

SCIENTIFIC PRODUCTIVITY IN RELATION TO MOUTH NEOPLASMS AND MOUTH REHABILITATION: A BIBLIOMETRIC ANALYSIS

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ABSTRACT: The objectives of this study were to analyze the results of articles retrieved on the subject of mouth neoplasms and mouth rehabilitation, published between 1990 and April 2016, identify the dispersion of the publications, and examine authorship patterns and citations in the Scopus database, based on the Laws of Bradford and Lotka. This was a bibliometric study, with a descriptive and quantitative approach. An analysis of articles published in journals indexed in the Scopus database was performed, using the terms "Mouth Neoplasms" and "Mouth Rehabilitation". Twenty-eight original articles were retrieved, published in 18 journals, with irregular distribution in the period studied. At the time of analysis, 222 citations were identified with a mean of eight per document. The fields of medicine and dentistry stood out with publications on the theme. Germany had the largest scientific production. The study revealed a modest number of publications and the need for nursing engagement in this area of research.

DESCRIPTORS: Mouth neoplasms; Mouth rehabilitation; Nursing; Bibliometrics.

PRODUTIVIDADE CIENTÍFICA ACERCA DA NEOPLASIA MALIGNA BUCAL E DA REABILITAÇÃO BUCAL: UMA ANÁLISE BIBLIOMÉTRICA

RESUMO: Analisar resultados da recuperação de artigos sobre a temática neoplasia bucal e reabilitação bucal, publicados entre os anos de 1990 e abril de 2016, identificar a dispersão das publicações, examinar o padrão de autoria e citações na base de dados Scopus, a partir das Leis de Bradford e Lotka. Estudo bibliométrico, com abordagem descritiva e quantitativa. Realizada análise de artigos publicados em periódicos indexados na base de dados Scopus, utilizando-se os termos *Mouth Neoplasms* e *Mouth Rehabilitation*. Foram recuperados 28 artigos originais, publicados em 18 revistas, com distribuição irregular no período estudado. No momento da análise, identificou-se 222 citações com média de oito por documento. Medicina e odontologia se destacaram com publicações na temática. A Alemanha foi o país com maior produção científica. O estudo evidencia um quantitativo discreto de publicações e revela um campo que necessita do engajamento da enfermagem.

DESCRIPTORES: Neoplasia bucal; Reabilitação bucal; Enfermagem; Bibliometria.

PRODUCTIVIDAD CIENTÍFICA ACERCA DE LA NEOPLASIA MALIGNA BUCAL Y LA REHABILITACIÓN BUCAL: UN ANÁLISIS BIBLIOMÉTRICO

RESUMEN: Analizar resultados de la recuperación de artículos sobre la temática neoplasia bucal y rehabilitación bucal, publicados entre los años 1990 y abril de 2016; identificar la dispersión de las publicaciones, examinar el estándar de autoría y citaciones en base de datos Scopus partiendo de las Leyes de Bradford y Lotka. Estudio bibliométrico, con abordaje descriptivo y cuantitativo. Se realizó análisis de artículos publicados en periódicos indexados en la base Scopus, utilizándose los términos *Mouth Neoplasms* y *Mouth Rehabilitation*. Pudieron recuperarse 28 artículos originales, publicados en 18 revistas, con distribución irregular en el período estudiado. Al momento del análisis de identificaron 222 citaciones, con promedio de ocho por documento. La Medicina y la Odontología se destacaron con publicaciones en la temática. Alemania fue el país de mayor producción científica. El estudio evidencia una cantidad discreta de publicaciones y revela un campo que necesita del compromiso de la enfermería.

DESCRIPTORES: Neoplasias de la Boca; Rehabilitación Bucal; Enfermería; Bibliometría.

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● INTRODUCTION

Mouth neoplasms are a worldwide public health problem, due to their epidemiological, social and economic magnitude. According to data from the International Agency for Research on Cancer (IARC), of the World Health Organization (WHO), their incidence in the world has grown by 20% in the last decade⁽¹⁾.

Cancer of the oral cavity is the tenth most common cancer in the world, with two-thirds of cases found in developing countries⁽¹⁾. In the two-year period of 2016 and 2017, Brazilian males ranked fifth on the list of incidence, with approximately 11,390 new cases, and women twelfth, with 4,350 new cases⁽²⁾.

