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Elderly patient safety in Intensive Care Unit: bibliometric analysis of international production

Segurança do paciente idoso na Unidade de Terapia Intensiva: análise bibliométrica da produção internacional

Seguridad del paciente anciano en la Unidad de Cuidados Intensivos: análisis bibliométrico de la producción internacional

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ABSTRACT

Objective: to analyze the international scientific production on elderly patient safety in Intensive Care Unit. **Method**: bibliometric study carried out on ISI Web of Knowledge / Web of Science™ database, with the search terms: "Patient Safety", "Elderly", "Intensive Care Units", performed from exporting these data for the bibliometric analysis software HistCite™. **Results**: 103 publication records were identified, in 85 different journals, written by 679 authors that are associated with 224 institutions, located in 30 countries. In analysis of number of citations count, the h-index value is equal to 24. **Conclusion**: the theme is presented in a broad and diverse way, without demonstrating the existence of a good articulation among the studies, authors and institutions around the world. There is a need to construct knowledge networks in the field that make possible further studies able to contribute to improve elderly patient safety in intensive care.

Descriptors: Patient Safety. Elderly. Intensive Care Units.

RESUMO

Objetivo: analisar a produção científica internacional sobre segurança do paciente idoso na Unidade de Terapia Intensiva. **Método**: pesquisa bibliométrica realizada na base de dados *ISI Web of Knowledge / Web of Science*™, com os termos de busca: "*Patient Safety*", "*Elderly*", "*Intensive Care Units*", efetuada a partir da exportação destes dados para o software de análise bibliométrica *HistCite*™. **Resultados**: identificados 103 registros de publicações, em 85 periódicos distintos, escritos por 679 autores que possuem vínculos com 224 instituições, localizados em 30 países. Na análise da contagem do número de citações, o valor do h-index é igual a 24. **Conclusão**: o tema é apresentado de forma ampla e diversificada, sem demonstrar a existência de boa articulação entre os estudos, autores e instituições de todo o mundo. Há necessidade de construção de redes de conhecimento na área que possibilitem mais estudos capazes de contribuir para melhoria da segurança do idoso na terapia intensiva.

Descritores: Segurança do Paciente. Idoso. Unidades de Terapia Intensiva.

RESUMÉN

Objetivo: Analizar la producción científica internacional sobre seguridad de pacientes de edad avanzada en la Unidad de Cuidados Intensivos. **Método**: Investigación bibliométrica realizada en la base de datos *ISI Web of Knowledge / Web of Science*™, con los términos de búsqueda: "*Patient Safety*", "*Elderly*", "*Intensive Care Units*", realizada a partir de la exportación de estos datos al software de análisis bibliométrico *HistCite*™. **Resultados**: se identificaron 103 publicaciones en 85 revistas diferentes, escritas por 679 autores que tienen vínculos con 224 instituciones ubicadas en 30 países. En el análisis del número de citas, el valor del índice h es igual a 24. **Conclusión**: el tema se presenta de forma amplia y diversa, sin mostrar la existencia de una buena articulación entre estudios, autores e instituciones de todo el mundo. Existe la necesidad de construir redes de conocimiento en el área que permitan estudios adicionales que puedan contribuir a mejorar la seguridad de los ancianos en cuidados intensivos.

Descriptores: Seguridad del Paciente. Anciano. Unidades de Cuidados Intensivos.

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INTRODUCTION

Patient safety is the risk reduction of unnecessary damage associated with healthcare process up to an acceptable minimum. The acceptable damage, minimally, concerns what is possible in the current knowledge, of which is available as resources and of the situational framework that the provided care is found. The risk of non-treatment or of another therapy, with the intention of reducing unsafe practices in care processes through the best actions described in order to reach the best possible results for the patient, is characterized as a strategic and continuous reduction of the potential damage in care process.[1-2] The patient safety is essential for the healthcare quality because it comprises attitudes that are intended to manage and prevent risks of which patients are exposed.[3]

Transformations and advancements occur permanently, in health, and they allow improving processes and services provided to public. Moreover, it is realized that the patient safety in the last decades has provoked a constant debate that demonstrates how necessary the involvement among the welfare, patient's quality of live and provided care is.[4]

The population aging is among the highlights in the current century, with the growth index of elderly individuals in the world being around 3% a year, and it is estimated that in 2050 this population will be formed by 2.1 billion people. Currently, about 962 million people are 60 years old or older in the world, which corresponds to 13% of total population. By 2050, all regions of the world, but Africa, will have almost a quarter of their population composed of people in this age range.[5]

