

Economic Factors and Quality Indicators in Intensive Care Unit: A Systematic Review

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ABSTRACT

Social inequality in Brazil promotes discrepancies in access to health services, especially in intensive care units, which require highly complex assistance in a set of therapies and procedures of high cost and specialization. Economic factors may influence the demand for beds in intensive care units, while the lack of resources in developing countries, such as Brazil, may demand greater operational efficiency, which includes health care quality indicators. In view of this, economic factors linked to quality indicators, such as infection rates, length of stay and mortality, are not usually used in public policy assessments. The objective of the article is to analyze the scientific production that deals with the relationship between people's economic and behavioral variables, the quality of care with the provision of intensive care beds. To this end, a systematic review was carried out in the main databases, and a bibliometric analysis on the topic. Research directly related to bed optimization and the quality of care in intensive care units, as well as economic planning or economic variables, is very scarce among the databases surveyed, especially in developing countries such as Brazil. Data related to indicators of quality of care or the provision of intensive care services in periods of economic recession help to understand regionally the aspects of demand and offer of intensive care services, as social inequality in Brazil promotes discrepancy in access to health services, especially in tertiary health care, which requires highly complex assistance in a set of highly specialized therapies and procedures. In view of the results, research that may result in strategic health planning, especially for developing countries like Brazil, where operational efficiency must be prioritized due to scarce resources, should be promoted in order to prioritize investments and health management based on economic factors.

Keywords: Health Economics, Intensive Care Unit, Quality Indicators, Systematic Review.

INTRODUCTION

“Right of all and duty of the State” is what provides for the inclusion of health in the Federal Constitution of 1988 and must be “guaranteed by social and economic policies that aim at reducing the risk of disease and other diseases” (Federal, 1988). Until then, the Ministry of Health participated with less than 20% of federal resources for health financing (Brasil, 2011). Today, the resources destined for health do not differ from countries that managed to obtain better assistance to the population than that which, on average, is provided to Brazilians, around 8% of GDP (Saldiva, 2018). According to IBGE data, health financing and investment in the country predominantly incurs in the private service, which comprises only 20% of the population. Therefore, efficiency in health investments and strategic planning development has become essential in health policies since just spending more significant fractions of GDP does not mean better health conditions.

The permanent evaluation of public policies is a historical process in the search for planned and excellent management and process of health decentralization. The Ministry of Health provides systematic and coordinated measurements of health and performance indicators of the Brazilian health system, whether for subsidizing strategic and operational analysis, whether to monitor and evaluate

the achievement of SUS objectives, in accountability and in improving the quality of services offered to the Brazilian population (Santos, 2015; Aly et al., 2017).

However, social inequality in Brazil promotes discrepancy in access to health services, especially in tertiary health care, which requires highly complex assistance in a set of highly specialized therapies and procedures, with intensive care units (ICUs) being those who receive the largest share of financial, human and infrastructure resources at this level of care (Reis, 2018). According to the WHO, it is necessary to have a minimum distribution of 1 ICU bed for every 10,000 inhabitants. However, in Brazil, individuals who use the public health system have access to an average of 0.9 ICU beds per 10,000 inhabitants, while users of the private system have 4.1 beds per 10,000 inhabitants (AMIB, 2016).

Compared to countries in Europe, in England, the distribution of ICU beds is 0.6 for every 10,000 inhabitants, below the Brazilian numbers (Pattison, 2014). However, the physical infrastructure and human resources development develop indicators such as mortality, infection rate, and length of stay much better than in Brazil (Costa et al., 2019). This is due, in part, to the constant increase in life expectancy of Brazilians (Brasil, 2015), which corresponds proportionally to an increase in the incidence of chronic diseases, especially cardiovascular and metabolic (Campolina, et al., 2013), to population growth, which directly increases demand for health services, and possibly to the oscillations of the economy, which in growth popularizes the state as a regional health reference, increasing its demand for treatment outside the home. In the contraction of the economy, we increase the number of users of the single health system since the number of users of the single health care corroborates the number of users of private health plans.

