







Safety culture in the operating room: an integrative review

Cultura de segurança no centro cirúrgico: uma revisão integrativa

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ABSTRACT

Objective: To analyze the scientific evidence on safety culture by health professionals related to the operating room environment. **Method:** Critical integrative review with a search in the Medline, Embase, LILACS, CINAHL, Scopus and Web of Science databases based on the health sciences descriptors: organizational culture, surgicenters and health personnel. Eight articles were selected, 75% of which were published by nursing, the professional class most found in the studies. **Results:** In data collection, the Hospital Survey on Patient Safety Culture was used in 3 studies, the Safety Attitudes Questionnaire in 3, the Safety Attitudes Questionnaire/Operating Room in 1 and the online survey in 1 study. Two dimensions, management support and communication, were considered weak, while the best score was for teamwork. **Conclusion:** The use of various instruments to evaluate the safety culture in the operating room is evidenced, although there is an instrument of specific applicability.

Descriptors: Organizational Culture; Surgicenters; Health Personnel.

RESUMO

Objetivo: Analisar as evidências científicas sobre cultura de segurança pelos profissionais de saúde relacionada ao ambiente do centro cirúrgico. **Método:** Revisão integrativa crítica com busca nas bases de dados Medline, Embase, LILACS, CINAHL, Scopus e *Web of Science* a partir dos descritores em ciências da saúde *organizational culture, surgicenters e health personnel*. Selecionaram-se 8 artigos, sendo 75% publicados pela enfermagem, a classe profissional mais encontrada nos estudos. **Resultados:** Na coleta de dados, 3 usaram o *Hospital Survey on Patient Safety Culture*, 3 o *Safety Attitudes Questionnaire*, 1 o *Safety Attitudes Questionnaire/Operating Room* e 1 *survey on-line*. Duas dimensões foram consideradas frágeis, o apoio da gerência e a comunicação e a melhor pontuação foi o trabalho em equipe. **Conclusão:** Evidencia-se o uso de variados instrumentos para a avaliação da cultura de segurança no centro cirúrgico, apesar de haver um instrumento de aplicabilidade específica.

Descritores: Cultura Organizacional; Centros Cirúrgicos; Pessoal de Saúde.

INTRODUCTION

After publication of the document *To err is human: building a safer health system* in 1999 by the Institute of Medicine in the United States of America, patient safety assumed greater scientific visibility worldwide. In 2002, the 55th World Health Assembly realized the impact of the health damage caused by

the lack of appropriate patient safety, thereby creating in 2004 the World Alliance for Patient Safety with the objective of favoring patient safety standards and practices⁽¹⁾.

In 2008, the issue of safety in surgical care was chosen as the second global challenge for patient safety and led to the creation of the World Health Organization (WHO) manual

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for safe surgery in 2009. The milestone of discussions in Brazil happened in 2013 with the launch of the National Patient Safety Program published by Ordinance number 529⁽²⁾.

Thus, patient safety is understood as a critical component of the quality of health care, showing the importance of strengthening the safety culture in health organizations⁽³⁾. The safety culture derives from the individual or collective product of perceptions, values, attitudes, competencies and behavior patterns that determine the commitment, style and competence of the safety management in a health organization⁽⁴⁾.

Assessing the patient safety culture contributes to recognize the organizational situation and signal possible improvement interventions necessary to boost the quality of care and patient safety and to monitor the implemented interventions⁽⁴⁾.

There are some instruments to assess the safety culture such as the Hospital Survey on Patient Safety Culture (HSOPSC) and the Safety Attitudes Questionnaire (SAQ), psychometric questionnaires already translated and adapted to the Brazilian reality, and the Safety Attitudes Questionnaire/Operating Room (SAQ/OR), designed from the SAQ and used for investigation in the context of the operating room.

