BJPS

Brazilian Journal of
Pharmaceutical Sciences

http://dx.doi.org/10.1590/s2175-97902022e20155

Article

Patient safety culture from the perspective of employees in a university hospital

Géssica Caroline Henrique Fontes-Mota[1]*, Eliane Ribeiro[1,2]

[1]Department of Pharmacy, Faculty of Pharmaceutical Sciences, University of São Paulo, São Paulo, São Paulo, Brazil, [2]University Hospital, University of São Paulo, São Paulo, São Paulo, Brazil

Safety culture is a product of values, attitudes, skills, and behavioral patterns, and it determines the commitment of the management to a secure organization. The evaluation of safety culture in hospitals helps to identify and manage the relevant patient safety issues in hospital routines and working conditions proactively. Thus, this study is aimed to evaluate patient safety culture in all the departments of a university hospital of medium complexity. This study employed a cross-sectional and analytical design employed in the Portuguese version of the Hospital Survey on Patient Safety Culture. A sample of all hospital staff participated in this study, which was conducted from December 2016 to May 2017. The percentage of positive responses was calculated to identify the strong and weak areas in patient safety. Of the 413 questionnaires distributed, 368 valid responses were returned. The response rate was, therefore, 89%. The overall percentage of positive responses was 50.3%. The "Supervisor/manager expectations and actions promoting patient safety" dimension obtained the highest percentage of positive responses (67.1%). The "Nonpunitive response to error" dimension was considered the weakest for safety culture, with only 22.9% positive responses. Furthermore, most professionals (70.6%) did not report any events in the previous 12 months. Nevertheless, 69.5% of participants considered patient safety within their unit/work area as "very good" or "great." The results showed that the employees' perception of patient safety diverged from the reality within the institution. Therefore, efforts should be made to promote an acceptable safety culture in all hospital areas.

Keywords: Healthcare quality. Health services research. Patient safety. Safety management.

INTRODUCTION

The Health and Safety Commission (Leape *et al.*, 1993) defines safety culture (SC) as the product of values, attitudes, abilities, and behavioral standards that determine the necessary compromises for a safe organization (Nieva, Sorra, 2003).

In 1999, the Institute of Medicine published a report entitled "To Err is Human: Building a Safer Health System." It estimated that 44,000 to 98,000 deaths occurred annually in the United States (US) due to healthcare-related adverse events (AE). The additional annual cost associated with these events has been estimated to be between $17 billion and $29 billion, including income losses and resulting disabilities (Kohn, Corrigan, Donaldson, 1999). After the release of this report, investing in the patient safety culture in health organizations was considered an essential requirement for reducing the occurrence of AE by proactively learning from the errors and redefining the processes (Handler *et al.*, 2006). The World Health Organization (WHO) (2009) defines AE as unintentional harm resulting from care provided to a patient, unrelated to the natural course of the underlying disease. Patient safety is defined by the WHO as reducing the risk of unnecessary harm associated with healthcare to an acceptable minimum (WHO, 2009).

In this context, evaluation of SC in an organization helps to identify and manage relevant safety issues in hospital routines and working conditions proactively. On that basis, we can access information from professionals

***Correspondence:** G. C. H. Fontes-Mota. Departamento de Farmácia. Faculdade de Ciências Farmacêuticas. Universidade de São Paulo. Av. Prof. Lineu Prestes, 580, Butantã. 05508-000, São Paulo, São Paulo, Brasil. Phone: +5511999666971. E-mail: gessicafontes@hotmail.com. ORCID: 0000-0003-1986-9155

about their perceptions and behaviors related to patient safety (Sorra, Nieva, 2004). For this purpose, the SC evaluation is carried out among the institution's employees using a questionnaire. The Hospital Survey of Patient Safety Culture (HSOPSC) is a questionnaire designed to measure multiple dimensions of SC. Some studies evaluate only a portion of the hospital employees or some sectors/units using the same questionnaire: HSOPSC (Mikušová *et al.*, 2012; Reis, Laguardia, Martins, 2012; Santiago, Turrini, 2015).

Regarding this study, we evaluated the attitudes and experiences of health professionals concerning patient safety culture, using a sample of all hospital staff, including those in administrative departments, supporing units, and direct patient-care units. The purpose of this study was to evaluate the state of SC in a university hospital of medium complexity, to identify the strong and weak areas related to patient safety in the institution, and to improve the quality of care provided to patients.

MATERIAL AND METHODS

Study design

This study used a cross-sectional and analytical (Grimes, Schulz, 2002) design, and was conducted over a period of six months, from December 2016 to May 2017, in a university hospital that provides care of medium complexity, located in the city of São Paulo, Brazil. It is a teaching hospital with approximately 200 beds installed to cater for the local community, students, professors, and university employees.

This hospital is affiliated to a very important university in Latin America and it is administered mainly by directors of the university's higher-education units. The technical heads of departments and divisions in the hospital are mainly teachers of these education units, and they respond to the university administration.

Sampling

The study participants were employees from the hospital, selected by means of a convenient sample. The sample was divided in proportion to the number of employees in each department and level of education. The levels were classified as "basic education" (completed first grade), "technical education" (completed high school or a professional technical course), and "college education" (graduated). The analysis of the hospital staff was conducted based on the following departmental structure: administrative, nursing, pharmacy and clinical laboratory, medical, nutrition, dentistry, social service, and superintendence.

Previously, the sample was calculated based on a figure of 1,513 employees, which was the total number of hospital workers at the beginning of the study. OpenEpi program version 3.03 (http://www.openepi.com/SampleSize/SSPropor.htm) was used to calculate the sample. The resultant sample was 430 participants, a 40% loss was considered in relation to the estimates of previous studies (El-Jardali *et al.*, 2011; Gama, Oliveira, Henández, 2013; Santiago, Turrini, 2015). After the Voluntary Resignation Incentive Program carried out at the institution, the total number of workers at the beginning of data collection in December 2016 was 1,475. So, the final sample was 413 participants distributed proportionally to the number of hospital employees in each department and educational level.

Instrument

The HSOPSC was used to assess employees' perceptions of the patient safety culture (Sorra *et al.*, 2016). This instrument was developed by the Agency for Healthcare Research and Quality in a version applicable to hospitals (Sorra, Nieva, 2004) and later translated into Portuguese and validated for a Brazilian hospital setting (Reis, Laguardia, Martins, 2012). The HSOPSC contains 42 items divided into 12 dimensions. Each dimension consists of 3–4 questions rated on a 5-point Likert response scale of agreement (from "strongly disagree" to "strongly agree") or frequency (from "never" to "always"). The dimensions evaluate certain aspects of SC, eight of which are unit-level measures (supervisor/manager expectations and actions promoting patient safety, organizational learning/continuous improvement, teamwork within units, communication openness, feedback and communication about error, nonpunitive

response to error, staffing, and management support for patient safety), two of which are hospital-wide measures (teamwork across units and handoffs and transitions), and two of which are risk-awareness measures (overall perceptions of patient safety and frequency of events reported). The questionnaire also comprises questions about demographic characteristics, such as age, sex, profession, level of education, duration of professional experience, length of hospital and unit service, weekly workload, direct contact with the patient, personal rating on patient safety, and number of events reported over the previous 12 months by the respondents (Sorra, Nieva, 2004).

