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ERGONOMICS AND PATIENT SAFETY: A LITERATURE REVIEW OF NURSING IN THE OPERATING ROOM

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Abstract

Concerns about Patient Safety (PS) gained prominence after the report by the Institute of Medicine (IOM) in the United States in 2000, which revealed high rates of Adverse Events (AE) in hospitals, triggering a worldwide movement. The World Health Organization (WHO) led efforts in this regard, promoting campaigns such as "Hand Hygiene" and "Safe Surgery Saves Lives". AEs associated with surgical care are little studied, justifying the need for research, especially on the role of nursing professionals. The WHO has established guidelines to promote safety during surgeries, emphasizing the importance of the ergonomic approach. The study in question aims to analyze the literature on incidents, AEs and contributing factors in surgical care, using a systematic literature review. Nineteen articles were selected that highlight problems in communication, coordination, leadership, task management and safety protocols, in addition to issues related to equipment and service structure. The review highlights the importance of understanding these factors to improve the quality of care and patient safety in surgical procedures, reinforcing the need for improvement plans.

Keywords: Ergonomics; patient safety; adverse events; nursing; operating room.

1. INTRODUCTION

Concern about patient safety (PS) spread worldwide in the early 2000s with the publication of the *Institute of Medicine* (IOM) report in the United States (USA) on errors related to health care "To err is human: building a safer health system" (KOHN et al., 2000), which pointed to a high occurrence of Adverse Events (AE) in hospitals, with 44,000 to 98,000 preventable deaths per year in the USA, and being a milestone for the mobilization of the global movement on PS, which had care-related infections as its first global challenge.

Within the scope of the World Health Organization (WHO), a program aimed at PS was created and consolidated, which favored several initiatives in the areas of education, research, the development of an appropriate conceptualization and the dissemination of campaigns at global and regional levels, such as "Hand hygiene" and "Safe life-saving surgery" (BROWN et

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al., 2008; RUNCIMAN et al., 2009). PS has been a widely discussed topic in recent decades (AMALBERTI et al., 2018), since AEs related to health services have become frequent, broadening the view of this theme as a fundamental component of improving the quality of health care, considering that the absence of PS constitutes a serious global public health problem (REIS et al., 2013).

Several important concepts related to PS have been established by the WHO (WHO, 2009a), including the definition of the term incidents, considered an event or circumstance that could have resulted, or resulted, in unnecessary harm to the patient, and the term adverse events, defined as incidents that result in harm to the patient, which may increase hospital stay or cause disability (BRASIL, 2014). In short, they represent unpleasant outcomes caused by a number of contributing factors (such as situations, actions, or omissions that play an important role in the origin, development, or increased risk of events) during the provision of care (BRASIL, 2014; WHO, 2009a)

Although AEs are a potential morbidity and economic cost factor, especially those associated with surgical care, they remain poorly studied. In this perspective, the WHO (WHO, 2009b), in one of its PS initiatives, established guidelines to promote safety during surgeries, defining steps and responsibilities of the entire multidisciplinary team, with the purpose of ensuring that the correct procedure is performed in the correct patient, in the correct place, with all the necessary resources available. For this, according to the organization, there is a set of actions to be carried out, from surgical scheduling to the postoperative period.

The research is justified by the fact that there are few studies on nursing professionals working in surgical procedures, given the uniqueness of the activity; the issue of difficulty in accessing surgical centers; and because the research investigates other professional classes in the performance of surgeries.

In addition, the use of a methodological approach in Ergonomics of analysis and observation of the work of nursing professionals during their activity in the operating room could contribute to further clarification and fill this existing gap.

According to the WHO (WHO, 2019), one of the WHO's strategic objectives for PS in the next 10 years is the construction of high-reliability health services and health organizations that protect the patient from avoidable harm, having as one of the lines of action the contribution of human factors/Ergonomics to the resilience of health systems. Recognizing the importance of Ergonomics as a method of analysis, diagnosis and problem solving, and the incipience of the PS theme in the global and national context, the objective of the present study is to analyze

the literature qualified for studies that deal with incidents, adverse events and their contributing factors in the provision of surgical care.

2. METHOD

This study is a literature review with a systematic search, and a database analysis was performed in the MEDLINE information sources via *PubMed*, *Scopus* via the Journal Portal of the Coordination for the Improvement of Higher Education Personnel (CAPES). The choice of these databases is due to the wide coverage of studies in the area of health at the national and international levels, with public access or available through a library.