In this perspective, the assessment of patient safety in the surgical environment is necessary to support the aspects related to the organizational culture, safety climate and peculiarities inherent to the work process⁽⁵⁾. In the operating room, complex, precise activities are developed with multiple and multidisciplinary technologies strongly dependent on individual performance but with great need for teamwork, often marked by stress and pressure. The operating room is remarkably an environment at high risk for incidents, such as surgery in the wrong place, wrong patient and surgical item retained in cavities⁽⁵⁾. The development of a safety culture is evidently the responsibility of all members of the surgical team, since the promotion of safe organizations can improve the functioning and performance of the team and contribute to positive results for patients, professionals and institutions⁽⁶⁾.

Although the assessment of safety culture is widely discussed in the different hospital settings, weaknesses are still present regarding the perioperative environment. Therefore, it is relevant to invest in research on the patient safety climate in the operating room, as it allows identifying the deficiencies inherent in this theme and knowing the trends, thereby assisting in planning the improvements originated from a positive safety culture.

Based on the above, the aim of this study was to analyze the scientific evidence on safety culture by health professionals related to the operating room environment. We believe the collection of this evidence can instrumentalize leaders in advancing the maturity of culture and in the development

of improvement actions, encouraging a reflection about the work environment and working conditions.

METHOD

This is an integrative literature review that proposes to synthesize the studies available on a particular object of study and may guide leaders' decision-making based on the best evidence available currently. The six steps of the development of the integrative review were followed for its construction⁽⁷⁾ and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist⁽⁸⁾ was used to guide the organization of information.

In the first step, the development of the guiding question was based on the variation of the PICO strategy⁽⁹⁾, with population (health professionals), intervention (safety culture) and context (operating room). Then, the following question was asked: "What is the scientific evidence on safety culture by health professionals related to the operating room context?"

In the second step, the following inclusion criteria were applied for the selection of articles: published in English, Spanish and Portuguese; full articles addressing the object of study in question; and articles published and indexed in the databases mentioned below in the previous five years. The exclusion criteria were review studies, dissertations and theses, book chapters, reports and letters to the editor.

The search period was April 2020, using the terms of controlled vocabularies Descriptors in Health Sciences (DeCS), Medical Subject Headings (MESH) and Embase Subject Headings (EMTREE) according to each database and combined with synonyms through Boolean operators (Chart 1). The descriptors were Organizational Culture, Surgicenters and Health Personnel. The following electronic databases were surveyed: Medical Literature Analysis and Retrieval System Online (Medline) via Pubmed, Excerpta Medica Database (Embase), Latin American and Caribbean Literature in Health Sciences (LILACS) via Virtual Health Library (VHL), Current Nursing and Allied Health Literature (CINAHL) via EBSCOhost, Scopus (Elsevier) and Web of Science.

In the third step, the Rayyan application developed by the Qatar Computing Research Institute (QCRI)⁽¹⁰⁾, a software to assist in the archiving, organization and selection of articles, was used. The articles were blind evaluated without interference to avoid bias; first by two reviewers and then, a third reviewer analyzed the selection and decided the conflicts in a consensus meeting. Figure 1 shows the flowchart for identification and selection of articles, according to the PRISMA checklist⁽⁸⁾.

In the development of the fourth and fifth steps, the articles underwent a thorough and critical analysis. From this analysis, a matrix with the synthesis of results and the main

Chart 1. Controlled vocabularies in the health area. Rio de Janeiro, RJ, Brazil, 2020.

