







Safety culture in surgical centers from the perspective of the multiprofessional team

Cultura de segurança em centros cirúrgicos na perspectiva da equipe multiprofissional

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ABSTRACT

Objective: to evaluate the safety culture through an observation of the safety climate of health workers from a Surgical Center. **Methods:** cross-sectional study in eight surgical centers from a hospital complex. A validated Brazilian version of the Safety Attitudes Questionnaire/Operating Room was applied to a convenience sample of 172 health and support workers (physicians and nurses). The Chi-squared, Student's t, and Mann-Whitney's tests were used. **Results:** the general evaluation showed a positive safety climate. Only the nursing professionals reached the minimum score that indicates a positive result in the domain Quality of communication and collaboration. The domains Safety climate, Stress recognition, Communication in the surgical environment, and Perception of professional performance showed positive results, while Perception of management and Work conditions had the worst scores. **Conclusion:** the safety climate was positive. Nonetheless, communication showed shortcomings pointed out by the workers. **Contributions to practice:** identifying domains that need to be improved helps fomenting safety culture in surgical centers, leading to better care outcomes and work environments.

Descriptors: Surgicenters; Organizational Culture; Patient Safety; Nursing.

RESUMO

Objetivo: avaliar a cultura de segurança a partir da percepção do clima de segurança dos profissionais de saúde que atuam em Centro Cirúrgico. **Métodos:** estudo transversal realizado em oito centros cirúrgicos de um complexo hospitalar. Aplicou-se a versão brasileira validada do *Safety Attitudes Questionnaire/Operating Room* para uma amostra de conveniência de 172 profissionais de saúde (médicos e de enfermagem) e de apoio. Para a análise empregou-se os testes Qui-quadrado, t de Student e Mann-Whitney. **Resultados:** na avaliação geral, o clima de segurança foi avaliado como positivo. Apenas os profissionais de enfermagem atingiram a mínima pontuação necessária para indicar um resultado positivo no domínio Qualidade da comunicação e colaboração. Os domínios Clima de segurança, Percepção do estresse, Comunicação no ambiente cirúrgico e Percepção do desempenho profissional mostraram-se positivos, enquanto Percepção da gerência e Condição de trabalho apresentaram piores escores. **Conclusão:** a percepção do clima de segurança foi positiva. No entanto, a comunicação apresentou fragilidades apontadas pelos profissionais. **Contribuições para a prática:** a identificação de domínios que necessitam ser fortalecidos contribui para fomentar uma cultura de segurança nos centros cirúrgicos, repercutindo em melhores resultados assistenciais e ambientes de trabalho para os profissionais.

Descritores: Centros Cirúrgicos; Cultura Organizacional; Segurança do Paciente; Enfermagem.

Introduction

The surgical center is one of the most complex structures of the hospital environment in health systems. It is a sector that encompasses high-cost services that can have a strong positive impact on the quality of life of their users⁽¹⁾. A study carried out in 2015 estimated that 266.1 million surgeries were carried out throughout the world in less than 10 years. This number has reached 312.9 million - an increase of 17.5%. The estimated mean global surgical rate was of 4,469 surgeries per 100,000 people every year, with a mean cost of 389.16 dollars per procedure⁽²⁻³⁾.

The assistance to the patient in the surgical center, due to its dynamics and to the interaction of multiple elements, is vulnerable to adverse effects, which, sometimes, will lead to physical, social, and/or psychological, in addition to suffering, disablement, or even death. Situations such as falls, interventions at the wrong surgical site, infection, hemorrhage, and dehiscence are examples of adverse events that are not associated with the base diseases and can be avoided during the perioperative period⁽⁴⁾.

Therefore, the teamwork in the surgical environment is essential to promote the health of the patient. In regard to this, two concepts are often discussed as they are intrinsically related with teamwork: safety culture and safety climate. While the former is associated with the essential values of an organization and its norms, premises, and expectations, the latter encompasses perceptions, awareness, beliefs, and attitudes of the workers regarding risk and safety⁽⁵⁻⁶⁾.