Data collection

Data were collected using a self-administered and numbered questionnaire to ensure confidentiality and avoid embarrassing the participants due to reporting of personal and professional data, besides minimizing the risk of measurement bias.

To be eligible to this study, a participant needed to have a weekly workload of at least 20 hours in the hospital and have been present in one of the work shifts during the period of data collection in the organization, according to the criteria suggested by the creators of HSOPSC (Sorra, Nieva, 2004). Undergraduate, graduate, and resident students were excluded from the study.

After presenting the study objectives to the heads of the different sectors, the professionals were invited to participate in the study, and each participant was given an unidentified envelope containing the printed instrument. After filling in the questionnaires, they were returned to the researcher or delivered to the secretaries of the sectors. The HSOPSC was distributed among employees from all hospital departments, including daytime and nighttime workers with different levels of education.

Data analysis

The data were analyzed using the R 3.4.3 program (http://www.R-project.org/). For the descriptive analysis of the instrument and SC evaluation of the participating hospital, we calculated the percentages of positive, neutral, and negative responses to the patient safety culture dimensions. The percentage of positive responses represented a positive reaction to patient safety culture and helped to identify the strong and weak areas of patient safety.

The "strong patient safety areas" in the hospital were those whose positively written items obtained 75% or more positive responses ("strongly agree" or "agree"), or those whose negatively written items obtained 75% or more negative responses ("strongly disagree" or "disagree"). Similarly, the "weak patient safety areas" requiring improvement were considered as those whose items that obtained 50% or fewer positive responses (Sorra, Nieva, 2004).

The values and percentages presented were calculated based on the valid responses of the questionnaires. Thus, the percentages differed according to the number of items completed for each variable. However, there is no impairment in the study results, as the questions were not mandatory.

A multivariate regression model was employed to compare employee departments and educational levels with each patient safety dimension. The procedures used were the Tukey method, when the model was ANOVA, and the Steel-Dwass-Critchlow-Fligner procedure, when the Kruskal-Wallis test was performed. The Kendall correlation coefficient was also calculated as a measure of linear association between quantitative variables. We considered $p<0.001$ significant for the results.

In this study, results from the dentistry and social service departments were grouped with those of the medical department, and findings from the superintendence department were included in those of the administrative department, to facilitate statistical analysis of the data.

The reliability and exploration factor analysis were calculated to evaluate the quality of the questionnaire. The internal consistency of the factors was assessed using the Cronbach's Alpha coefficient, which was calculated for each dimension and for the overall questionnaire (Cronbach, 1951). An instrument is considered to have adequate reliability when its Cronbach's Alpha is higher than 0.70 (Nunnally, 1978).

Ethic

This work was submitted to the Research Ethics Committee of the Faculdade de Ciências Farmacêuticas of the Universidade de São Paulo and of the hospital. The respondents voluntarily participated in the survey and signed a free and informed consent form, that guaranteed the participants' anonymity in the disclosure of the results and their freedom to withdraw from the survey at any time.

RESULTS AND DISCUSSION

Response rate

According to the calculated sample referring to the total number of employees (1,475), 413 employees from different fields at the hospital were invited to participate in the study. From the 413 questionnaires distributed, 370 were completed and returned—a loss of 10% (43/413) of participants. However, two of the completed questionnaires were not valid as they had at least one incomplete section. Thus, 368 questionnaires were regarded as valid, and the response rate was 89% (368/413). Table I shows the values related to total number of hospital employees and the final number of study participants distributed by department and educational level.

TABLE I - Distribution of hospital employees and study participants by department and educational level.

Variables		Employees		Participants	
Department		**N**	**%**	**N**	**%**
	Administrative	304	20.6	67	18.2
	Nursing	584	39.6	148	40.2
	Pharmacy and clinical laboratory	105	7.1	28	7.6
	Medical	350	23.7	91	24.7
	Nutrition	91	6.2	25	6.8
	Dentistry	8	0.5	2	0.5
	Social service	14	1.0	3	0.8
	Superintendence	19	1.3	4	1.1
	Total	1475	100.0	368	100.0
Educational level					
	Basic education	309	21.0	69	18.7
	Technical education	615	41.7	149	40.5
	College education	551	37.3	150	40.8
	Total	1475	100.0	368	100.0

The response rate found in this study (89%) is considered high, as compared to that in other studies—77% (Nie *et al.*, 2013) and 85.7% (El-Jardali *et al.*, 2011)—with some studies reporting much lower rates—51.2% (Hamdan, Saleem, 2013) and 60.3% (Carvalho *et al.*, 2017). The engagement of managers from different sectors and the availability of professionals throughout the hospital to participate in the study contributed to the high response rate, as employees understood the importance of undertaking the study within the institution because it is a teaching hospital.

In addition, the response rate is considered representative because SC was evaluated in a sample of all hospital staff and distributed proportionally to the number of employees in each department. Other studies have not performed the sample division proportionally for the institutions as a whole (Alahmadi, 2010; Mikušová *et al.*, 2012; Hamdan, Saleem, 2013).

Instrument reliability

Cronbach's Alpha was used to evaluate the internal consistency of the instrument, and a coefficient value of 0.91 was obtained. That means the questionnaire has high reliability. This result corroborates other studies that have used the same instrument and obtained a Cronbach's Alpha above 0.90 (Reis, Laguardia, Martins, 2012; Santiago, Turrini, 2015).

Respondents' characteristics

The mean age of the respondents was 45.6 (± 8.9) years, ranging from 26 to 66 years, and the mean period they had worked in the current profession was 19.1 (± 9.0) years. Women dominated the study with a total of 248 (68.3%) participants. Both the mean age of the respondents and the mean period they have worked in their current profession show that they have significant professional experience and stability, which can be considered favorable for patient safety, as inexperience may contribute to the occurrence of AE. It is important to determine the composition of the health team to assess SC, as the perception of this culture may vary according to the characteristics of the professionals involved in patient care (Gambashidze *et al.*, 2021).

The majority of participants (71.7%) indicated that they had direct contact with patients, as shown in Table II. In addition, 33.0% of the professionals reported they have been working in units that were not among the options listed in the instrument, and 18.1% affirmed that they performed functions in other sectors and in administrative positions. Nevertheless, most employees worked in the care areas. This may be considered challenging with regard to the instrument, which had more units and functions related to the care areas among all the options.

TABLE II - General characteristics of the participants.