The progressive human aging results in changes of physiological systems, bringing vulnerabilities and fragilities for the elderly, which leads to compromise physical-functional aptitude. The increase of estimated life directly reflects in health conditions, morbidity and functional limits in the elderly, increasing the incidence of diseases and disablements, with possible changes in physical, cognitive and emotional dependence, often generating the need of permanent care.[6] Associated with ageing, the multimorbidity is characterized by a combination of diseases with diverse implications, among them the high utilization of healthcare, hospitalization, high public spending on health and mortality.[7]

There is a high utilization of healthcare by the elderly especially in Intensive Care Units (ICUs). This is evidenced by the increase of average age in these units, which demands more attention for health professionals with the real effectiveness of treatment and care provided to this age group.[8-9] These environments require more technology to attend patients that are serious, complex and exposed to invasive procedures.[10] Thus, the concern with the elderly patient safety in ICUs is notorious and growing, generating the increase of studies on the theme.[10-11]

The evidences show that the adverse events (AE), that is, the incidents that occur with the patient during healthcare provision, resulting in an injury or lesion, may represent a temporary or permanent damage, of which falls, medication errors, unscheduled withdrawals of therapeutic devices and pressure injury are highlighted. The last are more present among hospitalized adult

and elderly patients, which means that with the advance of age there is a greater incidence of AE, and consequently the increase of more serious sequelae. It is worth noting moreover that the decrease of ICU stay time constitutes an important measure for prevention of moderate and serious AE, in addition to resulting in cost savings.[12,11]

Considering these issues, it is opportune that the scientific production of studies on elderly patient safety in ICU be analyzed and broadened. The questions that guide the study are: What are the sources of value on the elderly patient safety in ICU acknowledged by means of authorship and citation metrics? What is the analysis of indicators on the dynamics and evolution of scientific and technological information regarding elderly patient safety in ICU?

Therefore, considering these questionings and the importance of safety promotion of elderly patient who needs intensive care, the study has as objective to analyze the international scientific production on elderly patient safety in ICU.

METHOD

Bibliometric study carried out on Main Collection of ISI Web of Knowledge / Web of Science™ database, of studies published in the period from 1945 to 2018. The following search terms were selected, "Patient Safety", "Elderly" and "Intensive Care Units", defined from Medical Subject Headings – MeSH.

The found works were refined by filter, document type, and 103 articles were found. The articles published in annals of events or under edit (Conference Proceedings) and records resulting from "proceedings papers", "editorial material" and "letter". Complete works "article" and "review" were included.

The material processing and analysis were performed from exporting these data for the HistCite™ software. The analysis of selected articles followed the three suggested proceedings: the definition of database; the data collection and data presentation and analysis.[13-14] The distribution of publications by year, the journals with the greatest number of articles, the authors who contributed the most with the publications and the number of published articles by country were analyzed.

In addition to this data generated by the software, the following was done: an identification of sources of value on elderly patient safety in Intensive Care Unit (ICU) acknowledged by means of authorship and citation metrics; an analysis of number of citations count, through h-index value, based on a list of publications sorted in descending order; and an analysis of indicators on the dynamics and evolution of scientific and technological information regarding the theme. Moreover, the average of citation per article and the sum of number of citations for all the items in the result set were searched.

Aspects of texts from the 15 most cited articles on Web of Science™ about elderly patient safety in ICU were elucidated. The results of these analyses were presented in graph, tables and chart. The ethical aspects for the study of this nature were respected.

RESULTS

The fist article published on the theme was in 1991. Therefore, only studies published in the period from 1991 to 2018 were considered.