According to ANS - National Supplementary Health Agency - in December 2020, Brazil had 47 million health plan beneficiaries, leaving 165 million Brazilians exclusively dependent on the public health system. However, all Brazilians are partially dependent on the public health system because national immunization policies and pre-hospital emergency care are the federal responsibility. In addition, due to the high cost of tertiary care, many beneficiaries of supplementary health use the public health system, especially because of the need for treatment in an intensive care unit.

Without strategic planning based on economic and demographic forecasts, the emergency vision of investments in tertiary care can cause periods of low efficiency in health services, leading to tragic situations in quality indicators, such as service supply below demand, low level of resolvability, high mortality rates. According to Saldiva & Veras (2018), health financing in Brazil has been oscillating around 8% of GDP in recent years. By way of comparison, countries that offer universal access to good quality health expend resources slightly higher than those of Brazil, such as Canada (10.4% of GDP) and the United Kingdom (9.9% of GDP). However, studies denote inefficiency of spending and not a problem of underfunding, in our case (Piola, 2013).

In the last 10 years, the average cost per hospitalization had a significant variation, being that in the years 2015 and 2016, there was an increase in public expenditure and the average cost of hospitalization (or daily per hospitalization) reached a peak of \$1,280 (BRL), with a reduction in the following years, the same period that the country experienced the economic recession, leading to a decline in GDP for two consecutive years (IBGE, 2015). The economy contracted by about 3.8% in 2015 and 3.6% in 2016, coming out of recession only in subsequent years. According to the National Confederation of Industry (CNI, 2016), the deepening of the economic crisis led to the loss of the standard of living of a significant part of the Brazilian population, resulting in the exchange of private services for public ones, where 34% no longer had health insurance.

In addition, due to the economic crisis caused by the pandemic of the new coronavirus, the Brazilian Institute for Supplementary Health Studies published in the second half of 2020 that there was a decrease of 0.5% in the number of health plan beneficiaries, totaling an increase of 254.5 thousand Brazilians dependent on the public health system in the last year alone. Therefore, this work aims to search for the main studies that bring the relationship between economics and quality indicators in intensive care units to guide future national data analysis.

SYSTEMATIC LITERATURE REVIEW

Bibliometrics emerged in the late 1960s and was thus named by Pritchard, since it aimed to measure the scientific production of a given field of knowledge (Teixeira, Iwamoto & Medeiros, 2013). The purpose, then, is to situate researchers about what, how and by whom scientific knowledge is produced. In recent years, the term systematic literature review has gained prominence, which is, in our view, very close to the concept of bibliometry. However, in many cases, the terms literature review and systematic literature review are confused, so it is necessary to differentiate between them. The systematic review of the literature, according to Galvão & Ricarte (2019) is a research modality, which follows specific protocols and seeks to understand and give some logic to a large collection, analyzing what works and what does not work in a given context.

Because of the above, systematic reviews follow specific protocols to contribute so that the literature reviews gain in quality by delimiting the issue to be treated in the review, selection of bibliographic databases for consultation and collection of material, preparation strategies for advanced search and selection of texts and systematization of information found. In this sense, it is understood that the systematic literature review has good applicability when the phenomenon to be observed is little explored in the literature and consequently by the conventional research bases. For example, in the field of health, many studies discuss primary

health care, both concerning the supply and demand for these services. However, there is little literature, especially Brazilian, that addresses tertiary care and specifically about the determinants and conditions of health—supply and demand of ICU beds. According to Yunes (1971), at the beginning of the 70s of the last century, the accelerated population growth is a consequence and not a cause of underdevelopment, and as such, it is not a medical problem. On the other hand, the discussion of the demographic characteristics of the time and the adoption of public health policies had as a center of debate the issue of family planning, access to contraceptive methods and the defence of national sovereignty in adopting social development policies. And the advances achieved in health policy, such as the constitutional guarantee of the right to health, the constitution of the Unified Health System (SUS) and a higher priority for primary care, with emphasis on maternal and child health assistance, contributed to increase life expectancy and to reduce mortality rates, in particular infant mortality (Piola, 2013).