In many countries, as in Brazil's case, patients are diagnosed in the advanced or metastatic stage of the disease, which, combined with the aggressiveness of the tumor, makes treatment difficult and significantly worsens the prognosis⁽³⁾. Treatment for these patients usually includes surgery, radiation therapy or chemotherapy, or a combination of these. There are, however, possibilities of numerous side and secondary effects, such as mouth deformity, with serious impairments in mastication, swallowing and phonetics, as well as impacts on social and family interpersonal relationships⁽⁴⁻⁶⁾.

The physical and psychological rehabilitation of patients with these deformities, and subsequent adjustments in their family, social and occupational relationships, depends on the work of multidisciplinary teams composed of a nurse, dentist, physician, nutritionist, speech therapist, occupational therapist, social worker, physical therapist, psychologist, and prosthodontist. Nurses, along with the other members of this multiprofessional team, carry out activities that permit knowledge exchange and the systematization of complementary information and actions, aimed at the reintegration of these patients into society, through oral communication, and thereby enhance their quality of life⁽⁷⁾.

Due to the importance attributed to cancer estimates, it is possible that scholars from various fields of knowledge have oriented their research to focus on new patient care procedures, in order to rehabilitate individuals affected by cancer of the oral cavity⁽⁵⁾. Therefore, understanding the origin of these studies, through a bibliometric study, could be beneficial to professionals at all care levels, as well as researchers interested in the theme.

Bibliometrics is a statistical tool used to determine the number of journals which are assumed to have the most relevant articles published on a specific theme⁽⁸⁾. This study was based on the main bibliometric laws: Bradford's Law (productivity of journals) and Lotka's Law (scientific productivity of authors). Following empirical principles derived from scientific information enables mapping and generating various information and productivity indicators, which helps delineate the profile of science and, consequently, manage studies⁽⁹⁻¹⁰⁾.

Through delineating the panorama of scientific production on the presented theme, this study will make it possible to estimate potential gaps and determine research relevance, as well as help professionals and researchers in health or other related areas, since it will present a distribution of the production in relation to time, geographic area, area of knowledge, impact of the journals, and the most productive authors.

The objectives of this study were to analyze the results of articles retrieved on the subject of mouth neoplasms and mouth rehabilitation, published between 1990 and April 2016, identify the dispersion of the publications, and examine authorship patterns and citations in the Scopus database, based on the Laws of Bradford and Lotka.

● METHOD

This is a bibliographic study, with a descriptive and quantitative approach, which addresses the production, dissemination, and use of information electronically registered in international databases.

Bibliometrics has been applied to various areas of knowledge, as an adequate means of assessing scientific production and viewing the literature from a specific thematic field, aimed at understanding

the subject. It is possible with this tool to explore, measure and view multifaceted realities, operationalize studies on information production and use, and treat, separate and classify data registered in information sources⁽¹¹⁾. Therefore, bibliometrics promotes opening up fields to inter- and transdisciplinarity, behavior consistent with contemporary reality, and actions for encouraging discussion among peers in their areas of expertise.

This study was conducted according to the following stages: data search, retrieval and preparation, bibliometric treatment using Bradford's Law and Lotka's Law, statistical treatment, graphic representation, and analysis of the graphs, as well as display and interpretation of the data.

The scientific basis for the study was searching for the following Portuguese terms in the Health Sciences Descriptors (DeCS) – “Neoplasia Bucal” and “Reabilitação Bucal”. Then, these same terms were used in English “Mouth Neoplasm” and “Mouth Rehabilitation” to retrieve articles from the online Scopus database, which has one of the largest databases used by the international scientific community. Scopus has 50 million entries from more than 21,000 peer-reviewed journals and around 5,000 publishers worldwide⁽¹²⁾.

The descriptors were used in association, through the “AND” Boolean search operator (“Mouth Neoplasms” AND “Mouth Rehabilitation”). The language chosen for the study was English since it is conducive to global knowledge exchange and can cover a larger number of publications, resulting, therefore, in a larger number of retrieved documents.

Data was collected in April 2016. The inclusion criteria were: original articles, provided in full and for free on the Internet, which contained the terms in the title, abstract or keywords, with no limitations for any sub-area. Articles published in the period from January 1990 to April 2016 were retrieved. The exclusion criterion was: any documents that were instructions for procedures or guidelines from societies of experts.

The data retrieved from Scopus was treated using descriptive statistics and presented in the form of simple and relative frequency distribution. The SCImago Journal Rank-SJR measurement was taken directly from the SCImago website during the same period the documents were retrieved.