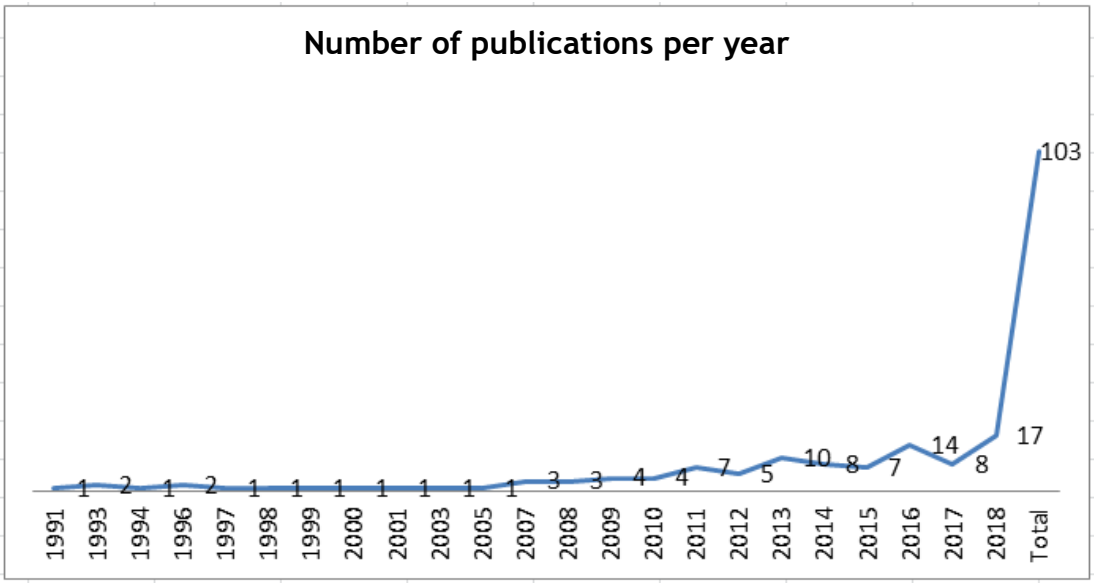
Table 1: General results of bibliometric survey of elderly patient safety in Intensive Care Unit (1991-2018). Teresina – PI, 2019.

Bibliometric Data	Quantity
Publications (articles)	103
Indexed journals	85
Authors	679
Institutions (authors associated with)	224
Countries	30
Cited references	3,118

Source: Own elaboration from data from Web of Science™.

The evolution of studies on elderly patient safety in Intensive Care Unit (ICU) points out that the international interest on the subject started in 1991, with the publication of 01 (one) study. Since the year of 2016, the number of studies increased, with 39 studies published in the period from 2016 to 2018.

Figure 1: Distribution of publications on elderly patient safety in Intensive Care Unit (1991-2018). Teresina – PI, 2019.



Source: Own elaboration from data from Web of Science™.

Table 2 shows the 10 journals that published the most on the theme in study, the quantity of articles published by journals, the number of citations of these articles on all Web of Science™ and the relation between the number of citations and the quantity of published articles.

Table 2: Journals with the greatest number of published articles (1991-2018). Teresina – PI, 2019.

Journals	Quantity of Articles	TGCS Citations	Citations/ Quantity
Critical Care Medicine	05	649	129.8
Plos One	04	97	24.25
Journal of Trauma-Injury Infection and Critical Care	03	140	46.6
Annals of Pharmacotherapy	02	24	12.0
Bmc Geriatrics	02	21	10.5
Critical Care Nursing Quarterly	02	03	1.5
Drug Safety	02	36	18.0
European Journal of Cardio-Thoracic Surgery	02	17	8.5
Infection Control and Hospital Epidemiology	02	56	28
International Journal of Cardiology	02	36	18
Acta Paulista de Enfermagem	01	01	1.0

Source: Own elaboration from data from Web of Science™.

The two journals with the greatest number of publication records are Critical Care Medicine and Plos One, which obtained 746 citations, the former with 05 (five) articles and the latter with 04 (four) published articles. To identify the journal with the most impact, an index was defined from the division of quantity of citations by the number of published works, presenting Critical Care Medicine as that with the highest index (129.8). This information becomes important for researchers and research centers in the field when mapping the academic journals that publish the most on the topic and that receive the most citations of other studies, considered the articles with the greatest impact factor on the topic.

In analysis of number of citations count, the results indicate the h-index value equal to 24 and the average of citation per item equal to 23.04 which corresponds to the average number of articles that made the citation for all the items in result set. This is the sum of number of citations count divided by the number of results in article set, based on a list of publications sorted in descending order. Moreover, the sum of number of citations equal to 2,373 was sought, as the total number of citations for all the items in the result set.

The authors with the greatest number of publications on the theme, on Web of Science™, are: Cheng KC with 04 publications, Chen CM with 03 publications, Aissaoui N, Bataille V, Besser S, Blanchard D, Blot S, Cankurtaran M, Chao CM and Chiang SR with 02 publications each.

To deepen representativeness of countries of origin of the institutions in which 85 authors of 103 works mapped in this bibliometric study were associated with, the countries with the most scientific production on elderly patient safety in ICU were identified, which can be observed in Table 3.

Table 3: Number of articles by country of origin of institutions which authors are associated with (1991-2018). Teresina – PI, 2019.