Variables		N	%
Sex			
	Female	248	68.3
	Male	115	31.7
	Total*	363	100.0
Level of education			
	First grade (incomplete education)	4	1.1
	First grade (complete education)	2	0.5
	High school (incomplete)	7	1.9
	High school (complete)	80	22.0
	Undergraduate	31	8.5
	Graduate	74	20.3
	Graduate student (specialization level)	87	23.9
	Postgraduate student (master's or doctoral level)	79	21.7
	Total*	364	100.0
Patient contact			
	Yes	259	71.7
	No	102	28.3
	Total*	361	100.0
Sector			
	Several hospital units/no specific unit	31	8.6
	Clinical (non-surgical)	22	6.1
	Surgery	23	6.4
	Obstetrics	25	6.9
	Pediatrics	22	6.1
	Emergency department	31	8.6
	Intensive care unit (any type)	30	8.3

TABLE II - General characteristics of the participants.

Variables		N	%
	Psychiatry/ mental health	2	0.6
	Rehabilitation	2	0.6
	Pharmacy	9	2.5
	Laboratory	20	5.5
	Radiology	17	4.7
	Anesthesiology	8	2.2
	Others	119	33.0
	Total*	361	100.0
Position/ function			
	Clinical physician/ Assistant physician	71	19.5
	Nurse	52	14.3
	Nursing technician	83	22.8
	Nursing assistant	9	2.5
	Pharmacist/ Biochemist/ Biologist/ Biomedical	13	3.6
	Dentist	1	0.3
	Nutritionist	4	1.1
	Physiotherapist/ Respiratory therapist/ Occupational therapist/ Speech therapist/ Social worker	6	1.6
	Technician (ECG, laboratory, radiology, pharmacy)	1	0.3
	Administration/ Management	25	6.9
	Administrative assistant/Secretary	5	1.4
	Other	28	7.7
	Clinical physician	66	18.1
	Total*	364	100.0
Length of service at hospital			
	1 to 5 years	45	12.4
	6 to 10 years	42	11.5
	11 to 15 years	76	20.9
	16 to 20 years	73	20.1
	More than 20 years	128	35.2
	Total*	364	100.0
Length of service in the sector			
	Less than 1 year	11	4.1
	1 to 5 years	53	19.6
	6 to 10 years	56	20.7
	11 to 15 years	79	29.3
	16 to 20 years	71	26.3
	Total*	270	100.0
Weekly workload			
	20 to 39 hours	274	75.5
	40 to 59 hours	79	21.8
	60 to 79 hours	9	2.5
	80 to 99 hours	0	0.0
	More than 100 hours	1	0.3
	Total*	363	100.0

*Value refers to the number of valid answers.

The nursing category (nurses, nursing technicians and nursing assistants) had the largest number of representatives in the study (39.6%), which corroborates the findings of other studies (Nie *et al.*, 2013; Carvalho *et al.*, 2017). This can be justified by the fact that it has the highest number of employees.

In regard to the participants' length of service at the hospital, the highest percentage (35.2%) of respondents reported they have been working at the hospital for 21 years or more. Furthermore, the majority (76.3%) indicated that they have been working in the same sector for more than five years. This fact may be an indication of a low turnover rate among employees. Furthermore, this may positively influence the employees' perception of SC because the development of patient safety in a hospital may be associated with a low turnover of professionals (Vogus *et al.*, 2014). On the other hand, changes in organizational culture might be difficult to implement because of the professionals´ age and their varying attitudes and customs. According to Harolds

(2015), problems related to quality are often due to people's cultural resistance to change.

Dimensions of the patient safety culture

Figure 1 shows the percentages of positive, neutral, and negative responses to the dimensions and overall percentage of these responses in the questionnaire. The overall percentage of positive responses was 50.3%. Thus, the SC is considered the average in the institution that was studied. In addition, the "teamwork within units" (62.7%), "supervisor/manager expectations and actions promoting patient safety" (67.1%), "organizational learning/continuous improvement" (63.1%), "communication openness" (56.7%), and "frequency of events reported" (62.4%) dimensions obtained positive-response percentages above 50%. However, no dimension reached 75% in the positive responses, which is considered a "strong area" for patient safety according to the classification criteria proposed by the authors of the instrument (Sorra, Nieva, 2004). This shows a need for SC improvement in all the institution areas, regardless of the hospital department or the participants´ level of education. Similarly, a study conducted in Palestine found no strong areas in the SC (Hamdan, Saleem, 2013), showing the need to implement a well-structured SC in hospitals.

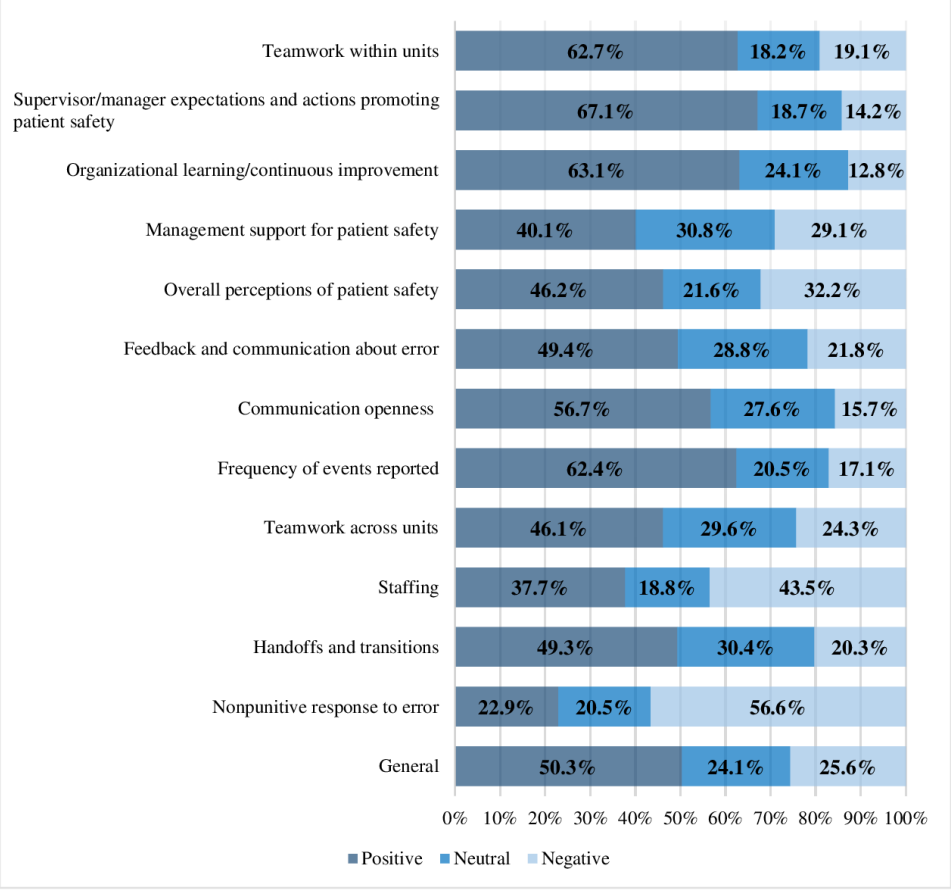

FIGURE 1 - Percentages of positive, neutral, and negative responses toward the various dimensions and overall questionnaire.