The search terms were selected after an exploratory reading of the theme, initially combining only two terms "*Ergonomics*" or "*Human factors*" with the descriptors "*patient safety*", "*nursing*" and "*operating room*". In the searches, a greater number of publications were observed in the "*Scopus*" and "*Pubmed*" databases with the term "*Ergonomics*" in combination with the term "*nursing*", as well as the descriptor "*Human factors*" combined with the term "*patient safety*".

Next, a combination of three descriptors was performed, based on the main keywords found in table 1 plus two variations of the terms "*patient safety*" and "*nursing*", which are "*adverse event*" and "*nursing staff*".

This was carried out with the purpose of verifying the existence or not of a greater number of publications. In the searches, there were no changes in the number of publications, and a greater number was observed in the selected databases with the terms "*Ergonomics*" or "*Human factors*" with the "*patient safety*" and "*nursing*" guidelines.

Finally, the two search terms most interconnected to the search theme "*Ergonomics"* or *"Human factors"* were combined with the other two words with the highest number of publications, evidenced in the previous searches, plus the keyword *"operating room"* and its variations *"surgery room"* and *"surgery"*.

This composition was carried out to increase the research design, in an attempt to locate the scientific studies with the greatest relationship with the theme and objective of the study in question. The descriptors with the highest number of publications were: *"Human factors", "patient safety", "nursing"* and *"surgery"* in the *Scopus database;* and *"Human factors", "patient safety", "nursing"* and *"surgery"* in the *Pubmed database.*

For a more detailed study of the review, we selected the articles resulting from the search in the *Scopus* and *Pubmed* databases with the search terms "*Ergonomics*", "*Human Factors*", "*Patient safety*", "*Nursing*" and "*Operating room*". The choice of terms was due to the degree of specificity of the content related to the research. The use of these terms in both databases, searching as follows "TITLE-ABS-KEY ("*human factors*" OR *ergonomics*) AND "*patient safety*" AND "*nursing*" AND "*operating room*", resulted in 478 scientific articles, of which 432 were found in *Scopus* and 46 in *Pubmed*.

From the elaboration of a spreadsheet in *Microsoft Excel software* with all the studies selected in the databases, for a greater detail of the research, duplicate articles were excluded and a refinement was performed, including only articles involving the areas of nursing and engineering, resulting in 118 scientific articles, 100 of which were found in *Scopus* and 18 in *Pubmed*.

After this stage, the following exclusion criteria were applied: review articles, opinions, editorials, letters, interviews, books and book chapters, theses, monographs, dissertations and course completion papers, and gray literature.

Next, the titles, abstracts and keywords of the studies were read in order to assess the compatibility with the research content. Therefore, we favored articles resulting from studies related to the theme with different methodological approaches, published in scientific journals.

