

Relationship of Nurse-Patient Ratios in the Quality of Care in the Intensive Care Unit: Systematic Review and Meta-Analysis

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Abstract

A documentary review was carried out on the production and publication of research papers related to the study of the INTENSIVE CARE UNIT, QUALITY OF SERVICE, NURSING. The purpose of the bibliometric analysis proposed in this document was to know the main characteristics of the volume of publications registered in the Scopus database during the period 2017-2022, achieving the identification of 348 publications. The information provided by this platform was organized through graphs and figures categorizing the information by Year of Publication, Country of Origin, Area of Knowledge and Type of Publication. Once these characteristics have been described, the position of different authors towards the proposed theme is referenced through a qualitative analysis. Among the main findings made through this research, it is found that the United States with 38 publications with the highest scientific production registered in the name of authors affiliated with institutions in that country. The Area of Knowledge that made the greatest contribution to the construction of bibliographic material referring to the study of the relationship between nurses and patients, with the quality of the service offered in the intensive care unit was Medicine with 239 published documents, and the Type of Publication most used during the period indicated above were Journal Articles with 81% of the total scientific production.

Keywords: *Intensive care unit, quality of service, nursing.*

1. Introduction

In the fast-paced, dynamic intensive care unit (ICU) environment, providing high-quality patient care is critical to achieving positive clinical outcomes. At the heart of this effort is the nurse-patient relationship and the overall quality of care for critically ill patients. The nurse-patient ratio refers to the number of patients assigned to a nurse at any given time and has become a critical factor affecting patient safety, efficiency of care, and overall efficiency of intensive care.

For years, the topic of nurse-patient relationships has been the subject of intense debate and research in the healthcare community. Finding the right balance between workload and level of care required is essential to ensure patient well-being and avoid potential side effects. Since nurses play an important role in monitoring patients' conditions, providing care and emotional support, proper allocation of nursing resources becomes critical for better patient outcomes.

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In this introduction, we delve into the multifaceted interaction between the nurse-patient relationship and the quality of care provided in the intensive care unit. Our goal is to highlight the importance of optimal staffing levels and how they can significantly affect various aspects of patient care, including patient safety, mortality, compliance, and overall patient satisfaction. In addition, we review existing research, best practices, and policy implications that can guide healthcare facilities to optimize their nurse-patient relationships to promote better care.

As healthcare systems evolve to meet the challenges of an aging population and complex medical conditions, understanding the relationship between the nurse-patient relationship and the quality of intensive care becomes increasingly important. By examining this vital relationship, we aim to contribute to ongoing efforts to improve ICU care and strengthen the foundation for patient-centered, evidence-based care practices. With this report, we want to emphasize the importance of having the right staff as a necessary factor to create a safer, more efficient and more compassionate environment for critically ill patients in the intensive care unit. For this reason, this article seeks to describe the main characteristics of the compendium of publications indexed in the Scopus database related to the variables INTENSIVE CARE UNIT, QUALITY OF SERVICE, NURSING, as well. As the description of the position of certain authors affiliated with institutions, during the period between 2017 and 2022.

2. General Objective

Analyze from a bibliometric and bibliographic perspective, the elaboration and publication of research works in high-impact journals indexed in Scopus database on the variables INTENSIVE CARE UNIT, QUALITY OF SERVICE, NURSING during the period 2017-2023.

3. Methodology

This article is carried out through a mixed orientation research that combines the quantitative and qualitative method.

On the one hand, a quantitative analysis of the information selected in Scopus is carried out under a bibliometric approach of the scientific production corresponding to the study INTENSIVE CARE UNIT, QUALITY OF SERVICE, NURSING. On the other hand, examples of some research works published in the area of study indicated above are analyzed from a qualitative perspective, starting from a bibliographic approach that allows describing the position of different authors against the proposed topic. It is important to note that the entire search was performed through Scopus, managing to establish the parameters referenced in *Figure 1*.