Some actions can be taken toward the development of SC in hospitals, such as supporting the development and implementation of a patient safety program, encouraging a nonpunitive culture for AE reporting, conducting research on patient safety, and training the whole team to ensure positive results around patient safety (Hughes, 2008).

The "supervisor/manager expectations and actions promoting patient safety" dimension has the highest percentage of positive responses. Another study also showed the highest percentage of positive responses (63.2%) for the same dimension (Gama, Oliveira, Henández, 2013). This result may influence other dimensions with more positive percentages, such as "organizational learning/continuous improvement" and "teamwork within units," thus reflecting the incentive received by the employees through their respective bosses.

The process to ensure patient safety should start with risk prevention, according to the risk management cycle, called PDCA (Plan-Do-Check-Act). Preventive action to reduce risks should be cyclical, including planning, implementation, monitoring, and intervention with respect to the identified weaknesses. This reflects on organizational learning, teamwork, and effective communication between professionals and is essential for safe care performance (Gama, Oliveira, Henández, 2013).

Health organizations face the challenge of overcoming cultural aspects to implement innovations in care practice. This requires collective learning of evidence-based practices with the participation of hospital leadership, ensuring consistent implementation of process changes (Rangachari, 2018).

The management of the supervisor is not considered a problematic area within the hospital unit, or as an important aspect for the support of SC. According to Sammer *et al.* (2010), SC begins with actions from the leadership, since the leaders involved are fundamental to the success of SC development in an organization. However, in this study, the "management support for patient safety" dimension shows a positive-response rate of 40.1%; this is a worrying result that indicates the need to invest in actions that prioritize SC promotion by hospital management. The involvement of the entire hospital leadership and real understanding of SC among the different groups of staff at the institution is necessary to improve SC (Gambashidze *et al.*, 2021). The effectiveness of a patient safety program depends on the management's knowledge of the real events in care units. Many health organizations have developed strategies to connect these managers with front-line workers, such as Walk Rounds (Mello *et al.*, 2014).

On the other hand, the following dimensions were identified as "weak areas" (with positive-response values of less than 50%): "management support for patient safety" (40.1%), "overall perceptions of patient safety" (46.2%), "feedback and communication about error" (49.4%), "teamwork across units" (46.1%), "staffing" (37.7%), "handoffs and transitions" (49.3%), and "nonpunitive response to error" (22.9%). This last dimension also obtained the highest percentage of negative responses (56.6%).

The "staffing" dimension presents an unfavorable result for SC, which shows a possible lack of human resources to ensure safe patient care due to the increased workload. Studies of nursing professionals show that excessive workload contributes to stress and burnout syndrome, so these workers are more likely to develop unsafe care practices (Rodrigues, Santos, Sousa, 2017). An adequate number of professionals should be the institution's priority and responsibility, to reduce risks (Inoue, Matsuda, 2010).

The weakest dimension for SC is the "nonpunitive response to error" dimension. Several studies show a similar result, with this dimension presenting the lowest percentage of positive responses (Santiago, Turrini, 2015; El-Jardali *et al.*, 2011; Hamdan, Saleem, 2013; Alahmadi, 2010). It is worth mentioning that there is a need for improvement regarding the culture of blame; the "fear of guilt" among professionals should be demystified within health institutions. To achieve this, a change in the cultural models of health organizations is needed. This is a major challenge because it involves fundamental changes in people's work patterns, values, and behaviors (Melo, 2012). The process of organizational culture change is time-consuming and requires improvement in all areas related to patient safety to be considered genuine (Vander Schaaf, Cornett, Randolph, 2018).

In addition, the large number of unnotified incidents may be due to fear of penalty, which may have influenced the decline in the number of AE reported in the previous 12 months. In a just culture, professionals understand their human limitations, realizing they can make mistakes and taking responsibility for them. When AE occur, the whole team should keep the communication open and work to understand what actually happened and what

factors contributed to the incident(s), besides trying to reduce the risk of recurrence. One strategy is to review monthly reports on AE as a team and discuss what improvements can be made to ensure that such situations do not recur. It is important that the members of the hospital's clinical team participate in the analysis of the incidents, because they better understand the reality in the different sectors and can suggest effective solutions to prevent a recurrence (Duffy, 2017).

Event notification in the last 12 months

Figure 2 shows that 243 study participants (70.6%) had not completed the event notification reports in the previous 12 months. These results show a possible lack of information or lack of divulgation about the importance of these documents. This could be related to a lack of knowledge and confidence by the team may also make it difficult to provide event notifications, which suggests that the work conducted by the institution regarding the incidents should be properly disclosed (Carrera, Aguiar, 2014).

The low number of AE reported may also be related to the culture of blame that has taken root in the professional teams, as identified in the dimension "nonpunitive response to error." However, the hospital in question has several strategies to encourage professionals to report events—for example, group meetings to analyze AE, the presence of a clinical pharmacy service activating in patient safety, and a commission to assess deaths.

According to Alahmadi (2010), building an SC requires the elimination of three destructive elements in health organizations: blame, fear, and silence with regard to errors. AE notification should be regarded as a way to learn from incidents and as the first step in reducing harm and improving patient safety.

Another study also found that 67.4% (Liu *et al.*, 2014) of respondents did not report AE in the prior year of this survey. This shows the highest rates of under-reporting in hospitals and should act as an incentive for future improvements.

Event notification allows identification of risks and provides information to improve patient safety as a strategic component to promote SC. The feedback on information about AE may increase confidence in the notification system and the number of notifications, thus consolidating the SC (Schein, 2010). The institution should provide a supportive environment for AE notification, including support of the hospital management, which maintains the confidentiality of the notifier, as well as an appropriate structure for analyzing notifications, developing action plans, and providing feedback in a timely manner to those involved (Mello *et al.*, 2014).

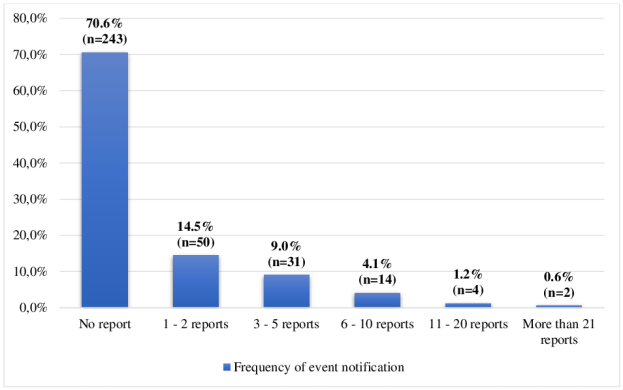

FIGURE 2 - Distribution of responses to the number of event notifications given by professionals in the previous 12 months.

Grade of patient safety

The majority of professionals (69.5%) considered patient safety within their unit/work area at the hospital to be "great" or "very good," as shown in Figure 3. Studies conducted in hospitals in other countries have presented similar results. For example, in hospitals in Saudi Arabia (Alahmadi, 2010), Slovakia (Mikušová *et al.*, 2012), and Palestine (Hamdan, Saleem, 2013), patient safety was rated "great" or "very good" by 60%, 61.9%, and 63.5% of the participants, respectively. This shows health professionals' positive perceptions of patient safety.

