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ORIGINAL

Trends in paediatric tumours from the perspective of scientific production

Tendencias sobre tumores en la edad pediátrica desde la perspectiva de la producción científica

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ABSTRACT

Introduction: neoplastic lesions in pediatric ages have a low presentation compared to adults. The development of studies in this area of knowledge is key to trying to mitigate the negative effects of these pathologies in patients under 18 years of age.
Objective: to characterize the scientific production regarding tumor conditions or neoplasms in pediatric ages.
Method: an observational, descriptive research was carried out with a bibliometric approach. The universe was made up of 13317 research papers. Variables analyzed: year of publication, thematic area of research, keywords, type of document, journal where they were published, country and affiliation. Descriptive statistics were applied.
Results: i highlight the year 2021 with 854 articles, equivalent to 6,41 %. Scientific articles stood out with 9047 studies, equivalent to 68 %. The United States was presented as the one with the greatest development with 5897 investigations for 44,28 % of the total. Articles related to thematic areas of Medicine stood out compared to the rest with 13209 studies (99,19 %). The representation of terms or keywords and the correlation between them according to the research yielded a presentation in five main clusters.
Conclusions: scientific production on tumours in paediatric age groups has shown upward trends. Its main epicenters are located in regions considered to be high producers. In turn, the main scientific contribution focuses on updating diagnostic and therapeutic means based on original research.

Keywords: Cancer; Science; Health Research Evaluation; Science; Technology and Innovation Indicators; Pediatrics; Tumor.

RESUMEN

Introducción: las lesiones neoplásicas en las edades pediátricas tienen una presentación baja en comparación con los adultos. El desarrollo de estudios en esta área del conocimiento es clave para tratar de mitigar los efectos negativos de estas patologías en los pacientes con edades inferiores a 18 años.
Objetivo: caracterizar la producción científica referente a las afecciones tumorales o neoplasias en edades pediátricas.
Método: se desarrolló una investigación observacional, descriptiva, con un enfoque bibliométrico. El universo estuvo integrado por 13317 trabajos investigativos. Variables analizadas: año de publicación, área temática de investigación, palabras clave, tipo de documento, revista donde se publicaron los, país y afiliación. Fue aplicada la estadística descriptiva.
Resultados: destaco el año 2021 con 854 artículos, equivalentes a un 6,41 %. Sobresalieron los artículos científicos con 9047 investigaciones equivalentes a un 68 %. Estados Unidos se presentó como el de mayor

desarrollo con 5 897 investigaciones para un 44,28 % del total. Los artículos relacionados con áreas temáticas de Medicina destacaron en comparación con el resto con 13 209 investigaciones (99,19 %). La representación de términos o palabras claves y la correlación entre los mismos según las investigaciones arrojo una presentación en cinco clústeres principales.
Conclusiones: la producción científica sobre tumores en las edades pediátricas ha mostrado unas tendencias ascendentes. Sus principales epicentros se ubican en regiones consideradas como altos productores. A su vez, el principal aporte científico se enfoca en la actualización de los medios diagnósticos y terapéuticos sobre la base de investigaciones originales.

Palabras clave: Cáncer; Ciencia; Evaluación de la Investigación en Salud; Indicadores de Ciencia, Tecnología e Innovación; Pediatría; Tumor.

INTRODUCTION

Throughout history, humanity has witnessed extensive scientific and technical developments in medical science. Small or large discoveries (depending on the perspective or scope of the discovery) made in earlier times have served as a fundamental basis for improving current knowledge. In this sense, we speak of evidence-based medicine, which depends on the socialization and communication of knowledge or results to the scientific community for its use for the benefit of humanity. For these reasons, scientific communication and production (in any branch of knowledge) undoubtedly perpetuate a substantial advance in social welfare.

Scientific activity or research is one of the main pillars of current medical training. In addition to their healthcare function, health professionals require scientific preparation to enable them to conduct research in their area of work (always on the basis of ethical principles). Research contributes to the development of scientific knowledge and allows for the perpetuation of advances that improve the quality of care and therapeutic health for the patient.[1,2]

The bibliometric approach provides greater insight for the scientific community. It contributes to the analysis (quantitatively and qualitatively) of the different areas of knowledge. These aspects can be applied at other levels, such as scientific journals, institutions, specialties, and even authors. Through their indicators, they are considered valid measures for the arbitration of the quality and quantity of scientific production and activity.[3]

In pediatrics as a branch of medicine, multiple results can be observed regarding scientific activity or production. In his research, Bachelor Butcher[4] analyses the scientific production after three Spanish Society of Neonatology congresses. A similar study was developed by López-Catá[5] focusing on the scientific activity of medical science students based on the results of the (II National Student Scientific Meeting of Paediatrics PEDIACAM2021).

