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RESEARCH ARTICLE (ORIGINAL)

Patient Safety Culture in Anesthesia Procedures Outside the Operating Room

Cultura de Segurança do Doente em Procedimentos Anestésicos Fora do Bloco Operatório

Cultura de Seguridad del Paciente en Procedimientos Anestésicos Fuera del Quirófano

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Abstract
Background: Non-operating room anesthesia procedures have increased significantly, making it essential to ensure an adequate patient safety culture (PSC).
Objectives: To characterize the PSC perceived by professionals working in these units, identify strengths and areas needing improvement, and analyze the relationship between PSC and sociodemographic or professional characteristics.
Methodology: A quantitative, descriptive-correlational study was conducted with 56 professionals. Data were collected between March and May 2022 using a sociodemographic/professional questionnaire and a PSC assessment instrument.
Results: The overall perception of PSC showed 67.4% positive responses. Priority interventions are needed in the dimensions related to Management support for patient safety, Staffing, Nonpunitive response to error, and Frequency of reporting. Teamwork was identified as a strength.
Conclusion: Ensuring adequate staffing levels and fostering a nonpunitive culture toward errors can significantly improve PSC in the analyzed units.

Keywords: organizational culture; patient safety; health personnel; procedures outside the operating room

Resumo
Enquadramento: Os procedimentos anestésicos fora do bloco operatório têm aumentado significativamente sendo importante garantir uma cultura de segurança do doente (CSD) adequada**.**
Objetivos: Caracterizar a CSD percecionada pelos profissionais que atuam nessas unidades, identificar pontos fortes e oportunidades de melhoria e analisar a relação entre a CSD e características socioprofissionais.
Metodologia: Estudo descritivo-correlacional, quantitativo, com 56 profissionais. A recolha de dados, decorrida entre março e maio de 2022, incluiu um questionário sociodemográfico/profissional dos participantes e instrumento de avaliação da CSD.
Resultados: A perceção global da CSD traduziu-se em 67,4% de respostas positivas. Necessitam intervenção prioritária as dimensões Apoio da gestão à segurança do doente, Dotações de profissionais, Resposta ao erro não punitiva e Frequência de notificação. O Trabalho em equipa foi identificado como ponto forte.
Conclusão: Garantir dotações mínimas de profissionais e promover uma cultura não punitiva face ao erro podem melhorar significativamente a CSD nas unidades estudadas.

Palavras-chave: cultura organizacional; segurança do paciente; profissionais de saúde; procedimentos anestésicos fora do bloco operatório

Resumen
Marco contextual: Los procedimientos anestésicos fuera del quirófano han aumentado significativamente, por lo que es importante garantizar una cultura de seguridad del paciente (CSD) adecuada.
Objetivos: Caracterizar la CSD percibida por los profesionales que trabajan en estas unidades, identificar puntos fuertes y oportunidades de mejora y analizar la relación entre la CSD y las características socioprofesionales.
Metodología: Estudio descriptivo-correlacional, cuantitativo, con 56 profesionales. La recopilación de datos, realizada entre marzo y mayo de 2022, incluyó un cuestionario sociodemográfico/profesional de los participantes y un instrumento de evaluación de la CSD.
Resultados: La percepción global de la CSD se tradujo en un 67,4 % de respuestas positivas. Requieren una intervención prioritaria las dimensiones Apoyo de la dirección a la seguridad del paciente, Dotación de profesionales, Respuesta al error no punitiva y Frecuencia de notificación. El trabajo en equipo se identificó como un punto fuerte.
Conclusión: Garantizar una dotación mínima de profesionales y promover una cultura no punitiva ante el error puede mejorar significativamente la CSD en las unidades estudiadas.

Palabras clave: cultura organizativa; seguridad del paciente; profesionales sanitarios; procedimientos anestésicos fuera del quirófano

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Introduction

Since the 20th century, the quality of care and patient safety have been linked to organizational culture, given that at least 99,000 deaths occur each year due to preventable medical errors. International organizations, such as the World Health Organization (WHO), have recommended that hospitals improve their organizational cultures (Granel-Giménez et al., 2022).