Alahmadi (2010) states that these results generally indicate that management actions treat patient safety as a priority within the institution. However, management's interest in this topic often appears only after the occurrence of AE. This confirms the importance of the leadership's role in building a strong and proactive SC with the incentive to learn from incidents.

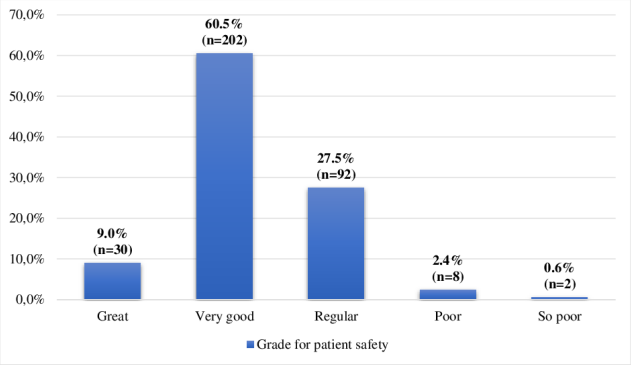

FIGURE 3 - Distribution of responses to questions aimed at evaluating patient safety by professionals in their unit/work area in the hospital.

In the correlation analysis between the dimensions and patient safety score, all dimensions show a significantly positive correlation ($p<0.001$) with the grade of patient safety, barring "staffing" and "nonpunitive response to error". Among the other dimensions, three obtained the highest correlation coefficients ($T>0.4$): "management support for patient safety," "overall perceptions of patient safety," and "feedback and communication about error" (Figure 4). These dimensions are most positively influenced by the best patient safety score. Overall, the increased patient safety score in the work unit is related to the increase in employee perception scores for these dimensions.

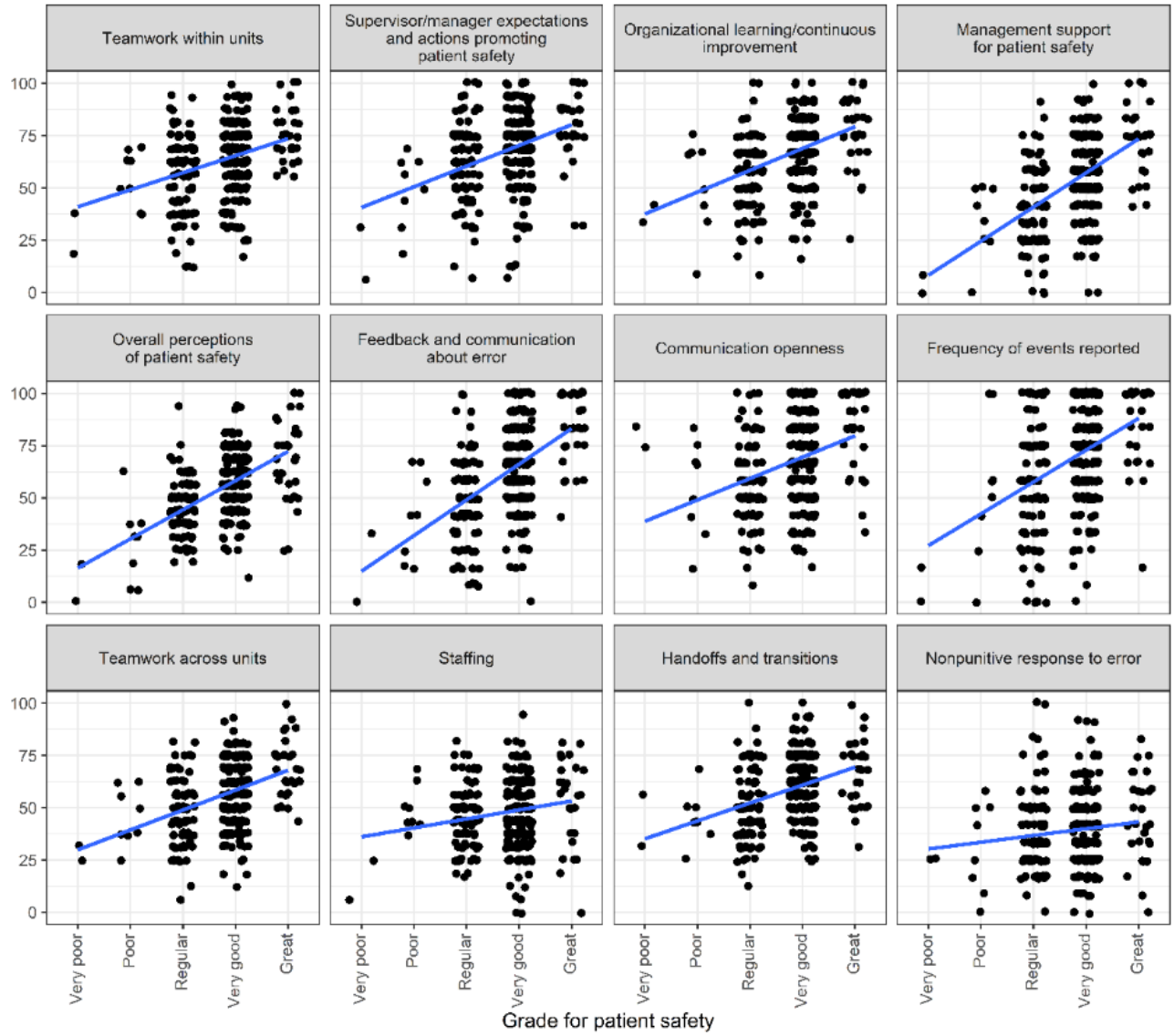

FIGURE 4 - Correlation of safety culture dimensions with grade of patient safety.

However, employees' perceptions of patient safety diverge from the SC assessment found in this study, since the overall percentage of positive responses from HSOPSC was around 50%. The evaluation of SC in this study is important to gain more accurate knowledge of the level of patient safety in the institution and for the planning of improvement actions. In addition, professionals understand SC differently, depending on their role in the team and their individual characteristics (Gambashidze *et al.*, 2021).

This difference can be due to the organizational structure of the hospital being studied—organized according to sectors that respond directly to the expectations and strategies of the different areas of higher education. Thus, management is fragmented, with each department having its own administrative power. This may reflect employees' perceptions of the SC in their area, thus presenting partial knowledge of patient safety in the hospital and making its improvement difficult. For this reason, when the HSOPSC dimensions were evaluated, the hospital did not present any strong areas. This emphasizes the need for improvement in hospital management processes as a way to integrate all areas and to develop multi-professional strategies for patient care, not just departments or specialties.

Perceptions of SC vary according to the hierarchical position and professional category of an employee, as reflected in the patient safety results. In addition, leadership style has a strong and consistent impact on SC. Leadership that empowers employees and enables open communication among team members should be encouraged (Singer, Vogus, 2013). Therefore, hospital managers need to implement interventions that promote this culture, by reducing AE and prioritizing patient safety throughout the institution.