Database	Population (P)	Intervention (I)	Context (CO)
	Health personnel	organizational culture	Operating room
PUBMED (MESH)	<i>health personnel[mh] OR health care providers[tiab] OR health care provider[tiab] OR healthcare providers[tiab] OR healthcare provider[tiab] OR healthcare workers[tiab] OR healthcare worker[tiab]</i>	<i>organizational culture [mh]</i>	<i>surgicenters[mh] OR surgicenter[tiab]</i>
Embase (EMTREE)	<i>'health care personnel'/exp OR 'health care personnel' OR 'health care practitioner' OR 'health care professional' OR 'health care provider' OR 'health care worker' OR 'health personnel' OR 'health profession personnel' OR 'health worker' OR 'healthcare personnel' OR 'healthcare practitioner' OR 'healthcare professional' OR 'healthcare provider' OR 'healthcare worker' OR 'home health aides' OR 'personnel, health' OR 'public health officer'</i>	<i>'organizational culture'/exp OR 'corporate culture' OR 'organisation culture' OR 'organisational culture' OR 'organization culture' OR 'organizational culture'</i>	<i>'operating room'/exp OR 'operating room' OR 'operating room stool' OR 'operating rooms' OR 'operating theater' OR 'operating theatre' OR 'operation room' OR 'operation theater'</i>
CINAHL (MESH)	<i>health personnel OR health care providers OR health care provider OR healthcare providers OR healthcare provider OR healthcare workers OR healthcare worker</i>	<i>organizational culture OR organizational cultures OR corporate culture OR corporate cultures</i>	<i>surgicenters OR surgicenter</i>
LILACS (DeCS)	<i>"health personnel"</i>	<i>"organizational culture"</i>	<i>surgicenters</i>
SCOPUS (MESH)	<i>TITLE-ABS-KEY("health personnel" OR "health care providers" OR "health care provider" OR "healthcare providers" OR "healthcare provider" OR "healthcare workers" OR "healthcare worker")</i>	<i>TITLE-ABS-KEY("organizational culture" OR "organizational cultures" OR "corporate culture" OR "corporate cultures")</i>	<i>TITLE-ABS-KEY(surgicenters OR surgicenter)</i>
WEB OF SCIENCE (MESH)	<i>"health personnel"</i>	<i>"organizational culture"</i>	<i>surgicenters</i>

data of articles was built, including title, year of publication, journal, author(s), objectives, type of study, population, sample size, instrument used in the study, main outcomes and classification of levels of evidence, defined as suggested in the study⁽¹¹⁾.

The levels of evidence can be classified from I to VI, according to the study design. Level I includes controlled and randomized clinical meta-analysis studies; level II are individual, experimental studies; level III are quasi-experimental studies; level IV are descriptive (non-experimental) or qualitative studies; level V are case report or experience report studies, and level VI is evidence based on expert opinion are level⁽¹¹⁾.

Finally, in the sixth step, the review of the selected studies and the discussion of the theme were presented with authors' impressions and reflections.

RESULTS

In Chart 2, an overview of the 8 (100%) selected scientific productions organized in chronological order of publication, was organized. Among the studies, 1 (12.5%) was published in 2020⁽¹²⁾, 3 (37.5%) in 2019⁽¹³⁻¹⁵⁾, 2 (25%) in 2018^(16,17) and 2 (25%) in 2015^(18,19). The largest number of studies was found at Embase (n=5) (62.5%)^(12,15-18), Web of Science (n=2) (25%)^(13,14) and at LILACS (n=1) (12.5%)⁽¹⁹⁾. Regarding the