Other studies focus on the general analysis of the scientific production of research bodies, such as the Asunción Journal of Paediatrics[3] and the Cuban Journal of Paediatrics.[6] On the other hand, authors such as García-García et al.[7] show that topics related to pediatrics were present in their analysis of the scientific production of a faculty of medical sciences. Authors such as Madero Durán et al.[8] analyze the impact of the visibility of scientific Cuban output.

In general, researchers' interest in paediatric-related topics has been on the rise. Topics that have benefited from this growth have been those related to pediatric pain, burns, pediatric ophthalmology, cardiology, and neurosurgery.[9] However, references to tumors in the pediatric age group are scarce. Authors such as Castro-Osorio et al.[10] contribute to their enrichment.

Neoplastic lesions in the pediatric age group have a lower presentation than adults. However, their repercussions on the later development of the infant are considerable as they disrupt biological development and social adaptation mechanisms. Not to mention the high costs involved in the care and support of these patients. In addition to being one of the leading causes of death at this age,[11,12,13] the development of studies in this area of knowledge is key to trying to mitigate the adverse effects of these pathologies in patients under 18 years of age. Based on the above, the author of the present study aims to characterize the scientific production concerning tumor conditions or neoplasms in the pediatric age group.

METHOD

To fulfill the objective of this study, observational, descriptive research with a bibliometric approach was carried out. The research was related to the scientific production on paediatric age tumours published in SCOPUS.

The universe consisted of 13 317 research papers published in the SCOPUS database. The use of sampling techniques was not required in the universe; therefore, we worked with the totality of the articles found. The following criteria were defined and applied. Selection criteria: articles published in the SCOPUS database and

research related to the central theme of the research. Those works that did not meet these criteria, and that did not allow the analysis of at least one of the variables were excluded.

Among the variables analyzed were: year of publication (corresponding to the year in which the research was socialized), thematic area of study (area previously defined by SCOPUS), keywords, type of document (corresponding to the kind of publication: original articles, letters to the editor, review articles, among others), the journal where the works were published (corresponding to the scientific body where the work is housed), country (origin of the authors of the works analyzed) and affiliation (institution to which the authors belong).

The information was compiled from the SCOPUS database using the following search strategy: SUBAREA (medi OR nurse OR dent OR heal) AND TITLE-ABS-KEY (cancer OR tumor) AND TITLE-ABS-KEY (pediatrics). The indicators were analyzed as a whole using the tools offered by the SCOPUS database. Descriptive statistics were applied.

For a better understanding of the thematic areas and representation of the keywords, the research was represented using a map with cluster correlation. For the elaboration of this map, the research data were exported through the CVS format and analyzed with the VOSviewer software version 1.6.20.

The ethical standards for the development of research related to health issues were complied with, as were the aspects declared in the II Declaration of Helsinki. The information was only used for research purposes.

RESULTS

Among the years with the most publications, 2021 stood out with 854 articles, equivalent to 6,41 %. This was followed by the articles published in 2022 with 762 (5,72 %) and 2018 with 755 (5,67 %) (figure 1), with an average of approximately 198 articles.