SC should be shared and integrated by all professionals of an organization to reflect the importance that the organizational culture assigns to patient safety in all decisions, services, and hierarchical levels of the health institution. The evolution of SC requires time and should be a continuous process based on the engagement of all professionals, because safety should be considered everyone's responsibility (Boissières, 2017).

Hospital department and educational level

Figure 5 shows the distribution of scores of each dimension by hospital department. Only the dimensions "frequency of events reported" and "nonpunitive response to error" showed $p<0.001$.

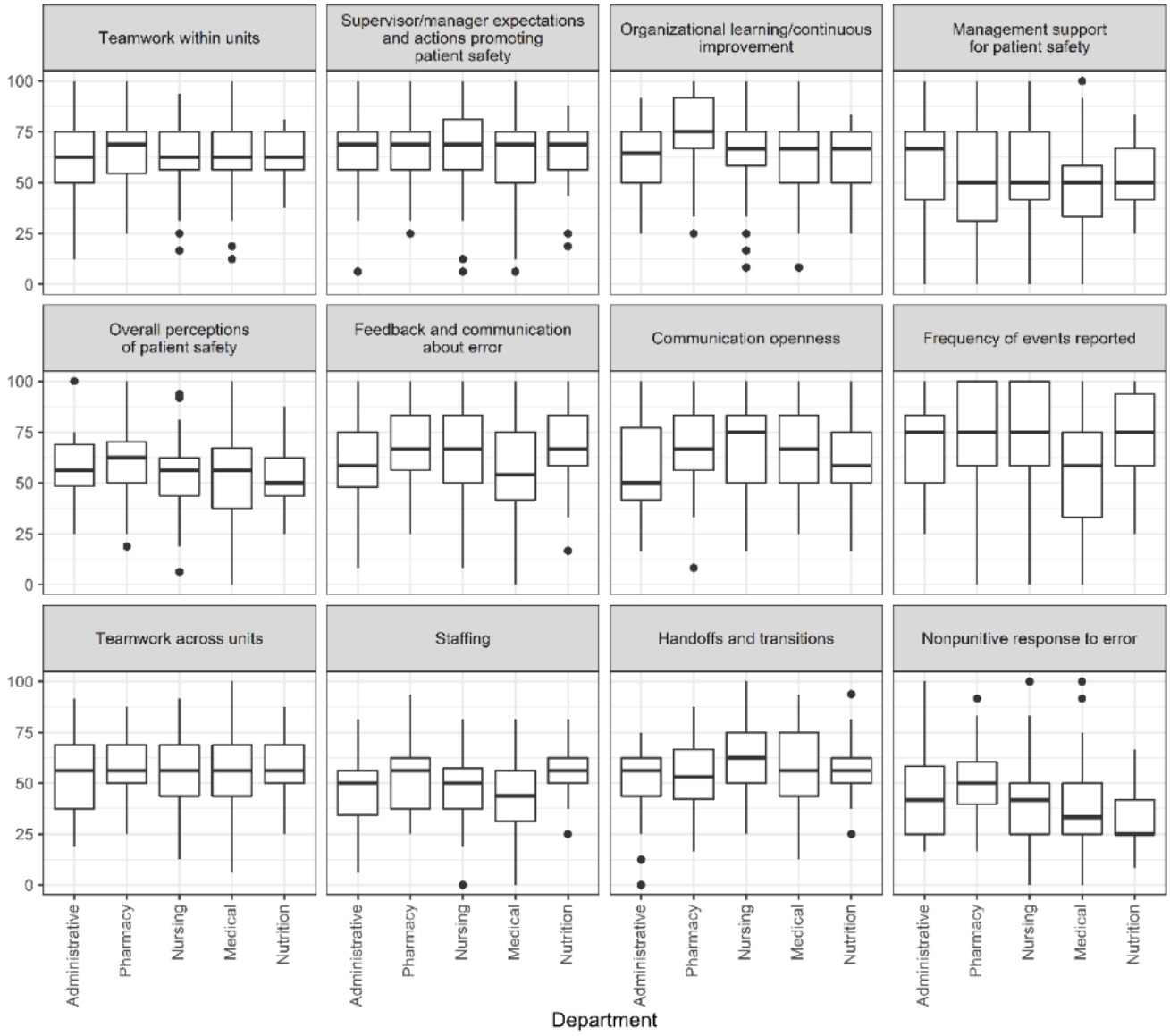

FIGURE 5 - Distribution of safety culture dimension scores by department.

In the dimension "frequency of events reported," the medical department was considered significantly different from others and showed a lower distribution, which means this department had the lowest frequency of event notifications. Another study found that a small percentage of physicians reported the incidents, and showed that lack of knowledge of the notification process decreased when reporting the frequency. Physicians face some barriers to AE reporting, such as lack of feedback on reported events, very long reports, and lack of time (Evans *et al.*, 2006). In addition, the expectation that physicians will be unfailing professionals reduces their willingness to report errors, generating a "culture of silence" that limits opportunities for learning from errors (Danielsson *et al.*, 2018). Thus, AE reporting should be encouraged and disseminated by the institution's leadership, and notification systems should be faster and smoother in both their reports and information feedback.

Regarding "nonpunitive response to error," the nutrition department presented itself as the only one distinct from the others with the lowest employee

perception of nonpunitive error responses. This department has received the worst evaluation in the dimension of punitive culture. Few studies have been conducted with these professionals to evaluate SC—Geil *et al.* (2015) conducted a study with nutritionists alone; however, they found that the dimensions with the lowest positive results were "overall perceptions of patient safety" and "staffing." The authors emphasized the need to conduct more research with nutrition professionals.

In the analysis of the dimensions for each level of education (Figure 6), only "management support for patient safety" and "frequency of events reported" showed a significant p value ($p<0.001$).