To evaluate the safety culture of institutions according with their safety climate, some instruments are used. In the field of the surgical center, the main tool was the Safety Attitudes Questionnaire/Operating Room (SAQ/OR), a version of the Safety Attitudes Questionnaire (SAQ) modified by Texas University researchers⁽⁷⁻⁸⁾. In Brazil, it was translated, adapted, and validated⁽⁷⁾.

The assessment and analysis of the safety culture in institutions using the safety climate of health workers allows the identification and management

of the target-aspects of patient safety. This evaluation can help increasing situational awareness, supporting the development of continued education programs, the implementation of assistance protocols, the monitoring of adverse events, and the quality of assistance⁽⁸⁾.

Several studies have been carried out to assess the safety climate from the perspective of health workers and evaluate the safety culture in surgical centers, reiterating the importance of researching this phenomenon and contributing to strengthen policies and strategies related with the safety of the patient in this complex work environment^(6-7,9). Most studies come from the southeast of Brazil, which shows the need to further the study of the topic in other contexts, considering the multiple practice settings that form the Brazilian health system. We are also considering the possibility of exploring aspects that can influence the safety attitudes of health workers in surgical centers, since there are gaps in the knowledge of their perception about safety attitudes in the practice of surgery, and in the incorporation of the research results in routine health actions. These studies suggest that management tools should be implemented to plan actions towards a safety culture^(6,9).

This study is justified by the fact that perioperative nursing care is increasingly committed to patient safety contributing for the best practices of assistance in surgical centers and being guided by scientific evidence. Although safe surgeries are the second global challenge for patient safety, the World Health Organization states that there is still a lot to be reached, invoking leaderships and public policy makers to engage in strengthening the culture of safety⁽¹⁰⁾. Therefore, the study becomes more relevant as it allows health workers with affinity for the topic to update their knowledge about surgical center settings, in regard to the goals for improving processes, decision making, and planning of assistance, to prevent adverse events and qualify nursing care.

This investigation has the potential of contributing for the safety culture of the surgical center, aiming to subsidize discussions to improve institutional

protocols and norms, to increase safety and the quality of assistance. As a result, the following guiding question emerged: How is the safety culture of the patient perceived by the health workers from the surgical centers of a hospital complex? Considering the above, this research aimed to evaluate the safety culture through an observation of the safety climate of health workers from a Surgical Center.

Methods

Cross-sectional study carried out in 53 operating rooms in eight surgical centers of a hospital complex in the south of Brazil during the Coronavirus Disease 2019 (COVID-19) pandemic, from June to August 2020. In 2019, the investigated locations carried out, together, nearly 5,700 surgical procedures a month. In 2020, due the impact of the COVID-19 pandemic, there was a lower number of surgeries, with approximately 4,800 procedures every month.

The population considered included 681 workers hired through the Brazilian decree Consolidation of Labor Law, with 10 nursing supervisors, 60 direct assistance nurses, 543 nursing technicians, 24 administrative workers, and 44 support workers (cleaning auxiliaries and pharmacists). In addition to them, 565 surgeons from several specialties were included, as well as 328 anesthesiologists and 335 medical interns.

The sample was non-probabilistic and its inclusion criteria were: having been working in a team from one of the eight surgical centers within the scope of the study for more than three months (period understood as a trial period by the Consolidation of Labor Law). Were excluded those who were absent due to vacations or leaves during data collection. As a result, the sample was formed by 172 workers, including health and support ones. The workers were addressed in the surgical centers during the pandemic, a period with a low number of surgeries. Among the workers who were present in this period, the rate of respondents was 20.8%. Many workers were relocated into health care areas destined to COVID-19

patients, while others were on leave due to being part of risk groups. Residents also had their practices interrupted. Some forms had missing answers, which did not lead to the exclusion of participants. The low return rates and the absence of different work groups can be considered limitations of the study.