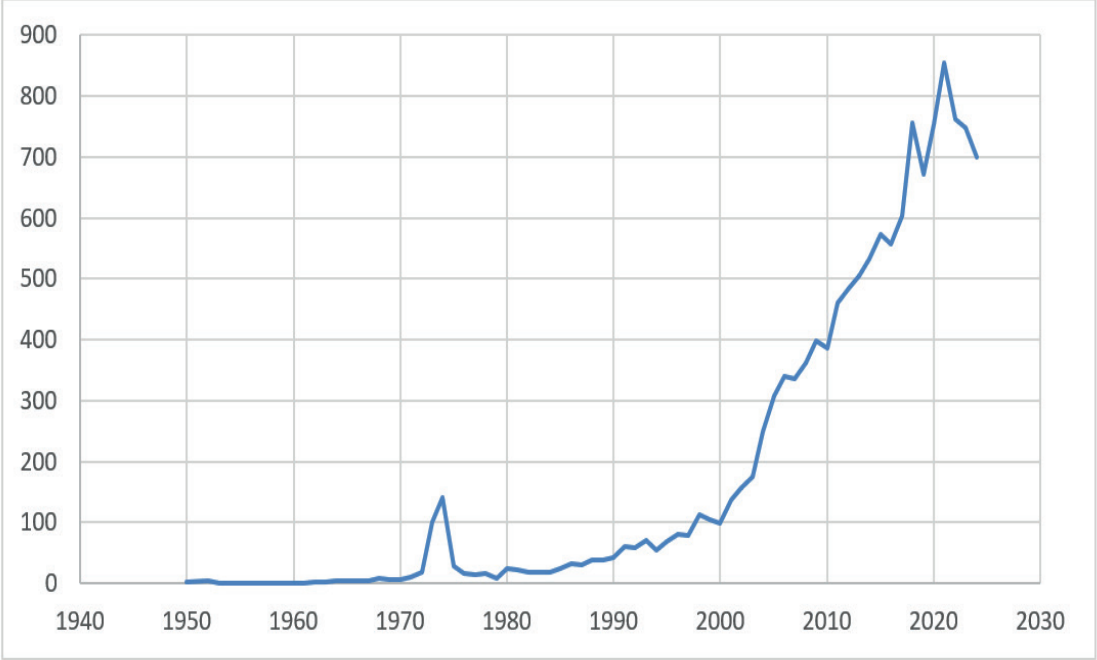

Figure 1. Distribution of articles by year of publication

Scientific articles stood out with 9,047 research papers, equivalent to 68 % of the total number of papers analysed. Review articles were in second place with 2,568 (19 %) (figure 2).

In terms of the most productive countries, the United States was the most developed, with 5,897 investigations, accounting for 44,28 % of the total. Canada (998 investigations; 7,49 %) and the United Kingdom (894 investigations; 6,71 %) came second and third respectively. Similarly, St. Jude Children's Research Hospital, with 554 papers (4,16 %), and The Hospital for Sick Children, with 441 papers (3,31 %), were among the most productive institutions (table 1).

Among the platforms with the highest number of scientific papers published are Pediatric Blood And Cancer, with 464 research papers (3,48 %), and Pediatrics, with 393 research papers (2,95 %).

Articles related to the thematic areas of Medicine stood out, with 13,209 research papers (99,19 %). These were followed by the thematic areas related to molecular genetics (1,957 papers; 14,70 %) and nursing (620 papers; 4,66 %) (table 2).

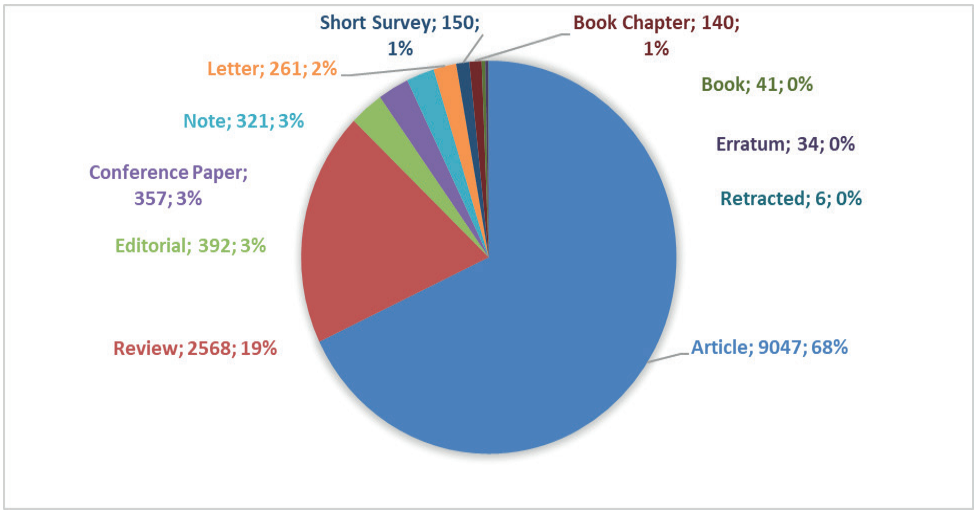

Figure 2. Distribution of articles according to type of research

Table 1. Distribution of articles by country and institution

	No	%
Distribution of articles by country		
United States	5897	44,28
Canada	998	7,49
United Kingdom	894	6,71
Germany	737	5,53
France	718	5,39
Distribution of articles according to institutions		
St. Jude Children's Research Hospital	554	4,16
The Hospital for Sick Children	441	3,31
Boston Children's Hospital	416	3,12
Harvard Medical School	395	2,97
The Children's Hospital of Philadelphia	374	2,81