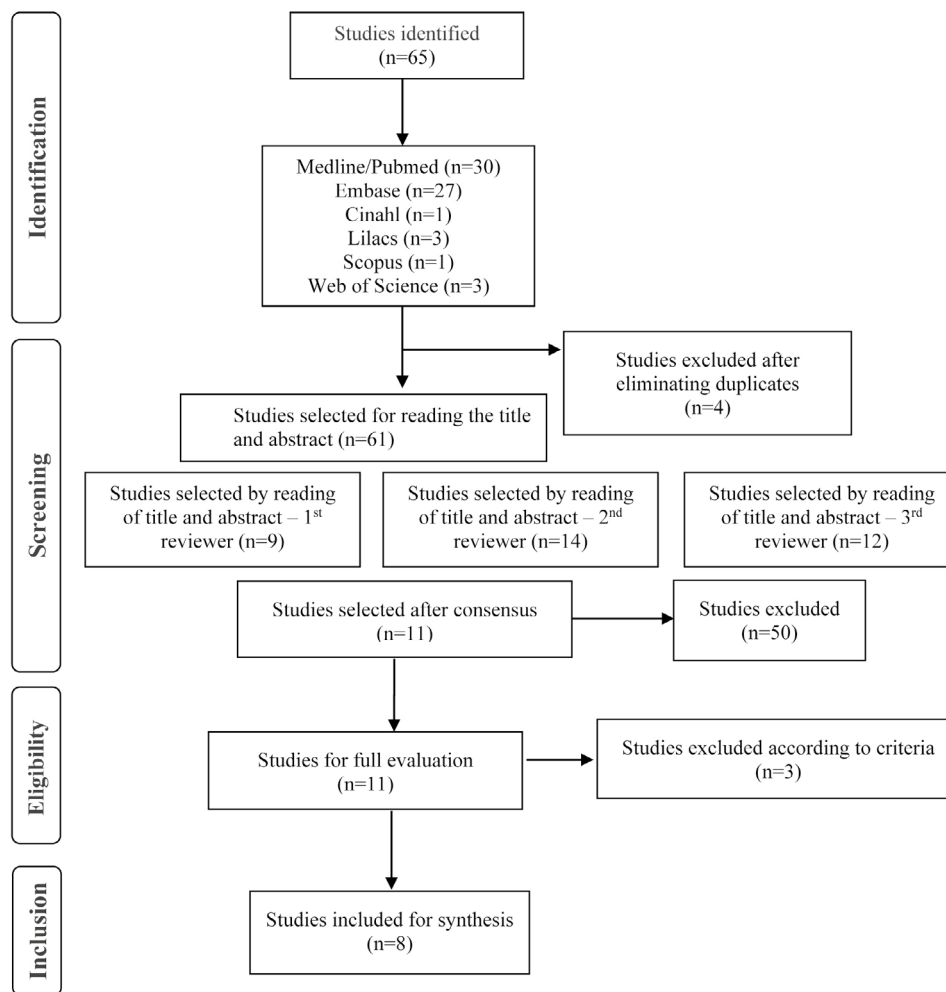


Figure 1. Flowchart of study selection. Rio de Janeiro, RJ, Brazil, 2020.

origin of publications, 4 (50%) studies are from Brazil^(13,14,17,19), while Spain⁽¹⁸⁾, Holland⁽¹⁵⁾, Sweden⁽¹⁶⁾ and Turkey⁽¹²⁾ each had 1 study. As for the profession involved, 6 studies were published by Nursing^(12-14,17-19) and 2 by Medicine^(15,16).

Regarding the population involved in the studies, 3 (37.5%) were with the medical and nursing teams⁽¹⁴⁻¹⁶⁾, 2 (25%) only with nurses^(12,17), 2 (25%) with the entire nursing team^(13,18) and 1 (12.5%) with a multidisciplinary team⁽¹⁹⁾. The nursing team was included in all studies.

The objectives of the studies ranged from analyzing the patient safety culture of nursing professionals⁽¹³⁾, the patient safety culture of spinal care professionals⁽¹⁵⁾, the patient safety culture relating to communication and notification of adverse events⁽¹⁴⁾, assessing patients' safety attitudes⁽¹²⁾, validating the SAQ/OR⁽¹⁶⁾, describing good patient safety practices⁽¹⁷⁾ and assessing perceptions about patient safety^(18,19).

For these purposes, in 3 (37.5%) studies the SAQ instrument was applied in data collection^(12,15,19), in 3 (37.5%) the HSOPSC^(13,14,18), in 1 (12.5%) the SAQ/OR⁽¹⁶⁾ and in

1 (12.5%) the online survey⁽¹⁷⁾. As we decided to analyze the common results found in the studies, management support^(18,19) and communication^(13,14) are considered necessary changes. Teamwork was the dimension with the best score^(12,15,16).

Most studies (75%) were cross-sectional^(12-14,16,18,19), followed by 1 (12.5%) multivariate analytical regression study⁽¹⁵⁾ and 1 (12.5%) quantitative and qualitative study⁽¹⁷⁾. In the analysis of the level of evidence, 100% of the studies were classified as level IV.

A limitation of this review was that some study may not have been contemplated in the search for the various descriptors used in the theme. Thus, some relevant studies may not have been evidenced in the search.