The eight surgical centers are destined to many different types of surgeries, including general (A=13 rooms), ophthalmologic (B=4 rooms), pulmonary (C=3 rooms), neurological (D=3 rooms), cardiac (E=4 rooms), oncological (F=7 rooms); transplant/plastic (G=12 rooms), and pediatric surgeries (H=7 rooms). To organize the data, the surgical centers were grouped according with the number of respondents, surgical rooms, and similarity of processes, leading to five comparable groups.

Data collection took place according with the application of the Safety Attitudes Questionnaire/Operating Room, which has three parts. The first is formed by 15 questions that address the quality of communication and the collaboration between professionals who worked in the surgical environment. The second includes 40 statements that address patient safety. It is divided in six domains and their respective items: safety climate (seven items), perceptions of management (five items), stress recognition (four items), working conditions (six items), communication in the surgical environment (four items), and perception of professional performance (four items). The third part of the questionnaire includes personal information (sex, age, ethnicity, professional category, time working and experience, shift, work regime, and time working in the hospital), in addition to a space where the participant can describe three recommendations to improve the safety of the patient in a surgical center⁽⁷⁻⁸⁾.

Each item in the Safety Attitudes Questionnaire/Operating Room is answered by choosing alternatives of a Likert scale scored as follows: strongly disagree (0), slightly disagree (25), neutral (50), slightly agree (75), and fully agree (100). The option "not applicable" is not scored. To calculate the score, the negative items are, at first, reverted and grouped

in the domains, and the score is found by adding them up and calculating the mean. That is, after the items of each domain is added up, it is divided by the number of items. The score of the scale varies from 0 to 100, with 0 being the worst possible perception of the safety climate and 100 the best possible. Values equal or above 75 indicate a positive perception of patient safety⁽⁷⁻⁸⁾. The reliability of the instrument and its internal consistency were verified using the Cronbach's alpha coefficient. The original study showed a coefficient of 0.76 internationally, while in the Brazilian version, the coefficient found was 0.87⁽⁷⁻⁸⁾. Since this instrument was only recently adapted and validated into Brazilian culture, with few publications showing its results, its reliability and internal consistency were tested again in this study, resulting in a general Cronbach's alpha of 0.86 in our sample. The coefficient varied from 0.62 to 0.76 in the domains, showing good reliability and internal consistency.

The information gathered was input in the software SPSS version 22.0. Descriptive statistics was used to analyze the results, with absolute values, mean, standard deviation, median, and percentiles. The normality of the sample was verified using the Shapiro-Wilk's statistical test⁽¹¹⁾. The association between groups was carried out using the chi-squared test and the difference between the means was evaluated using Student's t and Mann-Whitney's. To compare the variables, the Kruskal-Wallis test was used, and when it showed a significant result, the post hoc Dunn-Bonferroni test was also applied⁽¹¹⁾.

The differences between the groups are indicated by different superscript letters, showing that the domains are different between the surgical centers. The same superscript letter, on the other hand, indicates no difference, that is, that the domains did not vary from one surgical center to another. The *post hoc* Dunn-Bonferroni test was only applied and interpreted for domains that showed statistical significance, as shown in Table 2 by superscript letters (a,b,c). The significance level adopted for the statistic tests was 5%, with a confidence interval of 95%.

The study respected all ethical and legal requirements. Participants were informed about its

implications as they signed the Free and Informed Consent Form. The project was approved by the Research Ethics Committee of the *Universidade Federal do Rio Grande do Sul*, under Opinion 4,092,333/2020, and Certificate for Submission to Ethical Appreciation 31032220.9.0000.5335.

Results

Among the 172 workers who participated in the research, there were 100 (58.1%) nursing technicians (technologists or circulator technicians), 22 (12.8%) direct care nurses, 16 (9.3%) surgeons, 9 (5.9%) medical residents, 7 (4.1%) supervisor nurses, 7 (3.5%) administrative nurses, 5 (2.9%) anesthesiologists, 3 (1.7%) perfusionists, and 3 (1.7%) workers from the support team (cleaning and pharmacy auxiliaries).