Table 2. Distribution of articles according to thematic areas

Thematic areas	No	%
Medicine	13209	99,19
Biochemistry, Genetics and Molecular Biology	1957	14,70
Nursing	620	4,66
Health Professions	351	2,64
Neuroscience	326	2,45
Pharmacology, Toxicology and Pharmaceutics	309	2,32
Physics and Astronomy	284	2,13
Immunology and Microbiology	277	2,08
Psychology	177	1,33
Engineering	118	0,89

The representation of terms or keywords and the correlation between them, according to the research, yielded a presentation in five main clusters. Among the most important terms are human, article, child or infant, and preschooler.

The list of terms was organized as follows: in the first cluster (red), research related to the different symptomatology and health effects of neoplastic processes are analyzed and grouped. Cluster 2 (green) contains research on risk factors for developing neoplasms in the pediatric age group. Cluster 3 (blue) includes research on therapeutic means for treating tumors, clinical trials, and chemotherapy, especially in tumor lesions in the central nervous and osteoarticular systems. In contrast, cluster 4 (yellow) groups together research on tumor lesions of the haemolymphopoietic system, in particular leukemias for the most part. Cluster 5 (violet) correlates the different types of research according to their methodology and scope, including cohort studies, multicenter studies, and others (figure 3).

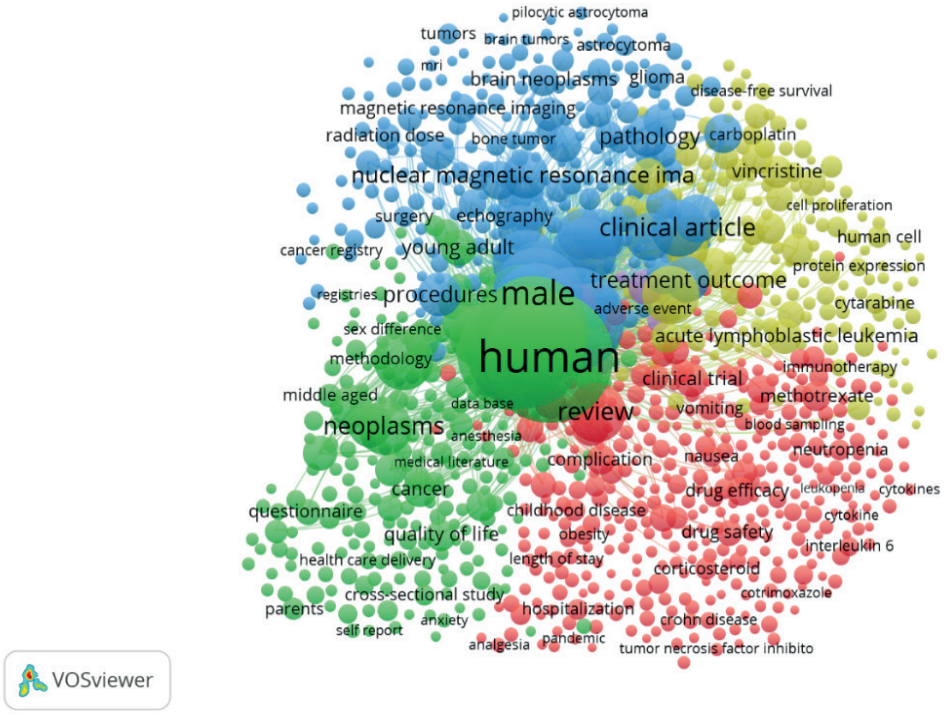

Figure 3. Representation of articles according to keywords

DISCUSSION

Neoplastic lesions in pediatrics respond to a heterogeneous group of diseases. Their multifactorial origin requires constant monitoring and study of these conditions. Their repercussions not only involve the care component and the resources allocated to them but also influence the biological and social development of the patient.

The behavior of scientific production related to tumors in the pediatric age group published in the SCOPUS database showed an increasing trend. There are several reasons for this performance. In the first instance, the scientific community is interested in this group of diseases. Similarly, with the development of new information and communication technologies, the use of the Internet, and the socialization of research through digital platforms, this scenario has grown.