Since 1988, in Brazil, studies had been published that identified for public policies the challenges that would be facing for a long period a great demand for health policies for the young portion of the population living with the accelerated growth of the elderly population and their medical-social needs. At the end of the nineties, there was an increase in the number of hospitalizations in intensive care units (ICU) in the country, by about 238.5%, with an increase in the supply of beds in this care from 11,110 to 14,738 (32.6%) in the period between 1999 and 2009. As much as this ICU offer is still in need, which would be 29,488 ICU beds for 80% of the Brazilian population - SUS user - there is a need to double the number of ICU beds. Although the offer of services influences their consumption, as evidenced in a study that fits, the greater the number of hospital beds available, the greater the chance of the individual being admitted, characterized as a demand induced by the offer (Mendes et al., 2012). According to the Informatics Department of the Unified Health System (30), it is observed, when analyzing the indicators of the three largest municipalities in Tocantins - Araguaína, Palmas and Gurupi - that the mortality rate between 2009 and 2018 varied, however with a high rate in 2016, reaching 4.64% of all hospitalized patients. In the following years, the number of deaths in hospitals decreased to 4.34% in 2017 and 4.25% in 2018, increasing the average length of stay to 6.3 and 6.5 days, respectively, with a significant increase compared to 2013, with 5.1 days.

In addition to being used as tools to analyze and publicize hospitals' performance publicly, quality indicators encourage to promote transparency and increase the responsibility of the service regarding the quality of health care (Junqueira & Duarte, 2013). Rising costs due to inefficiency, the need for long-term treatment and the occurrence of treatments that are often unnecessary burden the public health system and highlight the need to form a strategic investment planning agenda. There is no possibility of improvement when there is no recognition of the problems, and for this recognition to occur, the use of indicators is essential, as they provide objective information about the care process and its results (Silva et al., 2014). For having a constitution of universal access to the public health system, Brazil presents itself with a high expense, especially in tertiary care, which denotes high complexity care. In this context, there was an investment of 24 billion in the country in the period from May 2011 to April 2016. In the same period spending in Tocantins reached 325 million (DATASUS). The recent Brazilian economic recession has led the country to the biggest and most prolonged drop in GDP in current history, in addition to the rapid growth in the unemployment rate (World Bank, 2020). Among the causes of the decline of the Brazilian economy are inflation, unemployment, corruption and the lack of effective fiscal adjustment measures. In these moments of economic crisis, there is a limitation in the availability of resources and increased public services.

MATERIALS AND METHODS

For the review of systematic analysis and development of writing, articles published between the years 2010 and 2019, in Portuguese, English and Spanish, were used in the Google Scholar, MEDLINE, LILACS, SciELO, Scopus and Web of Science databases. The search was carried out through the PRISMA recommendation (MOHER et al. 2009) and consisted of the following steps: location of studies by reading the title and summary, careful reading of the summary of pre-selected articles, selection of articles consistent with the objective of the present study, application of the Jadad scale (JADAD et al., 1996) to assess methodological quality and exclusion of randomized articles with a score below three points in it, interpretation and discussion of results. For the bibliometric analysis, the descriptors “economics”, “intensive care unit”, “mortality” and “planning” were used only in the Scopus and Web of Science databases, since they standardize references and other indexed information, according to in order to institute more accurate bibliometric techniques.

Initially, 1407 publications were identified, 1364 in Scopus and 43 in Web of Science. Based on the collected data, bibliometric treatment went through the construction and analysis of networks based through the VOSviewer® software, whose emphasis is on the analysis and visualization of reference data sets from a distance-based approach. In view of this, the production network is placed in such a way that the distance between them shows the relationship according to certain aggregation criteria, forming a map. In this research, three complementary criteria were used for mapping in the software with data from Scopus: the citation, the co-occurrence of terms and the country of origin. And only one criterion for mapping with data from the Web of Science: citation and year of publication, since the other criteria did not bring relevance to this study due to the low number of documents.