Most of our sample were female 125 (72.7%), from 19 to 58 years old (72.2%) and a median of 37 (31.0-42.0) years old. Regarding their ethnicity, 126 (80.6%) self-classified as white, 18 (11.3%) as black, 12 (7.5%) as brown and 1 (0.6%) as Afro-descendant. 15 participants (8.7%) did not answer this item. Most participants (82 - 54.7%) worked half-time (6 hours during the morning or the afternoon), followed by full-time workers (8 to 10 hours), for 44 (29.3%) workers. 14 respondents worked in variable shifts (9.3%), while 10 worked nights (6.7%). 12 (6.9%) did not answer this question. The time of professional experience varied from 3 to 14 years (75.4%) with a median of 7 years (3.0 - 14.0). Regarding time working in the hospital, there was a variation from 2 to 10 years (61.0%), with a median of 5 years (2.0-10.0).

Table 1 shows the descriptive analysis of the first part of the Safety Attitudes Questionnaire/Operating Room regarding the quality of communication and collaboration between workers during their work routine in the surgical center, showing that only the nurses (nurse, technologists, and circulator technicians) reached the minimum score (≥ 75) for this aspect to be perceived as positive. The global analysis between the five surgical center groups, the "surgical residents" ($p=0.043$) and "anesthesiology residents" ($p=0.019$) showed statistically significant differences.

Table 1 – Descriptive measures regarding the quality of communication and collaboration between workers. Porto Alegre, RS, Brazil, 2021

Professional category	Mean	Cutoff point	Standard deviation	p-value*
Surgeon	67.5	75	25.6	0.183
Surgical resident	60.7	75	29.6	0.043 [†]
Nursing technician (technologist or circulator)	78.5	75	22.8	0.051
Anesthesiologist	69.0	75	28.1	0.068
Anesthesia resident	51.4	75	32.8	0.019 [†]
Surgical center nurse	78.9	75	24.6	0.072
Anesthesia recovery nurse	77.6	75	24.8	0.894
Surgical center head nurse	79.9	75	24.9	0.339
Support team	52.4	75	36.7	0.100

*Fisher’s exact test; [†] Statistical significance for p≤0.050

The six domains evaluated in the Safety Attitudes Questionnaire/Operating Room are shown in Table 2. The surgical center F showed a lower score than the others. In this center there were also the lowest scores in regard to Perception of management and Work conditions, with the former being lower. The analysis used the median and can be found on the table below. Furthermore, in the global analysis, the domains Safety climate (p=0.047), Perception of management (p=0.016), and Work conditions (p=0.001) presented statistically significant differences.

Table 2 – Descriptive analysis of the score as grouped per surgical centers and in general, according with the domains of the Safety Attitudes Questionnaire/Operating Room. Porto Alegre, RS, Brazil, 2021

Domains	Surgical center					p-value*	Median
	A+B (n=49)	C+D+E (n=38)	F (n=40)	G (n=23)	H (n=22)		
Safety climate	82.1(71.4-92.8)	82.1(69.6- 92.8)	71.4(60.7-82.1)	75.0(64.2-92.8)	78.0(64.2- 85.7)	0.047 [†]	78.5(64.2- 85.7)
Perception of management	80.0(65.0-85.0) ^{sa}	80.0(70.0-80.0) ^{sa}	62.5(52.5-75.0) ^{sb}	70.0 (65.0-85.0) ^{sab}	70.0(65.0-80.0) ^{ab}	0.016 [†]	70.0(61.2-85.0)
Stress recognition	81.2(62.5-93.7)	75.0(59.3-90.6)	81.2(68.7-93.7)	75.0 (53.1-81.2)	87.5 (62.5-100.0)	0.203	81.2(62.5-93.7)
Work conditions	66.6(56.2-79.1) ^{pac}	75.0(62.5-85.4) ^{ab}	66.6(50.0-70.8) ^{pac}	83.3 (75.0-87.5) ^{sb}	68.7 (54.1-87.5) ^{abc}	0.000 [†]	68.7(54.1-87.5)
Communication in the surgical environment	81.2(68.7-93.7)	81.2(68.7-87.5)	75.0(56.2-87.5)	81.2 (75.0-87.5)	84.3(62.5-93.7)	0.101	81.2(68.7-87.5)
Perception of professional performance	81.2(68.7-87.5)	75.0(62.5-90.6)	75.0(62.5-87.5)	81.2 (68.7-93.7)	75.0(62.5-87.5)	0.901	75.0(62.5-87.5)
General	78.7(63.4-89.3)	78.0(63.2- 89.0)	71.9(61.7-85.9)	77.6 (63.1-88.8)	77.3(63.0- 88.6)		77.6(63.1-88.8)