The alternative metric for journal impact was used, which is based on the idea that each citation is created differently. With SJR, the research area, quality, and reputation of the journal has a direct effect on the value of a citation. A citation from a source with a relatively high SJR is worth more than a citation from a source with a lower SJR.

In addition, the study applied Bradford's Law or the Law of Dispersion, which enables estimating the degree of relevance of journals that focus on specific areas of knowledge, and Lotka's Law, which analyzes the scientific productivity of authors, i.e., it verifies each one's contribution to scientific development in his or her area of knowledge⁽⁹⁾.

● RESULTS

Twenty-eight documents were retrieved, classified as original articles. There was no need to exclude any article, since all of them met the inclusion criteria. For the specified search period from 1990 to April 2016, articles were found, as shown in Table 1, with an irregular publication year distribution. Within this time period, the years with the highest number of documents were 1992, 1999, and 2009.

Table 1 - Total number of articles retrieved by year of publication. Recife, PE, Brazil, 2016 (continues)

Year	Total articles
2013	1
2012	1
2011	1
2009	4

2008	1
2007	1
2006	1
2005	1
2004	1
1999	5
1997	1
1996	1
1993	3
1992	5
1990	1

Source: Scopus database (2016)

In relation to the theme presented, of the 28 articles, 12 (42.8%) dealt with rehabilitation, 7 (25%) were epidemiological studies, 6 (21.4%) addressed surgical techniques, 2 (7.1%) addressed professional attitudes and 1 (3.5%) involved pre- and post-radiation therapy care.

In terms of areas of interest described in the Scopus database, in relation to the articles retrieved from the specific data search in 2016, the highest frequency was for articles related solely to medicine, with 12 (42.8%), followed by dentistry, with 5 (17.8%), and those of mutual interest to the areas of medicine and dentistry, with 10 (3.5%), plus those from an undefined field, with 1 (3.5%).

The 28 retrieved documents were published in 19 peer-reviewed journals. The SCImago Journal & Country Rank (SJCR) is a public portal that includes scientific journals and indicators from developed countries based on information contained in the Scopus® database (Elsevier BV). This platform got its name from the SCImago Journal Rank (SJR) indicator which shows the visibility of the journals contained in the database from 1996(13).

For measuring impact per publication (IPP) and SJR, the first 10 journals whose results for IPP ranged from 0.47 to 2.67 with a mean of 1.94, and for SJR, from 0.22 to 1.99 with a mean of 0.87, were considered. The journals that ranked the highest in the respective metrics were: "Plastic and Reconstructive Surgery" with SJR (2015) of 1.99 and IPP (2015) of 2.67 and, "Periodontology 2000" with SJR (2015) of 1.84 and IPP (2015) of 4.79.

Table 2, according to Bradford's Law, shows the order of the journals based on productivity zones and indicates that the empirical data from the journals and articles was not in line with this law, according to the theoretical calculations. In this study, three zones of productivity were considered for the articles retrieved in the study. It is important to mention the journals that stood out in productivity in relation to the theme during the time period of the study. The journal *Mund-Kiefer-und Gesichtschirurgie* is in Zone 1, with six published articles, and the journals *Fortschritte der Kiefer-und Gesichtschirurgie* and *Larngo-Rhino Otologie* are located in Zone 2, with five and two articles, respectively. In the other 15 journals, only one article was published.

Table 2 - Classic Bradford Table. Recife, PE, Brazil, 2016.

Zones	Theoretical Calculation - Total Articles	Journal No.	Theoretical Calculation - Total Articles	Journal No.	Bm	In line
1	9	2	6	1		No
2	9	4	7	2	2	No
3	10	12	15	15	7.5	No

Source: research data
Bm=Bradford multiplier

Table 3 shows that the number of journals in each zone increases as productivity drops, indicating decreasing returns among the three zones identified.

Table 3 - Division of journals by productivity zone. Recife, PE, Brazil, 2016.

Z	A	ΣA	%A	%ΣA	J	ΣJ	%J	%ΣJ	Bm
1 st	6	6	21.4	21.4	1	1	5.5	5.5	--
2 nd	7	13	25	46.4	2	3	11.1	13.3	2
3 rd	15	28	53.5	100	15	18	83.3	100	7.5
									XBm=4.75

Z=productivity zones; A=articles; ΣA=total number of articles; %A=percentage of articles; %ΣA=percentage of the total number of articles; J=Journals; ΣJ=total number of journals; %J=percentage of journals; %ΣJ=percentage of the total number of journals; Bm=Bradford multiplier; XBm=mean value of the Bradford multiplier.