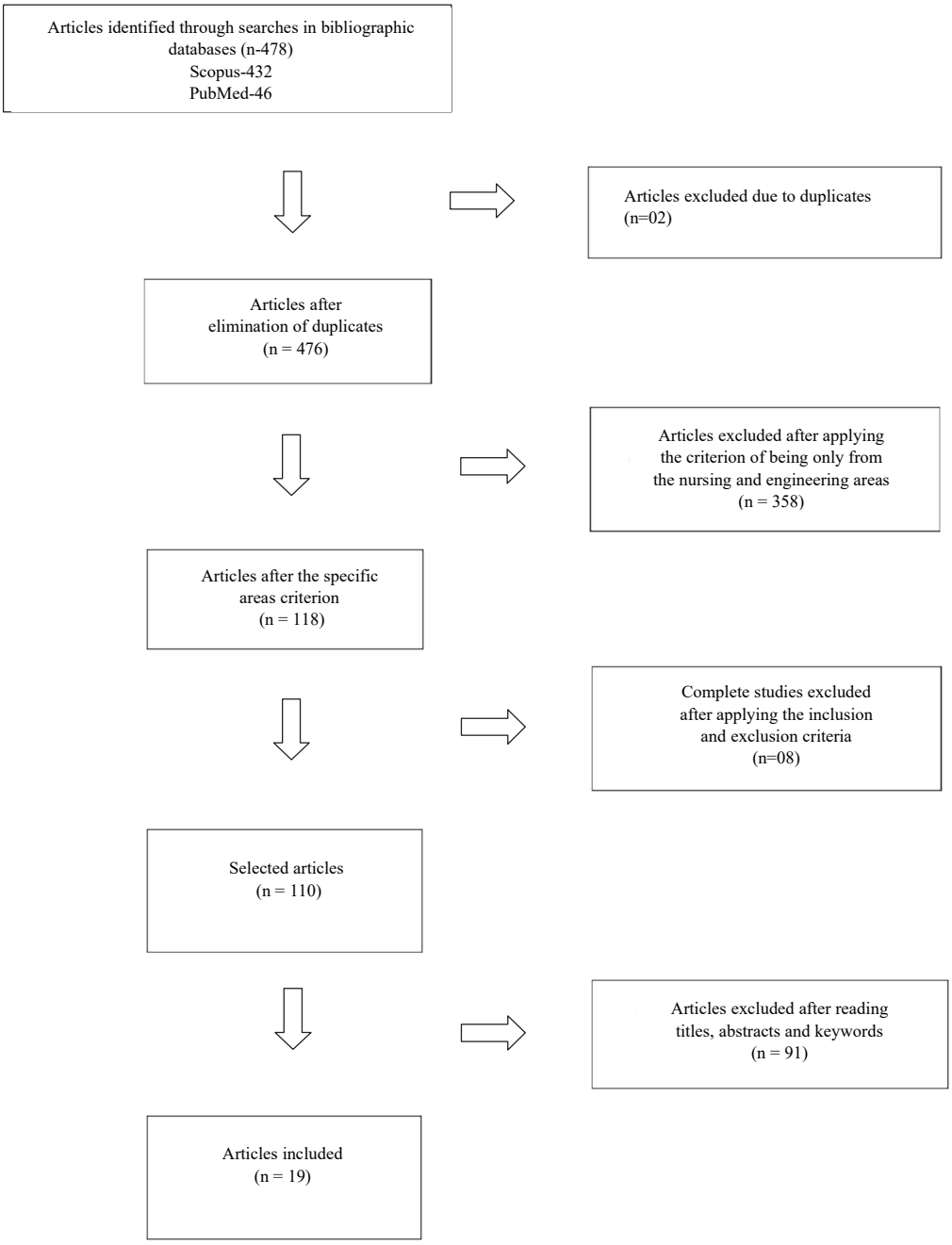
3. RESULTS AND DISCUSSIONS

Figure 1 presents the flowchart for the selection of scientific studies, following all the methodological procedures described above, with 19 articles being selected considering the theme of the research.

The contemplated studies presented full text, made available and accessed through a library, in English, regardless of methodological approaches (quantitative or qualitative) and study designs, published from January 2010 to July 2022.

The studies were read in full and the contents related to these thematic categories were extracted. The methods and results were observed, and these were highlighted, analyzed and interpreted in the light of the theoretical and conceptual literature in the area of Patient Safety and Ergonomics.

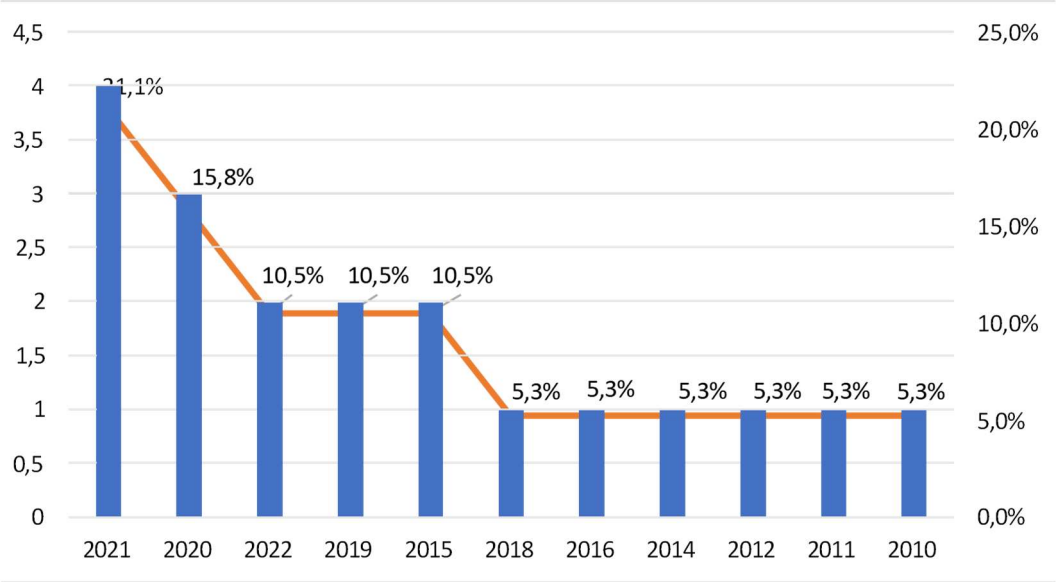
Figure 1: Flowchart for the selection of studies for literature review, 2022.