*Kruskal-Wallis test; [†]Statistical significance of p≤0.050; ^{a,b,c}superscript letters indicate significant differences (p≤0.050) between the groups evaluated according with Dunn-Bonferroni’s post hoc test

There was a difference in the domain Perception of management between surgical center F, showing the lowest value (62.15) and the surgical centers A+B, and C+D+E, which showed better values (92.24 and 95.76, respectively; p=0.016). There was also a difference in the domain Work conditions between the surgical centers C+D+E and G, which had the highest values (94.43 and 114.05) and the centers A+B and F, which presented the lowest (75.79 and 61.99; p<0.001).

Discussion

The findings in this research are similar to those from other studies, which identified, between workers in surgical centers, a higher number of female nursing workers from 20 to 40 years old⁽¹²⁻¹⁵⁾.

Regarding the quality of communication and collaboration between workers, nurses and nursing technicians were the only ones to reach a positive score (≥75) as opposed to the other categories, whi-

ch shows a considerable weakness in the communication process between the members of the health care teams in the surgical centers researched. Other studies⁽¹³⁻¹⁴⁾ corroborate the high score showed by the nursing team in this regard, suggesting that weak multiprofessional communication can directly interfere in the risks of the patient who undergoes surgical anesthetic procedures. It should be highlighted that effective communication is an essential element for safe surgeries, adverse event prevention, and quality health care⁽¹⁴⁾.

The domains Stress recognition and Communication in the surgical environment showed the highest scores among workers. These findings are similar to those found by a study in a teaching hospital⁽¹²⁾. Also, certain investigations⁽¹⁶⁻¹⁷⁾ highlight the importance of horizontal, open communication between teams, to disseminate information regarding the need for materials, equipment, and medication, in addition to involving the group to minimize mistakes and achieve the essential goals for surgical safety. It should be mentioned that practices of management that involve dialog can be spaces to improve the activities developed in the surgical center, thus improving the quality of the assistance provided.

The values presented by the Safety climate show a positive perception of the workers in our sample in the groups of surgical centers. There was only one exception where the score remained below the cutoff point, indicating a worse perception in this domain. These findings are in contrast with those by other studies^(14-15,17) carried out in Brazil, which indicated a negative perception of the safety climate, and, therefore, of the safety culture. As a result, there are recommendations, due to these results, towards implementing actions to improve and enhance these aspects of organizations⁽¹⁴⁾. The findings in this study indicate the need for more investments and follow up of these aspects in the specific surgical center.

The strategies used to implement the surgical checklist suggest some actions that can be carried out to improve this process, among which educational ac-

tions about the subject, feedback on safety using local data, and accountability in cases of non-conformity, in addition to management support for the leadership. These strategies are thought to aid enhancing the culture and climate of safety in the surgical center, indicating paths for managers to follow with the support of higher management⁽¹⁸⁾.

The borderline score in the domain Perception of professional performance shows the need to consider the elaboration of strategies for professional improvement, focused on the efficiency of actions, work satisfaction, and the development of work abilities. This domain reflects on the professional conduct and on the behavior of the worker when carrying out their activities, and can be evaluated and followed up by analysis of work satisfaction^(14,19).

The lowest scores, found in the domains Perceptions of management and Work conditions, show that the leadership needs to invest more in the work environment. Regarding the Perceptions of management, a research carried out in a public teaching institution highlights that, when there is no support from management and clear information for the performance of the work, communication is weakened⁽²⁰⁾. The Work conditions, on the other hand, include the perception of workers regarding the place where they work⁽⁷⁾. The worker from surgical centers must find favorable conditions to develop their activities in such a way as to provide safe and efficient assistance, involving management practices with a leadership that can provide clear guidance about common objectives and expected performance, in addition to providing the work with continued education, due to the constant innovation in the fields of anesthetics and surgery. It is also paramount to deal with the difficulties found in the environment, in addition to training the new collaborators and creating schedules with them⁽²⁰⁻²¹⁾.