RESULTS AND DISCUSSION

In the bibliometric analysis, 4217 authors were initially verified in the Scopus database, but only 317 authors had more than 20 citations. Kyeremanteng K. has the highest number of related documents, and Angus D. C, Rowan K. and Carson S.S have the

highest number of citations. According to the legend, figure 1 shows the network of sources ordered in four clusters, between the least cited authors (blue) and the most cited (yellow).

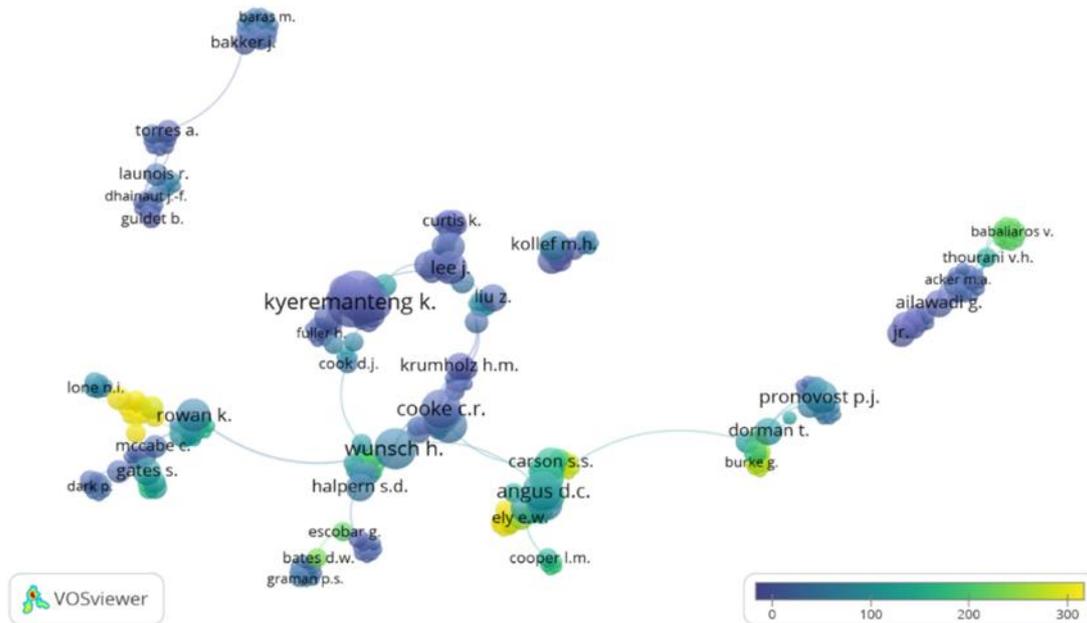


Figure 1: Visualization of the author citation network based on articles from the Scopus database.

In the mapping of studies in the countries, more publications on the subject in the United States were found; however, the works produced in the United Kingdom, Belgium, and Canada were highlighted among the citations, as shown in Figure 2.