The results highlight that the safety culture in the operating room environment has strengths considered positive, as well as weaknesses considered as opportunities for improvement in several dimensions. Knowing the areas of weaknesses and strengths for safety culture allows the development

Chart 2. Synthesis of the main information from studies. Rio de Janeiro, RJ, Brazil, 2020.

Title	Year of publication/ journal / authors	Objectives	Type of study / population / sample size / instrument used	Main results	Level of evidence
Turkish surgical nurses' attitudes related to patient safety: A questionnaire study ⁽⁴²⁾ .	2020/ Nigerian Journal of Clinical Practice/ Bahar S, Önlü E.	To assess the safety attitudes of nurses in Turkish surgical units.	Descriptive cross-sectional design/ Nurses in surgical units (surgical ICU, surgical center, surgical wards) of four Turkish hospitals/ 231 participants/ Safety Attitudes Questionnaire (SAQ).	The atmosphere of safety and teamwork had a higher score by nurses in the operating room.	IV
Patient safety culture at surgical center: the nursing perception ⁽⁴³⁾ .	2019/ Rev. Gaúcha Enferm./ Abreu IM, Rocha RC, Avelino FVSD, Guimarães DBO, Nogueira LJ, Madeira MZA.	To analyze the culture of patient safety from the perspective of the nursing team of a surgical center.	Cross-sectional and analytical study/ Nursing team from one hospital in Piauí/ 92 participants/ Hospital Survey on Patient Safety Culture (HSOPSC).	As for patient safety, 48.9% of professionals assessed it as regular. The results did not show any dimension with a score of positive responses above 75%. The dimension with the most positive result was "Organizational learning –continuous improvement" (58.7%) and those with the less positive results were "Opening for communication" (32.3%) and "Feedback and communication about errors" (32.6%).	IV
Culture of safety and communication about surgical errors from the perspective of the health team ⁽⁴⁴⁾ .	2019/ Rev. Gaúcha Enferm./ Batista J, Cruz EDA, Alpendre FT, Paixão DPSS, Gaspari AP, Maurício AB.	To analyze the patient safety culture regarding dimensions related to communication and notification of events in the perception of the health team.	Cross-sectional survey with data analysis using descriptive and analytical statistics/ Medical and nursing staff of the surgical unit and surgical center of a hospital in Paraná/ 158 participants/ Hospital Survey on Patient Safety Culture (HSOPSC).	No dimension or item/ Issue was considered strong to surgical patient safety. The results showed weaknesses in the culture of organizational safety related to communication.	IV
Safety Culture and attitudes among spine professionals: results of an international survey ⁽⁴⁵⁾ .	2019/ Global Spine Journal/ Gadjradj PS, Harhangi BS.	To assess attitudes towards the safety culture among spine professionals.	Multivariate analytical regression with descriptive statistical analysis/ Members of AOSpine International/ 356 participants/ Questionnaire with three parts containing the SAQ in its composition.	The dimensions of safety climate, job satisfaction and perceptions of the unit and hospital management reached greater internal consistency. Scores in the teamwork domain were generally high. Respondents in Africa scored significantly lower on working conditions compared to spine professionals in Asia.	IV

Continue...

Chart 2. Continuation.