Source: Author (2022)

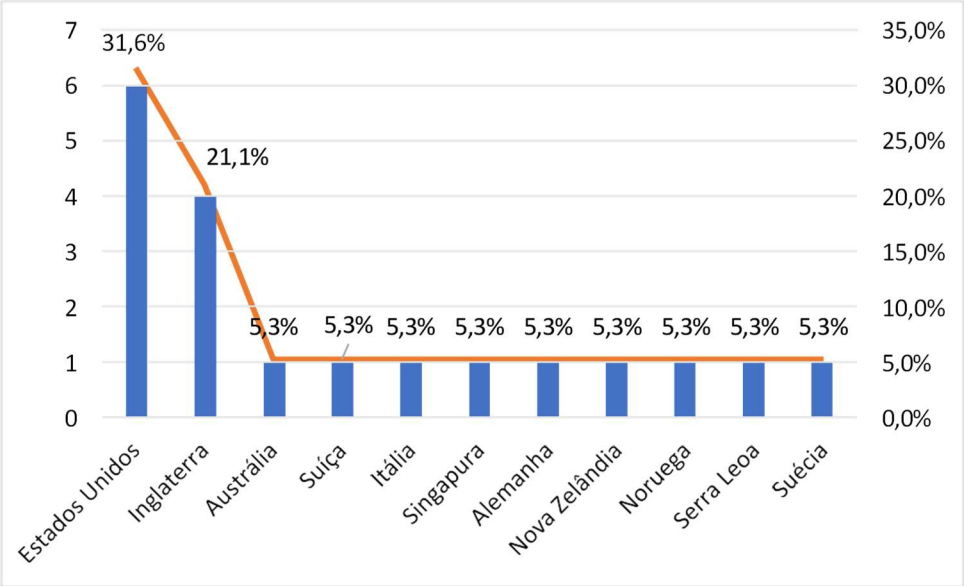
Among the 19 articles selected, the last 5 years corresponded to 63.2% of the publications with the themes analyzed, where 21.1% were published in 2021, 15.8% in 2020, 10.5% in 2022, 2019 and 2015. In the other years, only one publication was identified, totaling 5.3% for each year (Graph 1). The United States was the country with the highest number of papers (31.6%), followed by England (21.1%), corresponding to 52.6% of the total publications. The other countries had the same proportion of publications, with 5.3% (Graph 2).

Graph 1: Percentage of articles by year of publication



Source: Author (2022)

Figure 2: Percentage of articles by country of publication



Source: Author (2022)

Regarding the design of the studies, it was observed that the majority (58.6%) used qualitative methods and the same proportion (20.7%) adopted quantitative and mixed approaches. There was variation in the type and size of the sample, expressing a quantitative and/or qualitative design, as well as various forms of investigation of the aforementioned

methods, such as the application of questionnaires, the use of ergonomic tools or specialized methods aimed at quantitative-qualitative analyses, among others.

Among the studies analyzed, it was observed that most of them highlighted that adverse events occur or may occur more frequently due to communication problems among the surgical team (20%) followed by coordination problems (11.42%). Soon after, with the same proportion (8.57%), due to leadership problems, task management problems, teamwork problems and lack of protocols. Problems with equipment accounted for 5.71% of the causal factors. The other factors presented the same proportion (2.85%), as observed in graph 3.

Graph 3: Percentage of articles by causal factors of Adverse Events

Source: Author (2022)

4. CONCLUSIONS

This study reviewed the literature on nursing performance and its relationship with the occurrence of adverse events and the concern with patient safety in the operating room, presenting the differences and convergences between the different methods and discussing the main results. In this review, problems related to communication between professionals and coordination were highlighted as the most recurrent reports. Organizational factors were also reported, such as: leadership and teamwork problems; absence of patient safety protocols; difficulty of the team in managing the tasks to be performed in the operating room; and related to the environment and structure of services, such as equipment problems. All these factors

contribute to poor service and health care delivery, which can cause undesirable events to the patient.

This review stands out in relation to the previous ones because it brings to the debate studies in English, uses two well-known databases that cover a large number of articles focused on the theme of Patient Safety, in addition to expanding the range of countries and their respective cultural contexts. Finally, it is again important to know the incidents, adverse events and contributing factors reported by the researchers in their studies, so that, added to those identified by the professionals working in the operating room, they contribute to the elaboration of a plan to improve the quality of care and, consequently, improve the safety of patients undergoing surgical procedures.

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