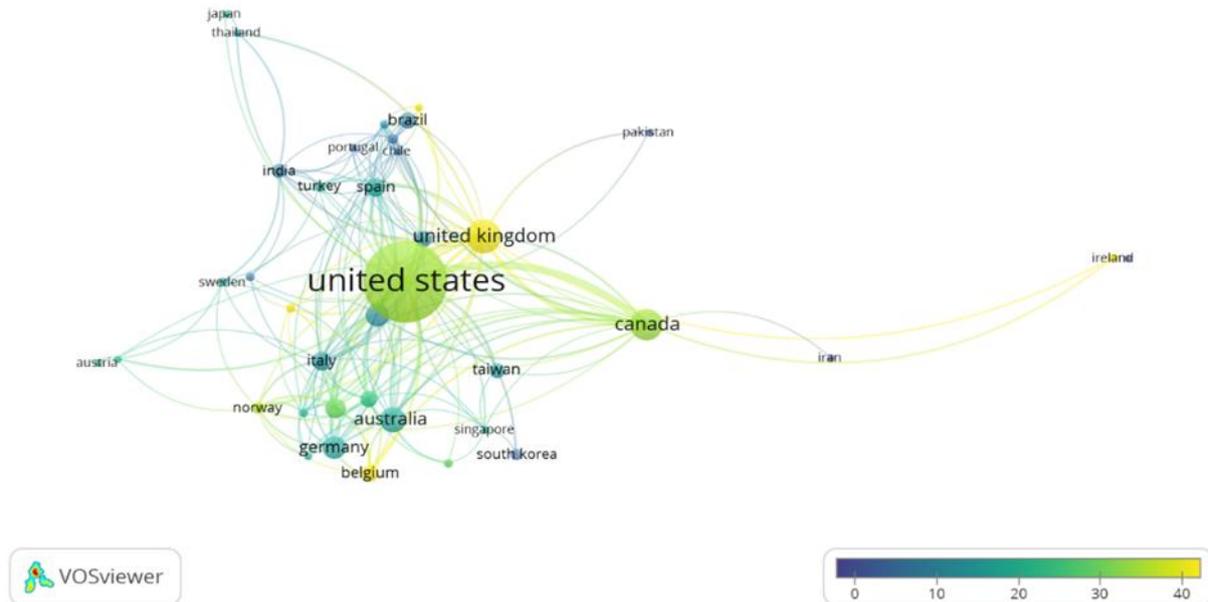


Figure 2: Visualization of the citation network by countries based on articles from the Scopus database

About the most commonly used descriptors in research such as co-occurrence of terms, the keywords “human”, “major clinical study” and “intensive care units” were the most present, obtaining the most significant number of productions on the subject between the years 2010 and 2014, as shown in the caption in Figure 3.

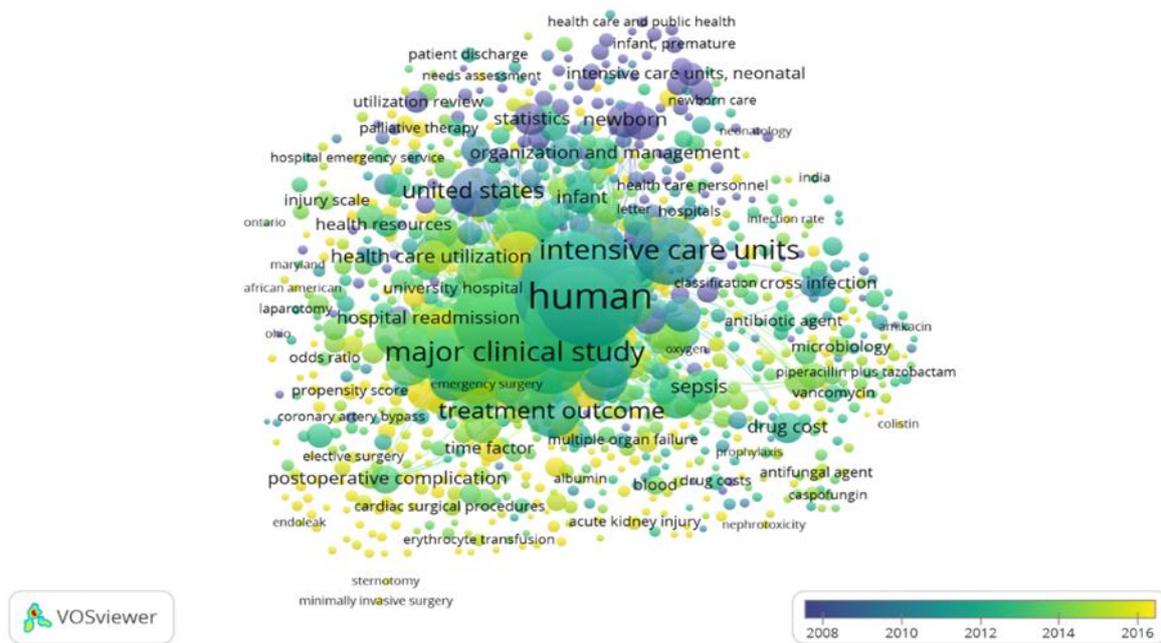


Figure 3: Visualization of the network by co-occurrences from the articles in the Scopus database.