Country	Quantity
USA	42
France	12
Italy	10
UK	08
China	07
Turkey	07
Canada	06
Taiwan	06
Japan	05
Brazil	04

Source: Own elaboration from data from Web of Science™.

It is noted a predominance of studies originating from the United States of America, in first place, with 42 articles, and France in second, with 12 published articles. Brazil appears in tenth place, with 04 published articles on the topic.

Chart 1, next, presents the Top 15 most cited articles on Web of Science™ in the period from 1941–2018, the number of citations of each article and the citation average per year, indicating the most representative studies on the theme, presenting seminal works and later ones that were also very referenced.

Chart 1. Top 15 most cited articles on Web of Science™ from 1941–2018.

#	Title	Authors	Year	Journal	No. of citations	Citation average per year
1.	Feasibility, efficacy, and safety of antipsychotics for intensive care unit delirium: The MIND randomized, placebo-controlled trial	Girard, T.D.; Pandharipande, P.P.; Carson, S.S.; et al.	2010	Critical Care Medicine	227	22.70
2.	Nurse working conditions and patient safety outcomes	Stone, P.W.; Mooney-Kane, C.; Larson, E.L., et al.	2007	Medical Care	178	13.69
3.	Haloperidol prophylaxis decreases delirium incidence in elderly patients after noncardiac surgery: A randomized controlled trial	Wang, W.; Li, H.L.; Wang, D.X.; et al.	2012	Critical Care Medicine	154	19.25
4.	Iatrogenic complications in adult intensive care units: a prospective two-center study	Giraud, T.; Dhainaut, J.F.; Vaxelaire, J.F.; et al.	1993	Critical Care Medicine	152	5.63
5.	Dexmedetomidine for prevention of delirium in elderly patients after non-cardiac surgery: a	Su, X.; Meng, Z.T.; Wu, X.H.; et al.	2016	Lancet	151	37.75

	randomised, double-blind, placebo-controlled trial					
6.	Association of ICU or Hospital Admission with Unintentional Discontinuation of Medications for Chronic Diseases	Bell, C.M.; Brener, S.S.; Gunraj, N.; et al.	2011	Journal of the American Medical Association	127	14.11
7.	Radical cystectomy is safe in elderly patients at high risk	Chang, S.S; Alberts, G.; Cookson, M.S.; et al.	2001	Journal of Urology	96	5.05
8.	The Feedback Intervention Trial (FIT)-Improving Hand-Hygiene Compliance in UK Healthcare Workers: A Stepped Wedge Cluster Randomised Controlled Trial	Fuller, C.; Michie, S.; Savage, J.; et al.	2012	Plos One	84	10.50
9.	The Effects of Clopidogrel on Elderly Traumatic Brain Injured Patients	Wong, D.K.; Lurie, F.; Wong, L.L.	2008	Journal of Trauma-Injury Infection and Critical Care	80	6.67
10.	Cost-effectiveness of a coronary care unit versus an intermediate care unit for emergency department patients with chest pain	Tosteson, A.N.A; Goldman, L.; Udvarhelyi, I.S.; et al.	1996	Circulation	69	2.88
11.	Epidemiology and outcome of nosocomial bloodstream infection in elderly critically ill patients: A comparison between middle-aged, old, and very old patients	Blot, S.; Cankurtaran, M.; Petrovic, M.; et al.	2009	Critical Care Medicine	68	6.18
12.	Radical resection of periampullary tumors in the elderly: Evaluation of long-term results	Bathe, O.F.; Levi, D.; Caldera, H.; et al.	2000	World Journal of Surgery	58	2.90
13.	The Dirty Hand in the Latex Glove: A Study of Hand Hygiene Compliance When Gloves Are Worn	Fuller, C.; Savage, J.; Besser, S.; et al.	2011	Infection Control and Hospital Epidemiology	53	5.89
14.	Transfusion of packed red blood cells in patients with ischemic heart disease	Gerber, D.R.	2008	Critical Care Medicine	48	4.00
15.	Clinical safety of endoscopic submucosal dissection compared with surgery in elderly patients with early gastric cancer: a propensity-matched analysis	Park, C.H.; Lee, H.; Kim, D. W.; et al.	2014	Gastrointestinal Endoscopy	47	7.83

Source: Own elaboration from data from Web of Science™.