Title	Year of publication/ journal / authors	Objectives	Type of study / population / sample size / instrument used	Main results	Level of evidence
The Swedish Safety Attitudes Questionnaire – Operating Room Version: Psychometric Properties in the Surgical Team ⁽¹⁶⁾ .	2018/ Journal of Perianesthesia Nursing/ Nilsson U, Göras C, Wallentin FY, Ehrenberg A, Unbeck M.	To validate the Swedish version of the Safety Attitudes Questionnaire - Operating Room (SAQ-OR).	Cross-sectional study with the application of a questionnaire/ Nurses and doctors from three Swedish hospitals/ 541 participants/ Safety Attitudes Questionnaire (SAQ).	Job satisfaction and the teamwork climate had the highest rates, while working conditions and management perceptions had the lowest values. The lowest levels were in the management perceptions factor.	IV
Good practices for patient safety in the operating room: nurses' recommendations ⁽¹⁷⁾ .	2018/ Rev. Bras. Enferm./ Gutierrez LS, Santos JLG, Peiter CC, Menegon FHA, Sebold LF, Erdmann AL.	To describe nurses' recommendations for good patient safety practices in the operating room.	Descriptive, exploratory quantitative and qualitative/ Nurses from different Brazilian regions/ 220 participants / Online survey.	Recommendations regarding the use of the safe surgery checklist and the establishment of a patient safety culture stood out.	IV
Nursing professionals and health care assistants' perception of patient safety culture in the operating room ⁽¹⁸⁾ .	2015/ Enferm. Clin./ Bernalte-Martí V, Orts-Cortés MI, Maciá-Solerc L.	To evaluate patient safety perceptions, opinions and behaviors; describe strengths and weaknesses / opportunities for improvement.	Cross-sectional, observational study/ Nursing team from a hospital in the Valencian Community/ 74 participants/ Hospital Survey on Patient Safety Culture (HSOPSC).	The surgical nursing team has a more positive attitude and perception about the patient safety culture at unit level. The main areas that need improvement are the provision of staff and support from hospital management in patient safety.	IV
Safety culture in the operating room of a public hospital in the perception of healthcare professionals ⁽¹⁹⁾ .	2015/ Rev. Latino-Am. Enfermagem/ Carvalho PA, Göttems LBD, Pires MRGM, Oliveira MLC.	To evaluate the perception of healthcare professionals about the safety culture in the operating room.	Cross-sectional, descriptive study with quantitative analysis of data/ Multidisciplinary of a hospital in the Federal District/ 226 participants/ Safety Attitudes Questionnaire (SAQ).	The perception of safety culture among professionals is below the recommendations. Job satisfaction was the second most favorable result among professionals. There was a distance between hospital management and unit management in relation to professionals, precarious working conditions and a negative safety culture.	IV

of strategies for improvement and ratification of actions in search of a more qualified and safer surgical care.

Over the past five years, the number of publications on safety culture in the surgical environment has increased, reflecting a higher interest in the development of investigations about the safety culture of this scenario, probably motivated by worldwide discussions and movements. In 2019, a Brazilian journal launched a special issue focused on Patient Safety. This thematic fascicle boosted the Brazilian scientific production involving the study scenario, since half of publications selected for the present review were Brazilian, 25% of which were published in that journal. Note that 75% of productions identified in this review were developed by nurses.

DISCUSSION

Patient safety in the operating room is understood as the responsibility of all professionals working in it. Therefore, all professional categories must be encouraged to participate in research, since the object in question is multidisciplinary⁽³⁾.

Regarding the objectives, the proposal of the selected studies was to evaluate and analyze the safety culture of operating room professionals, pointing out the interest of several countries in the evaluation of the safety culture. The same was observed in other studies^(20,21). The instruments used to achieve the objectives of the studies were the SAQ, SAQ/OR and HSOPSC. Such data collection tools allow the measurement of the safety culture in health institutions, highlighting the variability between these instruments.

Six domains are analyzed in the SAQ: safety climate; perception of stress; management's perception; work conditions; teamwork climate; and job satisfaction. In the SAQ/OR, the first four of the original version remain, and the domains of communication in the surgical environment and perception of professional performance are added. In this last instrument, the communication domain, a specific item for the surgical environment, was added after realizing the importance of effective communication between health teams working in this scenario. The items in the perception of professional performance domain are found in the domain of recognition/perception of stress in the original version⁽⁵⁾.

The HSOPSC questions are grouped into 12 dimensions, namely: expectations and actions to promote patient safety from the supervisor/manager; organizational learning – continuous improvement; feedback and communication about errors; freedom of communication; suitability of professionals; non-punitive responses to errors; support from hospital management for patient safety; team work within the hospital units; team work between the units; transfers and change of shifts; general perception of patient safety; and frequency of notified events⁽³⁾.