Patient safety is a fundamental right in healthcare and a priority of the National Strategy for Quality in Healthcare (Organização Mundial da Saúde [OMS], 2020). As healthcare systems become more complex and dynamic, safety culture must be prioritized and involve all healthcare professionals. Assessing the safety culture is essential to directing improvement interventions and monitoring their progress in hospital units (Direção-Geral da Saúde [DGS], 2020).

Promoting a safety culture is an indispensable process for improving patient safety. Only through the identification of errors, adverse events, and their underlying causes can preventive and safety-promoting practices be implemented (Pinto & Sarnadas, 2020).

Over the last two decades, there has been a significant increase in the number of anesthesia procedures performed outside the operating room (OR; Ordem dos Médicos, 2019). The organization, leadership, training, and experience of the professionals involved are essential to ensure that the same standards governing practice in the OR are met, while avoiding adverse events and providing optimal patient care (Ordem dos Médicos, 2019).

In Portugal, the limited scientific evidence and the lack of guidelines for systematizing nursing care during non-operating room anesthesia procedures highlight the importance of this topic and its link to patient safety. However, patient safety culture (PSC) assessments are generally conducted in contexts other than those in which the study was developed. For this reason, assessing PSC in this context is justified.

To address this gap, this study aimed to characterize PSC as perceived by healthcare professionals working in units where anesthesia procedures are performed outside the OR in a hospital dedicated solely to cancer care. It also aimed to analyze the relationship between PSC and participants' sociodemographic and professional characteristics, as well as to identify PSC strengths and areas needing improvement in these units.

Background

Safety culture is a concept that encompasses the whole organizational structure and includes non-technical skills such as teamwork, communication, and reporting adverse events (Pinto & Sarnadas, 2020).

The WHO and the Council of the European Union recommend that Member States assess PSC as an essential condition for implementing changes in the behaviors of healthcare professionals and organizations, thereby achieving higher levels of safety and quality in patient care (DGS, 2020).

The first strategic objective of the National Plan for Patient Safety 2015-2020 was to increase the safety culture of healthcare organizations. The National Plan for Patient Safety 2021-2026 maintains this focus, defining safety culture as one of the five fundamental pillars and establishing the following objectives: promoting the training of healthcare professionals in patient safety, assessing PSC, and increasing the literacy and engagement of patients, families, caregivers, and society in patient safety (Despacho n.º 9390/2021 do Gabinete do Secretário de Estado Adjunto e da Saúde, 2021).

Patient safety is a central aspect of nursing practice and essential for the efficiency of healthcare systems (Barroso et al., 2021). According to the WHO, high-quality care is safe, effective, patient-centered, efficient, equitable, and integrated (OMS, 2020).

Scientific and technological advances have been crucial to the development of increasingly complex diagnostic procedures outside the OR, particularly in radiology, gastroenterology, interventional cardiology, vascular surgery, pulmonology, obstetrics and reproductive medicine, neurophysiology, and urology (Calabrese, 2019; Ordem dos Médicos, 2019).

According to Werthman et al. (2021), the advanced training requirements for nurses in these contexts are not clearly defined, which limits their education and training. The Portuguese nursing regulatory authority (Ordem dos Enfermeiros, OE) recommends that specialized examination units where sedation or anesthesia is administered have two nurses per room, one of whom should be a medical-surgical nursing specialist in the area of perioperative care (Regulamento n.º 743/2019 da Ordem dos Enfermeiros, 2019).

Research question

What is the perceived level of patient safety culture among healthcare professionals working in units where anesthesia procedures are performed outside the operating room?

Methodology

A quantitative, descriptive-correlational study was conducted.

The study population consisted of healthcare professionals (nurses, anesthesiologists, and non-anesthesiologists) working in units where anesthesia procedures are performed outside the OR, such as the brachytherapy, gastroenterology, gynecology, and pulmonology units, at a hospital in the central region of Portugal. The sample was selected using a non-probability purposive sampling approach (Polit & Beck, 2021). The inclusion criteria were having worked in these units for at least three months and agreeing to participate in the study freely and voluntarily after receiving full information about it. A total of 56 professionals who met these criteria were identified, and all of them agreed to participate.

The data collection instrument consisted of two parts: Part I focused on sociodemographic and professional characteristics, and Part II comprised the Portuguese version of the Hospital Survey on Patient Safety Culture (HSPSC; Eiras, 2011).