3.1. Methodological design

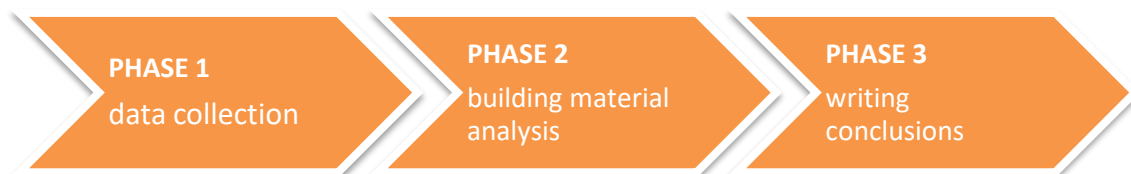


Figure 1. Methodological design
Source: Authors.

Source: Own elaboration (2023); based on data exported from Scopus.

Intensive Care Unit was the most frequently used keyword within the studies identified through the execution of Phase 1 of the Methodological Design proposed for the development of this article. Important Clinical Study is also among the most frequently used variables, associated with variables such as Controlled Study, Intensive Care Nursing, Nurse, Patient. From the above, it is striking that the importance of the nurse-patient relationship as a determinant of the quality of care in the intensive care unit. In addition, the need for evidence-based policies and interventions aimed at optimizing nursing staff to ensure the highest level of care for critical patients is emphasized. By addressing these fundamental questions, we can facilitate informed decisions by healthcare administrators, policymakers, and nursing leaders to create sustainable solutions that prioritize patient well-being in the dynamic ICU environment.

4.2 Distribution of scientific production by year of publication

Figure 3 shows how scientific production is distributed according to the year in which each paper was published.

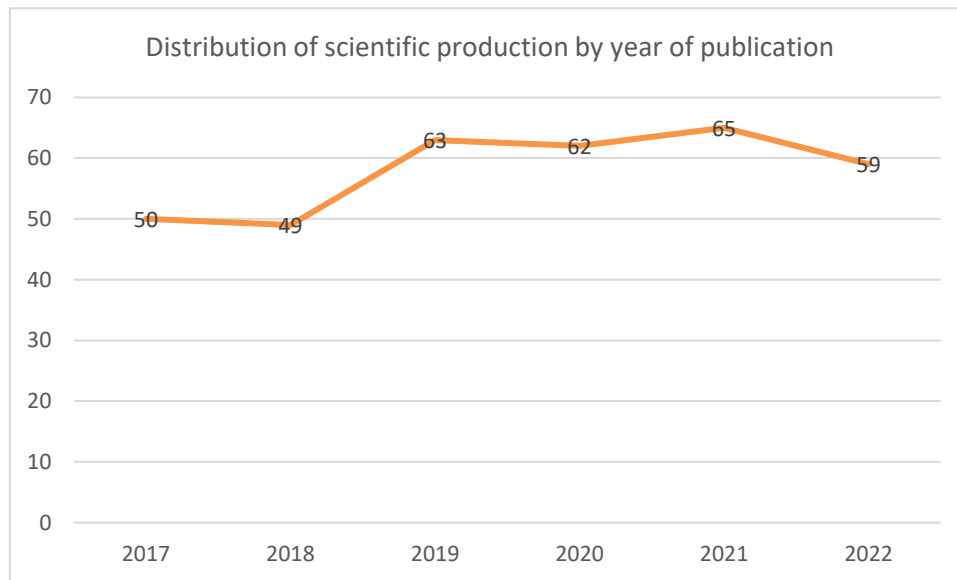


Figure 3. Distribution of scientific production by year of publication.

Source: Own elaboration (2023); based on data provided by Scopus.

Among the main characteristics evidenced by the distribution of scientific production by year of publication, a level of number of publications registered in Scopus is notorious in the years 2021, reaching a total of 65 documents published in journals indexed in said platform. This can be explained thanks to articles such as the one entitled "A multicenter study on patients who die from COVID-19: communication between doctors, patients and their families" this article aims to describe the communication between admitted patients, their families and physicians (doctors, nurses, health allies) during end-of-life care. Methods: This retrospective review included all patients (n = 230) who died directly from COVID-19 in five Melbourne hospitals between 1 January and 31 December 2020. Contacts and modality used (face-to-face, video, telephone) were recorded during the 8 days prior to death. Results: Patients were predominantly elderly (median age 86 years) and from residential care facilities for the elderly (62%; n = 141). The frequency of communication increased the closer the patient was to death, where on the day of death, contact between physicians and patients was 93% (n = 213), physicians and families 97% (n = 222), and between patients and families 50% (n = 115). Most contact between patients and families was facilitated by a physician (91.3% (n = 105) on the day of death) and the most commonly used mode was video calling (n = 30 days of death). Conclusion:

This study is one of the first and largest Australian reports on how end-of-life communication occurs for patients who die from COVID-19. Contact rates were relatively low between patients and families, compared to other cohorts who died from causes unrelated to COVID-19. The impact of this difference on grief outcomes requires vigilance and attention.(Everitt, 2022)

4.3 Distribution of scientific production by country of origin

Figure 4 shows how scientific production is distributed according to the country of origin of the institutions to which the authors are affiliated.

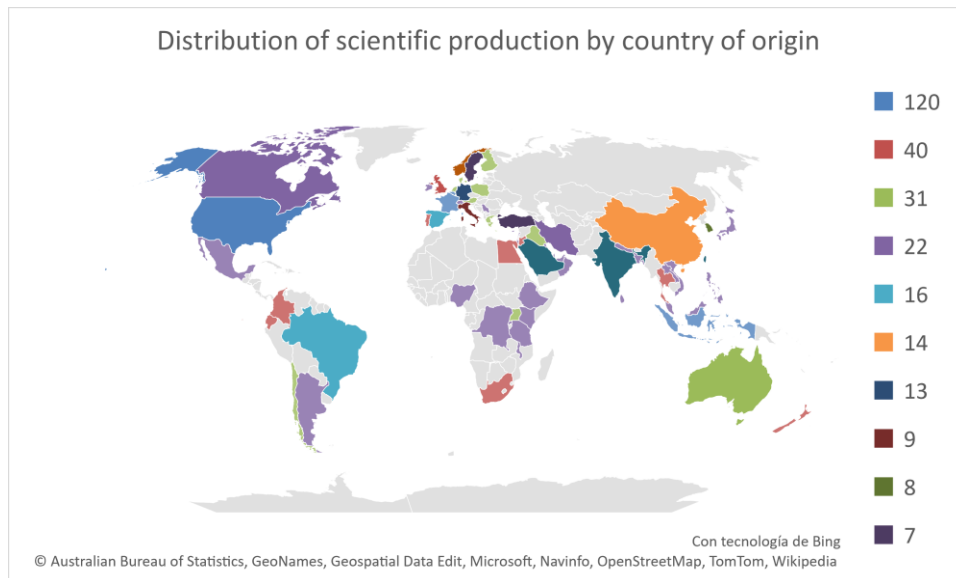


Figure 4. Distribution of scientific production by country of origin.

Source: Own elaboration (2023); based on data provided by Scopus

Within the distribution of scientific production by country of origin, records from institutions were taken into account, establishing the United States, as the country of that community, with the highest number of publications indexed in Scopus during the period 2017-2022, with a total of 120 publications in total. In second place, the United Kingdom with 40 scientific papers, and Australia ranking third presenting to the scientific community, with a total of 31 papers among which is the article entitled "The effect of the application of the medical material management system on nursing workload and stress" this article aims to develop a clinical medical material management application for nurses, in order to reduce your workload and improve the efficiency of medical equipment management. Design: The experimental design of a single group was adopted before and after the test. Methods: The subjects were nurses in the intensive care units of a regional hospital in the city of Hsinchu enrolled by intentional sampling. Pre-tests and post-tests were performed in a single group. The investigation period was from November 2019 to March 2020. The workload, stress and information acceptance of 57 nurses before and after the Medical Equipment App intervention were collected. Research tools included a structured questionnaire, which includes open-ended questions covering aspects of nurses' workload, stress, and intention to accept information, as well as a demographic questionnaire, which collects basic personal data, including gender, age, years of service, education level, nursing skill level, the usability of IT products and the type of drive. Results were analyzed and compared using SPSS, APP Inventor, and mining models to determine application effects. (Chen, 2022)

4.4 Distribution of scientific production by area of knowledge

Figure 5 shows the distribution of the elaboration of scientific publications from the area of knowledge through which the different research methodologies are implemented.