The international literature approaches the elderly patient safety in ICU theme highlighting the Top 15 most cited articles on Web of Science™ in the period from 1941–2018, with citation average per article equal to 23.04. The World Health Organization – WHO[1] establishes 06

International Patient Safety Goals, with the Goal No. 01: Identify patients correctly; Goal No. 02: Improve the communication among health professionals; Goal No. 03: Improve the safety of high-alert medications; Goal No. 04: Safety surgery; Goal No. 05: Reduce the risk of healthcare-associated infections; and Goal No. 06: Fall damage prevention.

DISCUSSION

In relation among the 15 articles with the greatest impact factor and the goals of elderly patient safety, studies on the following themes stand out: feasibility, efficacy and safety of antipsychotics for Intensive Care Unit (ICU) delirium, with this one being the greatest impact factor study published in the journal Critical Care Medicine, cited 227 times on Web of Science™, in the period from 1991 to 2018;[15] haloperidol prophylaxis decreases incidence of delirium in elderly patients after noncardiac surgery;[16] dexmedetomidine for delirium prevention in elderly patients after noncardiac surgery;[17] the effects of clopidogrel on elderly head trauma patients;[18] association of ICU or hospital admission with unintentional discontinuation of medications for chronic diseases,[19] which represents 33.3% (05) of studies presented in Chart 1, approaching Goal No. 03: Improve the safety of high-alert medications, these are thus considered by posing an even greater risk if mistakenly administered. These medications need to be managed differently from others, taking into consideration the process of storage, prescription, dispensing, administration and monitoring of effects after administration.

In the same proportion, 33.3% (05) of studies on: radical resection of periampular tumors in the elderly: long term outcome assessment;[20] red blood cell transfusion in patients with ischemic heart disease;[21] clinical safety of endoscopic submucosal dissection compared with surgery in elderly patients with early gastric cancer;[22] cost-effectiveness of a coronary care unit versus an intermediate care unit for emergency department patients with chest pain;[23] radical and safe cystectomy in elderly patients at high risk;[24] suggest a relation with Goal No. 04: Safety surgery, with the objective being to ensure that the correct procedure be done on the right patient, in the right place, with all the necessary resources available. For this, there is a set of performed actions, from surgical scheduling to postoperative period.

Next, the studies: the Feedback Intervention Trial (FIT) – improving hand-hygiene compliance in UK healthcare workers;[25] the dirty hand in the latex glove: a study of hand hygiene compliance when gloves are worn;[26] epidemiology and outcome of nosocomial bloodstream infection in elderly critically ill patients: a comparison between middle-aged, old, and very old patients,[27] demonstrated that 20% (03) associated with Goal No. 05: Reduce the risk of healthcare-associated infections, with the infection prevention and control being great challenges in most of health institutions. The main activity for infection prevention and elimination is proper hand hygiene. The WHO, the Centers for Disease Control and Prevention (CDC) and various other national and international organizations establish

the guidelines of hand hygiene based on evidences.

The other studies: nurse working conditions and patient safety outcomes[28] and iatrogenic complications in adult intensive care units,[29] which represent 13.3% (02) of studies, approached with Goal No. 01: Identify patients correctly and Goal No. 02: Improve the communication among health professionals, which represents an effective communication, in which identifying properly each patient attended in the hospital is the first step for a safe care, ensuring in an opportune, complete and clear way the transmission of information that will favor the continuity of care. It is noteworthy that none of the Top 15 most cited articles on Web of Science™ in the period from 1941–2018 mentioned Goal No. 06: Fall damage prevention, with these accidents being frequent in hospital environments, and they may result in sequelae to the patients, especially to the elderly.

The bibliometric study presents limitations, considering that a single database was utilized, Web of Science™, even though it is a referential platform for scientific citations designed to support scientific and academic research with broad coverage in science and social sciences fields.

CONCLUSION

There are few findings on Web of Science™ that approach the theme elderly patient safety in Intensive Care Unit (ICU), represented by 103 publication records as sources of value on the theme, published in the period from 1991 to 2018, acknowledged by means of authorship and citation metrics. The analysis of indicators on the dynamics and evolution of scientific and technological information regarding elderly patient safety in ICU evidenced that there is a gap in the knowledge about the theme, presented in a broad and diverse way without demonstrating the existence of a articulation among the studies, authors and institutions around the world. There is a need to construct knowledge networks in the field that make possible further studies able to contribute to improve elderly patient safety in intensive care.

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AVAILABILITY OF DATA

Does not apply.

FUDING SOURCE

Does not apply.

CONFLICTS OF INTEREST

There are no conflicts of interest to declare.

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