The HSPSC includes 42 items grouped into 12 dimensions related to patient safety at the hospital and unit levels, as well as outcome variables. It uses a 5-point Likert scale with three possible responses: Negative (scores 1 and 2), Neutral (score 3), and Positive (scores 4 and 5). Data were collected between March and May of 2022.

The survey data were imported into IBM SPSS Statistics, version 29.0. Descriptive statistical analyses (e.g., frequencies, measures of central tendency, and measures of dispersion) and inferential analyses (e.g., parametric or nonparametric tests, depending on whether the sample met the criteria for normal distribution) were then performed. The following hypotheses were formulated: H1: The perception of PSC varies by professional group; H2: There is an association between the perception of PSC and the number of years of professional experience among healthcare professionals; H3: There is an association between the perception of PSC and the number of years that healthcare professionals have worked in the unit; and H4: There is an association between the perception of PSC and the weekly working hours of healthcare professionals.

This study complied with the ethical requirements for research of this nature and was approved by the Ethics Committee and the Board of Directors of the healthcare institution where it was conducted (Opinion no. TI 01/2022).

Results

Sociodemographic and professional characteristics of the sample

The sample consisted of 56 healthcare professionals, corresponding to 100% of the study population: 23 non-anesthesiologist physicians (41.1%), 22 nurses (39.3%), and 11 anesthesiologist physicians (19.6%).

Most participants were female (67.9%), with a mean age of 46.25 years (*SD* = 9.85).

Regarding educational level, 75% held a bachelor's degree, 23.2% a master's degree, and one participant held a doctoral degree.

Participants reported an average of 21.52 years (*SD* = 9.21) of professional experience and an average of 11.69 years (*SD* = 8.85) of experience in their current unit.

Half of the participants had an individual employment contract, and 46.8% had a permanent public service employment contract. The majority reported working between 31 and 45 hours per week (87.5%). Table 1 shows the characteristics of the sample.

Table 1

Sociodemographic and professional characteristics of participants

Variable	N (%)	Mean	Standard deviation	Minimum	Maximum
Age (years)	56 (100)	46.25	9.85	25	6
Professional experience (years)	56 (100)	21.52	9.21	4	40
Experience in the unit (years)	56 (100)	11.69	8.85	0.25	30

Variable		**N (%)**
Gender	Male	18 (32.1)
	Female	38 (67.9)
Professional category	Nurse	22 (39.3)
	Non-anesthesiologist physician	23 (41.1)
	Anesthesiologist physician	11 (19.6)
Educational level	Bachelor's degree	42 (75)
	Master's degree	13 (23.2)
	Doctoral degree	1 (1.8)
Weekly workload (hours)	[15-30]	3 (5.4)
	[31-45]	49 (87.5)
	[46-60]	1 (1.8)
	[61-66]	3 (5.4)

Note. N = Number of participants; % = Percentage.

Perception of patient safety culture

The results on PSC can be divided into three main categories: adequate domains, when 75% of responses are positive; areas needing improvement, when 50%-75% of responses are positive; and critical areas, when less than 50% of responses are positive.

Overall, participants' perception of PSC had a mean score of 3.37, which corresponds to 67.4% positive responses, indicating that PSC can be improved.
When analyzed by domain, the Unit domain had the highest mean score, while the Outcome variables had the lowest (Table 2). Among the domains, Unit also had the highest percentage of positive responses, whereas Outcome Variables recorded the highest percentage of negative responses.

Table 2

Professionals' perception of patient safety culture

Domains	*N*	Mean	Standard deviation	Minimum	Maximum
Hospital	55	3.35	0.51	2.11	4.78
Unit	49	3.48	0.52	2.24	4.88
Outcome variables	55	3.13	0.71	1.38	4.88

Note. N = Number of participants.

At the hospital level, the results indicate that the Teamwork across units and the Hospital handoffs and transitions dimensions were perceived positively, although both remain insufficient. The Teamwork across hospital units dimension was identified as an area needing improvement, with 50.9% and 49.5% positive responses, respectively. The Hospital handoffs and transitions dimension was classified as a critical area, suggesting challenges in continuity of care and interdepartmental coordination. The Hospital management support for patient safety dimension was also considered a critical area, as only 31.7% of respondents viewed it positively, indicating a clear structural weakness and a lack of visible commitment from hospital leadership to promoting a safe culture (Table 3).