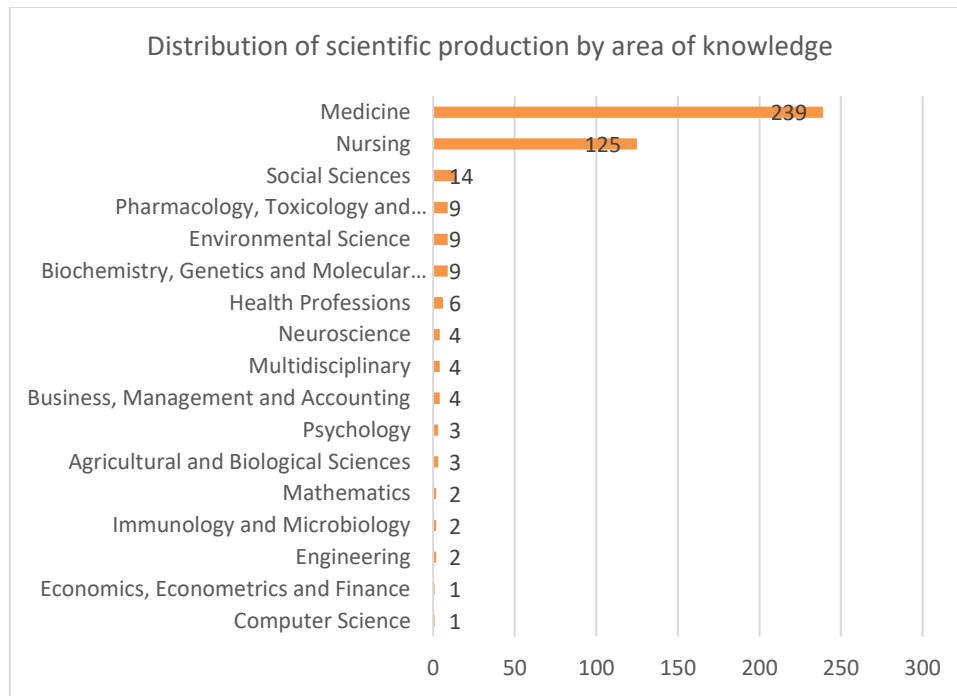


Figure 5. Distribution of scientific production by area of knowledge.

Source: Own elaboration (2023); based on data provided by Scopus

Medicine was the area of knowledge with the highest number of publications registered in Scopus with a total of 239 documents that have based their methodologies INTENSIVE CARE UNIT, QUALITY OF SERVICE, NURSING. In second place, Nursing with 125 articles and Social Sciences in third place with 14. The above can be explained thanks to the contribution and study of different branches, the article with the greatest impact was registered by the area of Medicine entitled "Effect of greater interprofessional familiarity on team performance, communication and psychological safety in medical teams of hospitalized patients: a randomized clinical trial" whose scope of study has as objective To determine the effectiveness of increasing familiarity between resident physicians and nurses on team performance, psychological safety and communication. Design, setting, and participants: A 12-month randomized clinical trial was completed in an inpatient general medical service at a large academic medical center from June 25, 2019 to June 24, 2020. Participants included 33 one-year graduate (PGY)-1 residents in an internal medicine residency program and 91 general practice nurses. Interventions: Fifteen PGY-1 residents were randomized to complete 16 weeks of general practice hospitalization on 1 medical nursing floor (intervention group with 43 nurses). Eighteen PGY-1 residents completed 16 weeks on 4 different general medical floors based on usual care (control group with 48 nurses). Main outcomes and measures: The primary outcome was an assessment of team performance in physician-nurse simulation scenarios completed at 6 and 12 months. Interprofessional communication was assessed through a time-movement study of both the work rounds and the individual clinical work of the residents.(Iyasere, 2022)

4.5 Type of publication

In the following graph, you will observe the distribution of the bibliographic finding according to the type of publication made by each of the authors found in Scopus.

