scores do not necessarily imply less secure institutions; it is therefore necessary to assess in future studies whether variability among institutions in the SC partly explains differences in patient safety outcomes, such as adverse events, among institutions.

Ethical responsibilities

The study was approved by the Institutional Committee for Human Research Ethics of the CES University (Minutes No. 87 of November 9, 2015) and by the research committees of the participating institutions. Written informed consent was requested from participants for the conduction of the survey.

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Conflicts of interest

The lead author works as an anesthesiologist in a Trade Union.

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