On the other hand, the SCOPUS database has grown historically and has a tradition of hosting the most important scientific journals over the years. This condition has made it one of the most prestigious databases and a reference for the publication and search of scientific information.[14,15,16]

Aldave Larriviere et al.[17] and Rodríguez Fernández et al.[18] show variable behavior in their research on scientific production. In the first study, the authors show an upward trend in the first few years, followed by a variable period in their behavior. The second case shows a decreasing trend in published articles yearly. In this sense, it can be said that the present research shows contradictory results to the authors cited above.

The scientific production in an area of knowledge should be enriching, from the contribution of results that make it possible to contrast hypotheses and/or theories to achieve a consensus to improve the quality of care. Original research or scientific articles support this criterion. They are research with a high communicative purpose as they constitute a vehicle for the socialization of scientific results. Many clinical trial results, population studies, and others are presented in scientific articles, especially original research.[19] Criteria that can support and justify the predominance of this typology in the present study.

Authors such as Riesgo Rodríguez et al.[20] analyzed the scientific production of teachers at a higher education institute to train health professionals in the specialty area of pediatrics. Their results show a predominance of original research of over 24 %. On the other hand, Ortiz Núñez et al.[21] analyzed scientific activity related to a thematic area of pediatrics (similar to the present study). They showed that over 79 % of the research modalities developed were original articles. The present research shows results identical to those of both authors.

However, the author considers it necessary to highlight the place of review articles. This research complements the original articles. Its purpose is to recruit, analyze, and evaluate the scientific literature (in this case, in the area of health) published and available to the scientific community. This objective opens new

questions and scientific problems, which are solved by executing the original research.

According to UNESCO data, around 72 % of international scientific production is located in five regions: the European Union, China, the United States, Japan, and Russia.[22] Extrapolating these results to current research, it is possible to support the predominance of the United States and the United Kingdom as the top-producing countries.

Organizing scientific knowledge into thematic areas is key to better scientific performance. It allows the quality of the relationships between the different scenarios to be evaluated and assessed; it contributes to appropriating the necessary resources for a given result and their application in pursuit of improving knowledge. In this sense, since the 20th century, progress has been made in the study and approach to pediatric tumors. One of the clearest examples was the celebration of the II National Congress of Paediatrics in Spain in 1923.[23] In this space, different topics about preventing infant mortality were analyzed, where the repercussions of tumors in the pediatric age were analyzed. This criterion is related to the data shown about the behavior of publications by year.

Since this period, pediatrics has occupied a new stage in the health sciences.[24] On the other hand, Suárez-Obando[25] acknowledges the achievements in pediatrics. At the same time, he highlights the new challenges to be met; among them are the lines of research related to cancer immunotherapy, the genetic study for disease prevention, and the relationship between biological and social factors in developing chronic conditions in childhood from a greater biological perspective. These aspects relate to the research on pediatric tumors reported in this study. In turn, it is related to one of the term relationship clusters, which establishes a link between both results.

Research such as that carried out by Abril Mera et al.[26] on the prevalence of fatigue in childhood cancer and its repercussions on daily life. In conjunction with the study on the sequelae of hematological cancer in the pediatric age group by this author[27], they are related to the list of articles according to the most developed research terms. The study by Pérez-Calleja et al.[28] is related to the scientific approach to the risk factors for the development of childhood cancer.

Sánchez Avila et al.[29] and Sales Cardoso et al.[30] present aspects and criteria for managing and caring for pediatric oncology patients from nursing procedures. On the other hand, Luna España et al.[31] assess the use of the most current biomarkers to detect childhood cancer. This research is related to the cluster concerning therapeutic and diagnostic alternatives for childhood cancer, two key elements considered when applying behavior and decision-making in pediatrics.[32,33]

Generally, the main trends in pediatric tumor research were related to the most frequent tumor conditions (haemolymphopoietic system disorders). Moreover, its main focus is on improving diagnostic and therapeutic means, which make it possible to counteract the morbidity of these conditions and their sequelae in the development of pediatric patients.

CONCLUSIONS

Scientific production of tumors in the pediatric age group has shown an upward trend. Its main epicenters are located in regions considered to be high producers. At the same time, the main scientific contribution focuses on updating diagnostic and therapeutic methods based on original research.

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CONFLICT OF INTEREST

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