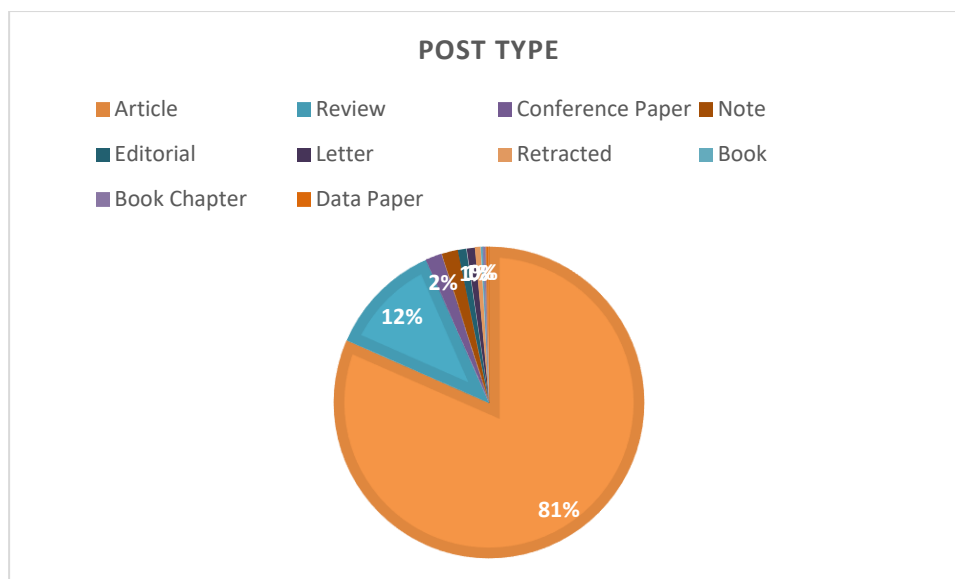


Figure 5. Type of publication.

Source: Own elaboration (2023); based on data provided by Scopus.

The type of publication most frequently used by the researchers referenced in the body of this document was entitled Journal Articles with 81% of the total production identified for analysis, followed by Journal with 12%. Conference Journal are part of this classification, representing 2% of the research papers published during the period 2017-2022 in journals indexed in Scopus. In this last category, the one entitled "Prediction of medical events and ICU requirements using a multi-objective multimodal transformer network" stands out. In this article, we present methods for predicting the length of stay in the ICU, as well as the need for critical interventions for a patient based on vital signs, laboratory measurements and nursing notes of the patient prepared within the first 24 h of stay in the ICU. The model has been constructed and cross-validated in the publicly available Medical Information Mart for Critical Care dataset (MIMIC-III v1.4). We showed that the proposed model works much better than most previous models in predicting ICU stay, which primarily used patients' vital signs. The experimental results also demonstrate the advantage of using a multiobjective model over independent models for the prediction of ICU stay and critical interventions. The proposed model uses local interpretable model agnostic explanations (LIME) that help identify the characteristics responsible for predictive decisions. This is very useful for building confidence in the prediction model among clinicians.(Jana, 2022)

5. Conclusions

Through the bibliometric analysis carried out in the present research work, it was established that the United States was the country with the largest number of records published in the face of the variables INTENSIVE CARE UNIT, QUALITY OF SERVICE, NURSING with a total of 120 publications in the Scopus database. Similarly, it was established that the application of theories framed in the area of Medicine, the nurse-patient relationship has a significant impact on the quality of care in the intensive care unit (ICU). Evidence shows that maintaining appropriate relationships with caregivers is essential to ensuring safe, high-quality care for critically ill patients. When the nurse-patient ratio is low and allows for an adequate nurse-patient relationship, significant improvements in clinical outcomes and patient safety are observed. Nurses can provide closer follow-up, more individualized care, and faster response to emergencies, reducing the risk of complications and adverse events. On the other hand, if the nurse-patient ratio is high, nurses may experience an excessive workload, which can negatively

affect the quality of care. Fatigue and stress from adverse relationships can impact nurses' ability to provide optimal care, which in turn can affect patient outcomes and their overall critical care experience. It is important for health authorities and decision makers to understand the importance of efficient and appropriate resource allocation in the ICU. Optimal and safe treatment is ensured by a sufficient number of nurses according to the complexity and severity of the patient. Finally, maintaining an adequate staff-to-patient ratio in the ICU is critical to providing quality care, improving patient outcomes, and ensuring the safety of the most critical ICU patients. Consideration of the nurse-patient relationship in health care planning and policy is critical to effective critical care.

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