Table 3

Domain of safety culture at the hospital level

Dimensions	*N*	Negative (%)	Neutral (%)	Positive (%)	N/A
Hospital management support for patient safety	55	23.3	41.9	31.7	1
Teamwork across hospital units	56	11.6	37.5	50.9	0
Hospital handoffs and transitions	56	10.3	40.2	49.5	0

Note. N = Number of participants; N/A = No answer.

At the unit level, the overall situation is adequate in some areas. The Teamwork within units dimension was viewed positively, with 80.9% positive responses. It is the only dimension considered adequate in the PSC domain, reflecting effective collaboration among professionals in the units. This factor may serve as an important pillar for developing a stronger safety culture. Nevertheless, several dimensions fall within the intermediate range and require special attention. The Supervisor/manager expectations and actions promoting safety, Organizational learning and continuous improvement, Feedback and communication about error, and Communication openness dimensions were perceived positively, with scores ranging from 52.4% to 68.7%. These results suggest that practices are in place but could be improved to promote a more transparent environment and strengthen mechanisms for learning from errors.
On the other hand, two dimensions require special attention due to their critical nature: Staffing (35%) and Nonpunitive response to error (33.5%). These low scores may compromise the quality of care provided and reduce professionals' willingness to report adverse events or near misses, both of which are essential for prevention and continuous improvement.

Table 4

Domain of safety at the unit level

Dimensions	*N*	Negative (%)	Neutral (%)	Positive (%)	N/A
Teamwork within units	52	4.1	15	80.9	4
Supervisor/manager expectations & actions promoting safety	56	20.1	24.1	55.8	0
Organizational learning - continuous improvement	54	12	9.3	68.7	2
Feedback and communication about error	56	22.6	25	52.4	0
Communication openness	56	16.1	26.8	57.1	0
Staffing	55	34.5	30.5	35.0	1
Nonpunitive response to error	55	35.9	30.5	33.5	1

Note. N = Number of participants; N/A = No answer; % = Percentage.

The outcome variables reinforce this diagnosis. The Overall perceptions of safety dimension reflects a moderately favorable view, with 51.8% positive responses, indicating an area needing improvement. The Frequency of event reporting, with only 29.7% positive responses, is a critical dimension that points to a culture of underreporting. This culture may be driven by a lack of institutional support and the perception of a punitive environment.

Table 5

Domain of patient safety according to outcome variables

Dimensions	*N*	Negative (%)	Neutral (%)	Positive (%)	N/A
Overall perceptions of safety	56	25.4	22.8	51.8	0
Frequency of event reporting	55	40	30.3	29.7	1

Note. N = Number of participants; N/A = No answer; % = Percentage.

In summary, the overall PSC profile reveals a system built on strong teamwork but facing significant challenges related to management involvement, error reporting, human resource management, and the promotion of a nonpunitive culture.

Association between participants' sociodemographic and professional characteristics and their perception of Patient Safety Culture

H1: The perception of PSC varies by professional group: a one-way analysis of variance (ANOVA) was performed (Z = 3.03; p = 0.058), which revealed no significant differences in the perception of PSC among the professional groups.

H2: There is an association between the perception of PSC and the number of years of professional experience among healthcare professionals: Following the Kruskal-Wallis test (p = 0.012), it was deemed relevant to identify which groups, based on their years of professional experience, showed significant differences. Professionals with 34-40 years of professional experience perceived PSC more positively than those with 14-23 (p = 0.003) and 4-13 years (p = 0.020). Professionals with 24-33 years of professional experience also perceived PSC more positively than those with 14-23 years (p = 0.028).

H3: There is an association between the perception of PSC and the number of years that healthcare professionals have worked in the unit: The Kruskal-Wallis test (p = 0.123) revealed no significant differences in the perception of PSC based on the number of years working in the unit.

H4: There is an association between the perception of PSC and the weekly working hours of healthcare professionals: The Kruskal-Wallis test (p = 0.055) revealed no significant differences in the perception of PSC based on the participants' weekly working hours.