It stands out that only in Surgical Center F the perception of the safety climate was not positive (≤ 75), meaning that the domains Management perception, Work condition, and Safety climate did not reach the minimum score for that to be the case. This surgical

center specializes in high-complexity cancer surgeries, which, often, require heavy workloads. According with the perceptions of the collaborators, the medical and nursing managers in this unit are not active, contributing for a worse safety climate. This finding is in accordance with that of a study in a surgical center that carries out surgeries in many specialties, which also showed low scores in regard to management and work conditions, suggesting that managers must look closer at the demands of their collaborators in order to show commitment with health care safety⁽⁹⁾.

In the A+B surgical centers, the domain Work conditions also showed a low score, similar to that of Surgical Center F. The higher number of surgical rooms and specialties in these centers lead to a higher number of procedures. Even with a higher number of collaborators, this could lead to a perception of a heavier workload in the members of the team, and, as a result, lead to worse evaluations of work conditions. Work conditions, in studies from Turkey and China, also showed shortcomings, standing out that organizational stress increase has a negative impact on health care teams and threatens the very safety of the patient, which is made clear by increased infection and mortality rates in surgical patients. These studies reiterate that healthy work environments can improve the professional satisfaction of the health care team, reducing fatigue at work and contributing for better practices⁽²²⁻²³⁾.

On the other hand, in the centers A+B, the Safety climate and Management perception scores were positive, especially due to the strong presence and activity of the medical and nurse managers, which favor the development of their teams, help dealing with demands, and continuously improve the processes of assistance.

These results are in disagreement with the score found in other studies^(9,14), where, in the same domains, respondents showed difficulties in the activities regarding the safety in the workplace, indicating a shortcoming in this regard. These studies point out that this shortcoming is associated with unqualified

health care teams and with an increased mortality rate among patients. On the other hand, they argue that the perception of a positive safety climate is related with the empowerment of nurses and with an environment that supports the practice of nursing.

The support from high-management and the existence of conditions that allow the improvement of the leadership helps them be closer to their teams, thus identifying their main difficulties and, proactively, leading to improvements in the workplace.

Study limitations

Limitations of this study were the non-probabilistic sampling and the number of respondents in each category. Nevertheless, the study presents relevant reflections about the safety climate and attitude in the surgical center during a critical period of health care. The low adherence of medical teams could in fact be due to the fact that they had to prioritize the attention to COVID-19 patients, reducing their time for other demands.

The results of this study suggest that nursing teams are engaged in the construction of a culture of safety, while also showing which aspects deserve to receive more careful evaluation and be developed in surgical centers, in order to foment interprofessional and collaborative work

Contributions to practice

The results of this study contribute to the field of direct assistance as they highlight the importance of providing further qualification to workers in management roles, seeking an approximation and a more assertive look regarding the needs of the team health assistance team. Another aspect that indicates improvement, and tends to contribute for a positive safety climate, is the investment on the work conditions provided to collaborators, decreasing work overload, and reevaluating the sizing of personnel.

Conclusion

The culture of safety, according with the perception of the safety climate by the nursing workers from surgical centers, was, in general, positive. This finding stood out in the domains Safety climate, Stress recognition, Communication in the surgical environment, and Perception of professional performance. On the other hand, the domains Perceptions of management and Work conditions presented the lowest scores, suggesting that strategies should be developed to optimize them and develop a culture of safety in the surgical center in regard to these topics.

Differences in the leadership and in the conduction of the processes in the different surgical centers suggest that institutional alignment is necessary. After all, considering that, within the same institution, structure and organization resources will be similar, significant differences were found between surgical centers in certain domains, presenting an opportunity to improve the institutional culture of safety.

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Authors' contribution

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