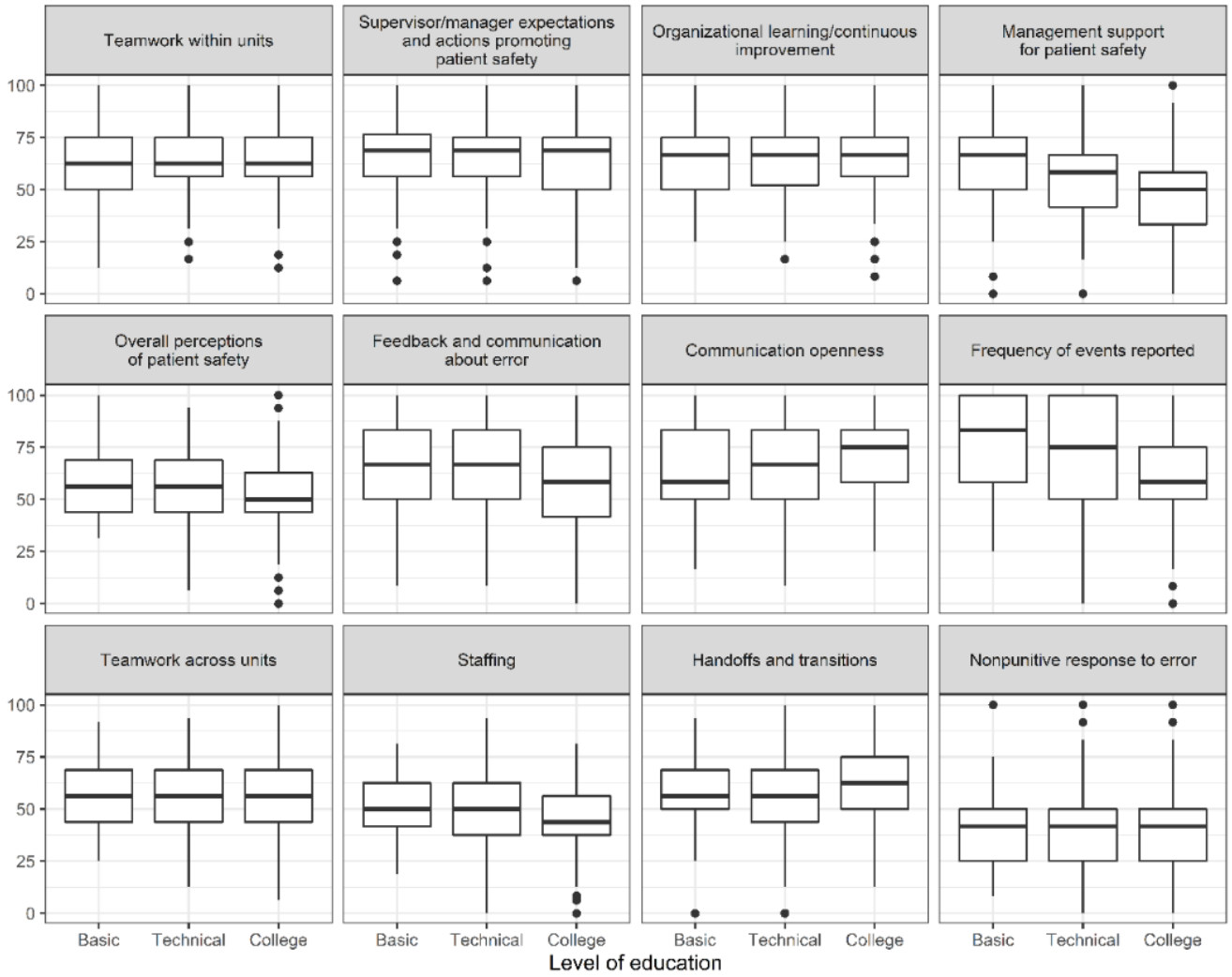

FIGURE 6 - Distribution of safety culture dimension scores by level of education.

In the dimension related to hospital management support for patient safety, the three groups were considered different from each other. However, the basic level of education presented the best result, and the college level, the worst. In the "frequency of events reported" dimension, there was a difference only in the higher level when compared to the other levels. This result may be influenced by the fact that the medical department has the lowest reporting frequency, and many of its professionals have a high level of education. There is a need to divulge

the notification system, especially among professionals with higher educational levels. Fear of punishment may reduce and discourage reporting of AE.

The implementation of SC involves an organizational change and requires the establishment of strategies that consider the complexity of the hospital setting. Safe and reliable care requires an environment where people work together with leaders, promoting effective teamwork and actions to reduce the risks associated with healthcare, besides having a visible improvement process for teams to learn from AE (Leonard *et al.*, 2013). Thus, a type of management that involves different areas of the hospital will allow greater integration and exchange of knowledge among health professionals.

In this study, we evaluate the SC of all the departments of a university hospital, through a sample of health professionals of different educational levels, unlike other studies that evaluate only a portion of the hospital employees or some sectors/units of the hospital (Mikušová *et al.*, 2012; Reis, Laguardia, Martins, 2012; Santiago, Turrini, 2015). Another differential of this study is the analysis comparing the dimensions of SC with the departments and education levels of employees. The results of this study may provide some evidence to help managers develop strategies to improve the quality of healthcare and ensure patient safety. However, our study also has some limitations. First, the sample calculation was not designed for subgroup analysis, such as department and level of education. Nevertheless, a proportional sample calculation was performed according to the number of employees for each subgroup. Second, the application of the questionnaire is limited to a period of six months. Yet we believe that the SC would not suffer significant changes during this period, because the process of change in organizational culture is time-consuming (Inoue, Matsuda, 2010). Third, this research does not evaluate whether the employee had another job, since there is no such question in the HSOPSC. This may influence the SC assessment due to the possibility of high workload and professional stress. Finally, there is also the limitation of the type of study—cross-sectional—itself.

In conclusion, no "strong areas" were found in patient safety within the institution, and the average percentage of positive responses was considered regular. However, most respondents rated the patient safety at their respective hospital units as "great" or "very good," which indicates lack of information about the reality of patient safety at the institution. On the other hand, seven dimensions were considered "weak areas," especially "nonpunitive responses to errors," which presented the lowest percentage of positive responses. Thus, we found that employees' perceptions of patient safety differed from its reality, according to the analysis of the dimensions of the HSOPSC. In addition, the low number of AE reported could be related to the culture of blame in professional teams. Therefore, we emphasize the need for improvement in relation to the culture of blame. The "fear of guilt" among professionals should be demystified within health institutions, and hospitals should invest in the promotion and dissemination of nonpunitive SC in all areas of their respective institutions. The findings of this study will provide health organizations a better understanding of SC in hospitals and possibly encourage improvement in the quality and safety of healthcare for patients.

ACKNOWLEDGMENTS

We thank CNPq for the financial support for the development of this research (process number: 134586/2016-6). We are also grateful to Professor Carlota de Oliveira Rangel Yagui for her helpful advice in the development of the manuscript and to Professor Nicolina Silvana Romano Lieber for her critical reading of the article.

REFERENCES

Alahmadi HA. Assessment of patient safety culture in Saudi Arabian hospitals. Qual Saf Health Care. 2010;19(5):e17.

Boissières I. The Essentials of Safety Culture [Internet]. Toulouse: Institut Pour Une Culture De Sécurité Industrielle; 2017. [cited 2019 Mar 25]. Available from: https://www.icsi-eu.org/documents/208/icsi_essentials_01_safety_culture_an.pdf.

Carrera SA, Aguiar BGC. Patient safety culture: the perception of nurse in oncology hospital. ACRED. 2014;4(7):88-103.

Carvalho REFL, Arruda LP, Nascimento NKP, Sampaio RL, Cavalcante MLSN, Costa ACP. Assessment of the culture of safety in public hospitals in Brazil. Rev Lat Am Enfermagem. 2017;25:e2849.

Cronbach LJ. Coefficient alpha and the internal structure of tests. Psychometrika. 1951;16:297-334.

Danielsson M, Nilsen P, Rutberg H, Carlfjord S. The professional culture among physicians in Sweden: potential implications for patient safety. BMC Health Serv Res. 2018;18(1):543-51.