The 43 works on the theme available on the Web of Science database are dated between 2001 and 2005, with duplications of productions by authors such as Angus D. C and Provonost P.J., with the description in the citation network being shown in Figure 4.

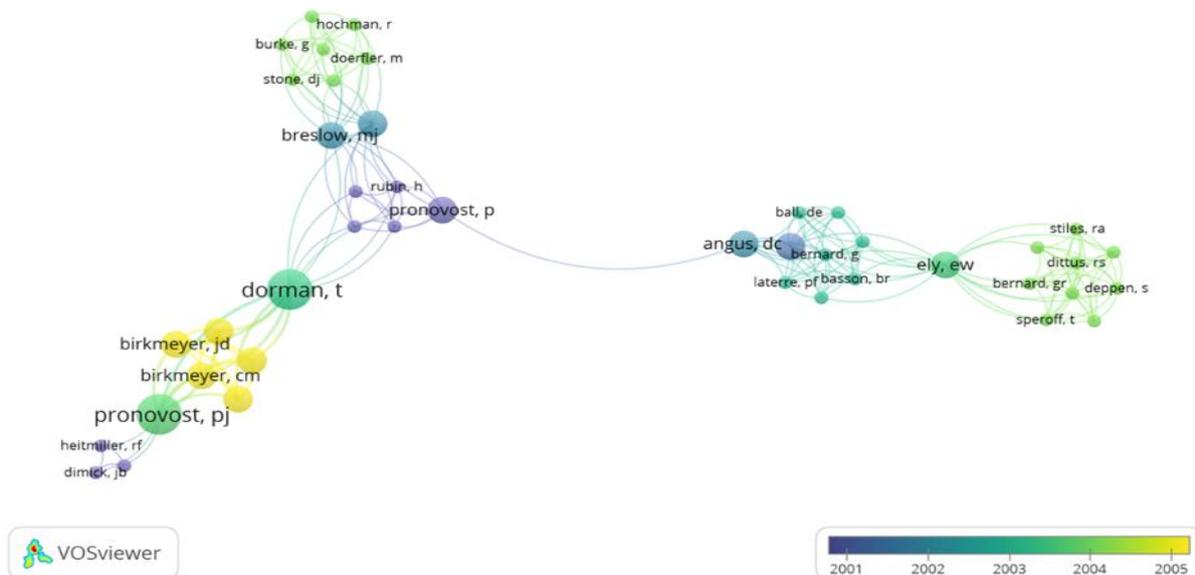


Figure 4: Visualization of the network of citations based on articles from the Web of Science database.

However, he noted in the analysis that the topic related to planning and economics in intensive care services is still little explored, especially by authors in South America and Brazil, countries that lack vacancies and availability of high-quality services. Despite understanding only one supplementary health system, the United States of America leads, quantitatively, the number of publications on the topic, considering that the total annual health costs in this country exceed the Brazilian gross domestic product and that the average expenditure monthly per family in health exceeds \$ 1,000 (USD), according to eHealth Insurance.

Canada and the United Kingdom lead the research that correlates economic factors with quality indicators about countries with a public health system. Brazil, the holder of the most extensive public health system globally, appears among the countries with the largest publications, as shown in Figure 2, where some statistical works demonstrated a significant correlation between unemployment and increased in-hospital mortality. However, most of the reviewed papers lack conclusive results on the relationship between the behavior of the economy and the quality of health care in the country.

FINAL CONSIDERATIONS

Scientific productions directly related to the optimization of beds and the quality of care in intensive care units and economic planning are very scarce among the researched databases, especially in developing countries such as Brazil. Nevertheless, the data relating to the quality of care indicators in periods of economic recession corroborate the analysis of more incisive regional data aiming at effectiveness and efficiency in public health.

Despite 1407 publications in the researched databases, few articles showed a specific relationship between the economy and health data in tertiary care. Because of the results, research that may result in strategic health planning, especially for developing countries like Brazil, where operational efficiency must be prioritized due to scarce resources, should be promoted to prioritize investments and health management based on economic factors.

CONFLICT OF INTEREST:

The authors declare no conflict of interest

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