The use of instruments with general applicability for assessment of the safety culture of the surgical environment is highlighted, although there is a specific instrument called SAQ/OR, translated and adapted into Brazilian Portuguese⁽²²⁾ in 2016 and validated in 2018⁽⁵⁾. The SAQ/OR particularity is that its communication domain allows the assessment of decision-making, of the quality of communication and collaboration between professionals working in this scenario.

In this study, a varied scope of instruments in the surgical center was found, as observed in a study⁽²³⁾ in the United Kingdom aimed at knowing the safety climate in hospital environments, including the surgical scenario, with use of the SAQ. In China, a study compared the safety culture in surgical and non-surgical units by applying the HSOPSC⁽²⁴⁾. In Brazil, in seven units of urgency and emergency in Rio Grande do Sul, the HSOPSC was used⁽²⁵⁾, differently from a study conducted in the operating room of a university hospital, in which was applied a specific instrument, the SAQ/OR⁽²⁶⁾.

Regarding the dimensions of safety culture evaluated by health professionals in the context of the operating room, in the dimension of management participation were observed weaknesses, even though this is essential and fundamental for the development of safety in the operating room. Corroborating what was perceived, in a study conducted in two university hospitals, Brazilian and Portuguese, this was the dimension with the lowest percentage of positive responses⁽²⁰⁾.

The supervisors' actions can exert direct impact on the importance given to patient safety by the team, which shows the magnitude of having managers committed to improving the safety culture⁽²⁴⁾. Management's involvement makes the team feel supported and encouraged to maintain a fair, open, non-punitive culture, and to expose situations to their managers with the intention of solving them jointly, thereby strengthening teamwork⁽²⁷⁾. Unlike the findings of this review, in a Chinese study, the support of hospital management was seen as a strong dimension⁽²⁴⁾.

Next, the dimension of communication in the surgical environment appears as a weakness in this study. The opening of communication of surgical units in a Chinese hospital obtained the same finding of this investigation, in which the performance was lower compared to other sectors of the same hospital⁽²⁴⁾. The dimension reflects the freedom of professionals to manifest and indicate aspects that interfere with patient safety⁽²¹⁾. Studies bring it as a dimension of strength for a safety culture^(21,26). Nurse's ability to communicate and negotiate with different professional categories is of utmost importance, as they can resolve conflicts and develop coping strategies in situations occurring in perioperative care⁽²⁸⁾.

The dimension with the best result found in this review was teamwork, which is fundamental in the surgical

environment and constitutes a strong dimension for most reviewed publications, corroborating other studies^(24,25,27). The interpersonal relationship of the surgical team can be characterized as a generator of conflicts that impact on patient care⁽²⁸⁾. Building multidisciplinary relationships in the operating room comprises recognizing the importance of different areas of knowledge and improving the actions developed, although it is still possible to face situations of fragmentation of knowledge as a result of the advancement and isolation of specialties⁽²⁹⁾.

The most used type of study was the cross-sectional design, corroborating with other studies on safety culture^(20,26,30). This type of study is considered fast, low cost, its measurements take place in a single moment and are useful for describing variables and their distribution patterns. There is an evident need to advance with other study designs aiming to deepen the assessment of safety culture beyond the situational diagnosis.

This study evidenced the need to advance with publications on the evaluation of the safety culture of the surgical scenario using the SAQ/OR, a specific instrument for a given scenario; with national studies, thus enabling comparative studies; and with studies in this scenario with the various managements.

CONCLUSION

The scientific evidence found in this review brings various instruments of general applicability that are used to evaluate the safety culture in the operating room, although there is a specific instrument for this purpose. However, in the literature found, the most punctuated dimension as a strength for safety culture, teamwork, was analyzed, as well as the dimension that most needs improvement, management support and communication.

We expect this study contributes to a broader discussion in the surgical scenario, strengthening the need for more publications, allowing the mapping and comparisons between different realities and cultures. We emphasize the importance of including all professionals involved in care within the operating room in the discussion, instead of investigating only one professional class, since, as shown here, the safety culture is transdisciplinary.

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