Duffy W. Improving patient safety by practicing in a just culture. AORN J. 2017;106(1):66-8.

El-Jardali F, Dimassi H, Jamal D, Jaafar M, Hemadeh N. Predictors and outcomes of patient safety culture in hospitals. BMC Health Serv Res. 2011;11:45.

Evans SM, Berry JG, Smith BJ, Esterman A, Selim P, O'Shaughnessy J, et al. Attitudes and barriers to incident reporting: a collaborative hospital study. Qual Saf Health Care. 2006;15(1):39-43.

Gama ZAS, Oliveira ACS, Hernández PJS. Cultura de seguridad del paciente y factores asociados en una red de hospitales públicos españoles. Cad Saude Publica. 2013;29(2):283-93.

Gambashidze N, Hammer A, Wagner A, Rieger MA, Brösterhaus M, Vegten AV, et al. Influence of Gender, Profession, and Managerial Function on Clinicians' Perceptions of Patient Safety Culture: A Cross-National Cross-Sectional Study. J Patient Saf. 2021:17(4):e280-e287.

Geil S, Sendlhofer G, Toplak H, Pregartner G, Pail E. Feasibility trial to assess the patient safety culture in the professional group of dietitians. Safety Health. 2015;1(1):29-30.

Grimes DA, Schulz KF. An overview of clinical research: The lay of the land. Lancet. 2002;359(9300):57-61.

Hamdan M, Saleem AA. Assessment of patient safety culture in Palestinian public hospitals. Int J Qual Health Care. 2013;25(2):167-75.

Handler SM, Castle NG, Studenski SA, Perera S, Fridsma DB, Nace DA, et al. Patient safety culture assessment in the nursing home. Qual Saf Health Care. 2006;15(6):400-404.

Harolds J. Quality and safety in health care, part I five pioneers in quality. Clin Nucl Med. 2015;40(8):660-2.

Hughes RG. Patient safety and quality: An evidence-based handbook for nurses. (Prepared with support from the Robert Wood Johnson Foundation). AHRQ Publication No. 08-0043. Rockville, MD: Agency for Healthcare Research and Quality; 2008. Available from: https://archive.ahrq.gov/professionals/clinicians-providers/resources/nursing/resources/nurseshdbk/nurseshdbk.pdf.

Inoue KC, Matsuda LM. Sizing the nursing staff in an Intensive Care Unit for Adults. Acta Paul Enferm. 2010;23(3):379-84.

Kohn LT, Corrigan JM, Donaldson MS. To err is human: building a safer health system. Washington, DC: National Academy Press. 1999.

Leape LL, Lawthers AG, Brennan TA, Johnson WG. Preventing medical injury. Qual Rev Bull. 1993;19(5):144-9.

Leonard M, Frankel A, Federico F, Frush K, Haraden C. The Essential Guide for Patient Safety Officers, 2nd edition. Oakbrook Terrace, IL: Joint Commission Resources, Institute for Healthcare Improvement; 2013.

Liu C, Liu W, Wang Y, Zhang Z, Wang P. Patient safety culture in China: a case study in an outpatient setting in Beijing. BMJ Qual Saf. 2014;23(7):556-64.

Mello LRG, Borges ES, Christovam BP, Silvino ZR, Ferreira SCM, Lima DVM. Understanding patient's safety. Rev Enferm UFPE. 2014;8(8):2954-6.

Melo MBFV. Cultura organizacional - Fator determinante para a segurança e saúde no trabalho em empresas construtoras. Sistemas & Gestão. 2012;7(4):620-27. Available from: https://www.revistasg.uff.br/sg/article/view/V7N4A9.

Mikušová V, Rusnáková V, Naďová K, Boroňová J, Beťková M. Patient safety assessment in slovak hospitals. Int J Collab Res Intern Med Public Health. 2012;4(6):1236-44.

Nie Y, Mao X, Cui H, He S, Li J, Zhang M. Hospital survey on patient safety culture in China. BMC Health Serv Res. 2013;13:288.

Nieva VF, Sorra J. Safety culture assessment: a tool for improving patient safety in healthcare organizations. Qual Saf Health Care. 2003;12(Suppl 2):ii17-ii23.

Nunnally JC. Psychometric theory, 2nd Edition. New York: McGraw-Hill. 1978.

Rangachari P. Innovation Implementation in the Context of Hospital QI: Lessons Learned and Strategies for Success. Innov Entrep Health. 2018;5:1-14.

Reis CT, Laguardia J, Martins M. Translation and cross-cultural adaptation of the Brazilian version of the Hospital Survey on Patient Safety Culture: initial stage. Cad Saude Publica. 2012;28(11):2199-210.

Rodrigues CCFM, Santos VEP, Sousa P. Patient safety and nursing: interface with stress and Burnout Syndrome. Rev Bras Enferm. 2017;70(5):1141-7.

Sammer CE, Lykens K, Singh KP, Mains DA, Lackan NA. What is patient safety culture? A review of the literature. J Nurs Scholarsh. 2010;42(2):156-65.

Santiago THR, Turrini RNT. Organizational culture and climate for patient safety in Intensive Care Units. Rev Esc Enferm USP. 2015;49(Esp):121-127.

Schein EH. Organizational Culture and Leadership. 4th ed. Jossey-Bass; 2010.

Singer SJ, Vogus TJ. Reducing hospital errors: Interventions that build safety culture. Annu Rev Public Health. 2013;34:373-96.

Sorra J, Gray L, Streagle S, Famolaro T, Yount N, Behm J. AHRQ hospital survey on patient safety culture: user's guide. (Prepared by Westat, under Contract No. HHSA290201300003C). AHRQ Publication No. 15-0049-EF (Replaces 04-0041). Rockville, MD: Agency for Healthcare Research and Quality; 2016. Available from: http://www.ahrq.gov/professionals/quality-patientsafety/patientsafetyculture/hospital/index.html.

Sorra JS, Nieva VF. Hospital survey on patient safety culture. (Prepared by Westat, under Contract No. 290-96-0004). AHRQ Publication No. 04-0041. Rockville, MD: Agency for Healthcare Research and Quality; 2004. Available from: http://proqualis.net/sites/proqualis.net/files/User%20guide%20HSOPSC.pdf.

Vander Schaaf EB, Cornett AC, Randolph GD. Improving culture, one quality improvement project at a time. J Public Health Manag Pract. 2018;24(1):57-62. Available from: https://journals.lww.com/jphmp/Abstract/2018/01000/Improving_Culture,_One_Quality_Improvement_Project.9.aspx.

Vogus TJ, Cooil B, Sitterding M, Everett LQ. Safety organizing, emotional exhaustion, and turnover in hospital nursing units. Med Care. 2014;52(10):870-76.

World Health Organization. World alliance for patient safety, Taxonomy. The conceptual framework for the international classification for patient safety: Final Technical Report. Genebra. 2009. Available from: http://www.who.int/patientsafety/taxonomy/icps_full_report.pdf.

Received for publication on 03rd April 2020
Accepted for publication on 29th August 2021