Discussion

Although PSC is recognized as a central concern for healthcare teams and organizations, this study focused exclusively on nurses, anesthesiologist physicians, and non-anesthesiologist physicians, as these professional groups are predominant in the contexts where this study was conducted. For this reason, the sample was restricted to these categories.

To examine healthcare professionals' perceptions of PSC in settings where anesthesia procedures are performed outside the OR in a Portuguese cancer hospital, 56 professionals who met the predefined inclusion criteria were identified. All eligible professionals agreed to participate in the study and completed the data collection instrument. Analysis of the HSPSC revealed that 67.4% of responses were positive, with a mean score of 3.37 (SD = 0.47).

This percentage does not represent a clear strength but rather suggests several areas needing improvement. These findings are consistent with those of Granel-Giménez et al. (2022), who reported that most nurses considered the overall perception of PSC to be adequate. However, as noted by Silva (2019) and Chegini et al. (2020), the international literature frequently highlights a decline in the perception of PSC across multiple dimensions of the scale.

With regard to PSC at the hospital level, the mean score was close to the total mean score. The Hospital management support for patient safety dimension had the lowest percentage of positive responses and the highest percentage of negative responses, which contrasts with more favorable findings reported in other studies (Chegini et al., 2020). This dimension is a key area for improvement. The literature emphasizes the importance of managers actively listening to staff suggestions (Lee et al., 2023) and involving multidisciplinary teams in quality and safety management (Pires et al., 2021). One strategy to improve this dimension is to hold regular multidisciplinary meetings with clearly defined objectives, ensuring that all voices are heard, and conduct briefings and debriefings on specific situations.

The Teamwork across hospital units dimension received 50.9% positive responses, a result slightly higher than that reported by Silva (2019). The variability of responses in this dimension across studies can be explained by institutional characteristics and the typology of the units analyzed, highlighting the need to develop communication, leadership, and teamwork skills. As noted by Santos and Grilo (2021), effective communication within healthcare teams requires continuous learning.

The Hospital handoffs and transitions dimension received 49.5% positive responses and was classified as a critical area. Although some studies report lower values (Chegini, 2020; Silva, 2019), this dimension requires particular attention, as communication failures between professionals and patients are major contributors to adverse events (DGS, 2017; Santos & Grilo, 2021). It is imperative to ensure the effective implementation of Standard 001/2017, which refers to effective communication during handoffs, as well as the audits it mandates.

In the PSC area at the unit level, the mean score was slightly higher than that observed at the hospital level, suggesting a more positive perception among professionals in local contexts. The Teamwork within units dimension received 80.9% positive responses, ranking as a strength. Similar results were reported by Brás et al. (2023), in which this dimension also scored highly (70.5%). These findings reinforce the perspective of Pinto and Sarnadas (2020) that teamwork is an essential feature of PSC.

The Supervisor/manager expectations and actions promoting safety dimension obtained 55.8% positive responses, a lower percentage than that reported in most analyzed studies. This result may reflect the nature of the relationships between professionals and their immediate supervisors. Pires et al. (2021) emphasize that leaders should be present and authentic figures who promote transparency and critical thinking while focusing on continuous improvement.

The Organizational learning-continuous improvement dimension received 68.7% positive responses, a lower value than that reported by Rockville et al. (2016) but still indicating a relatively positive outcome. Lima et al. (2018) also highlight the importance of Quality and Safety Committees developing specific action plans to address problem areas and promoting a learning culture based on reporting and analysis of adverse events. Mandatory and periodic training in this area can contribute to a more favorable outcome.

The Feedback and communication about error dimension received 52.4% positive responses and a mean score of 3.34 (*SD* = 0.89), exceeding the 22.42% reported by Silva (2019). This improvement is significant, as the WHO advocates for reporting systems that promote learning and error prevention (Pedroso et al., 2021).

Another dimension with positive results (57.1%) was Communication openness, which scored higher than in most studies analyzed. Santos and Grilo (2021) emphasize that communication is an essential skill in clinical practice and one of the greatest challenges in healthcare. However, the Staffing and the Nonpunitive response to error dimensions revealed significant weaknesses. The former had the lowest mean score (M = 3.01; *SD* = 0.72), reflecting concerns about staff shortages and heavy workload (Azyabi et al., 2021). According to the OE, adequate staffing levels are essential to ensuring safe and high-quality care (Regulamento n.º 743/2019 da Ordem dos Enfermeiros, 2019). To this end, it is necessary to analyze the institution's various units, listen to the professionals, and assess whether the safe staffing levels proposed by professional associations are being met. With only 33.5% positive responses, the Nonpunitive response to error dimension confirms the persistence of a punitive culture, making it urgent to promote the acceptance of error as a learning opportunity (Pedroso et al., 2021).

The outcome variables included Overall perceptions of safety and Frequency of event reporting, with a total mean score of 3.16 (*SD* = 0.70). The former highlights the need to raise professional's awareness and implement tools that promote safety improvements (DGS, 2015). Frequency of event reporting was the most critical dimension, with only 29.7% positive responses, requiring urgent intervention. The WHO (2020) emphasizes the importance of reporting incidents to prevent harm (Ramos et al., 2021). Most participants (69.6%) indicated that they had not reported any events in the past 12 months, while 26.8% reported only one or two events. These findings are consistent with those of other national studies (Brás et al., 2023; Freire, 2017; García, 2015; Silva, 2019) and highlight the need to foster an institutional culture that effectively promotes event reporting. The institution's internal platform allows the Risk Committee to evaluate reported events, contributing to the implementation of preventive measures. Regular dissemination of information about this platform through the institution's internal communication channels could encourage its use.

When asked about the level of safety in their unit, 64.3% of professionals rated it as *very good*, representing a per-

ception slightly above the mean score of the 12 HSPSC dimensions. This assessment was also more favorable than that reported by Brás et al. (2023). However, the lack of responses rating safety as *excellent* indicates room for improvement. Eiras (2021) advocates for promoting an organizational culture based on trust, effective communication, and preventive strategies.

The analysis of sociodemographic variables showed that professionals with more years of experience (34-40 years in the profession) have a better perception of the safety culture, reflecting recognition of institutional advances over time.

However, this study has some limitations: the sample was intentional, limited in size and context, and restricted to a single institution. Nevertheless, all eligible professionals participated in the study, which strengths the validity of the results.

Future studies should expand the sample to include other similar institutional contexts and explore comparisons with settings similar to operating rooms. In addition, a qualitative study should be conducted to further explore the underlying causes of the identified weaknesses through active listening with professionals and propose sustained improvement strategies.

Conclusion

PSC is a key dimension of healthcare quality and one of the major challenges for organizations. Its assessment will enable the redesign of care practices to ensure professional excellence.

These results are expected to promote preventive practices and a safer environment, thus optimizing care quality in this context. Non-operating room anesthesia procedures have increased substantially, making it an area that requires specific research to ensure patient safety and quality of care. This study addresses that need and emphasizes the importance of continuous PSC assessment as a basis for adjusting improvement interventions to address the identified weaknesses. Such research should be conducted both at a global level and in specific areas to support these interventions.

The analysis indicates that, overall, the 12 dimensions of the scale do not represent a strength. Areas needing improvement were identified, with different levels of priority, highlighting the dimensions in each domain that require more urgent intervention and providing specific suggestions for improvement.

This study makes an innovative contribution to the field of nursing in Portugal by assessing PSC in anesthesia procedures performed outside the OR. This context has been underexplored and lacks specific nursing guidelines. The results reveal weaknesses in Staffing, Nonpunitive response to error, and Frequency of reporting, all of which have direct implications for nursing practice. Therefore, it is crucial to comply with the OE's recommendations on safe staffing, promote learning environments that encourage reporting without reprisals, and invest in advanced training for anesthesia and sedation practices outside the OR. The identified strength in the Teamwork within units dimension highlights nurses' role as facilitators of multidisciplinary collaboration and effective communication. Therefore, this study not only fills a scientific gap in the national context but also provides practical guidelines for improving patient safety and the quality of nursing care. Organizations should encourage employees to voice their concerns and make constructive suggestions to foster continuous improvement in healthcare.

Thesis/Dissertation

This article is derived from the dissertation entitled "Patient safety culture in units performing anesthesia procedures outside the operating room*," presented at the Nursing School of Coimbra in 2023.*

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