Source: Research data

The division of journals by productivity zone presented in Table 3 shows that the first zone corresponds to 5.5% of the journals in the distribution, with 21.4% of the total number of articles published, representing the production core for the theme being studied. The last zone has a significant dispersion of the scientific literature, accounting for 83.3% of the journals, with 53.5% of the articles published.

As far as the Bm (Bradford multiplier) values, the result of dividing the number of journals from a zone by the previous one varied significantly between one zone and another. However, the XBm value (mean value of the Bradford multiplier) is distant from the individual Bm values of zones 2 and 3, confirming the difference in productivity among journals.

The retrieved documents were published in different countries, particularly Germany (n=5), United Kingdom (n=3), and the United States (n=2), as shown in Table 4.

Table 4 - Countries with published articles. Recife, PE, Brazil, 2016.

Order*	Country	Published articles
1 st	Germany	5
2 nd	United Kingdom	3
3 rd	United States	2
4 th	Austria	1
4 th	France	1
4 th	Italy	1
4 th	Holland	1

Source: Scopus database (2016)

*Some countries received the same ranking because they had the same number of published articles.

Table 5 presents the authors with the highest number of citations in the data analysis period, and quantifies, through the h-index, the productivity and impact of these authors, based on their most cited articles. For this evaluation, the first author of each of the 28 articles examined was selected, and the 10 authors with the highest number of citations within the stipulated time period for the study were extracted.

Table 5 - Top 10 first authors with the highest number of citations. Recife, PE, Brazil, 2016.

Order*	Author	No. of Articles	No. of Citations	h-index
1 st	Nicoletti G.	1	46	5
2 nd	Chan MFWY.	1	41	8
3 rd	Pace-Balzan A.	3	32	6
4 th	Kreeft A.	1	20	5
5 th	Grötz Knut A.	1	15	19
6 th	Bootz F.	1	14	22
7 th	Alani A.	1	10	9
8 th	Schmelzeisen R.	1	8	37
8 th	Méningaud JP.	1	8	18
9 th	Betz T.	1	7	5

*Two authors received the same ranking because they had the same number of citations and published articles.

Source: Scopus database (2016)

It is important to mention the three articles with the highest number of citations and their respective first authors: 1. Chewing and swallowing after surgical treatment for oral cancer: Functional evaluation in 196 selected cases – first author: Nicoletti G., with 46 citations; 2. Oral Rehabilitation with Implant-Retained Protheses Following Ablative Surgery and Reconstruction with Free Flaps – first author: Chan MFWY., with 41 citations; 3. The surgical dilemma of ‘functional inoperability’ in oral and oropharyngeal cancer: Current consensus on operability with regard to functional results – first author: Kreeft A., with 20 citations.

● DISCUSSION

The first available article indexed in the Scopus database dates from 1990 and the last is from 2013, corresponding to a time span of 23 years. There was a higher number of publications in 1992, 1993, 1999 and 2009, but this growth was not sustained in the following years.

The journals were distributed into productivity zones, which presented the absolute frequencies of articles with distinct values. The first zone forms the productivity core and contains the journal that publishes the most, supposedly of higher quality or relevance for the area of knowledge. The last zone is considered a dispersion zone, containing journals with less production.

The empirical data is not in line with Bradford’s theory, since journal distribution behavior among the zones was not compatible. It can be inferred that the number of articles is very irrelevant when compared with the number of journals. The Bradford multiplier (Bm) confirms the dispersion in Table 2.

The publication mean was 1.12 articles per year. Despite the high dispersion noted, it can be asserted that the theme has still not reached its maturity, or much less that it is obsolete. This can also be seen in the presentation of data by the International Agency for Research on Cancer (IARC)⁽¹⁾ which shows an upward trend for all types of cancer in the world population over the next 14 years. In Brazil, specifically, the estimate of new cases, especially of cancer of the oral cavity, was 15,490 in 2016⁽²⁾. Therefore, the study enables the conducting of future studies comparing what was collected at the international level and the way in which the content of the study is discussed in Brazil.

Regarding the theme of cancer of the oral cavity, the highest frequency of retrieved articles focused on rehabilitation, and only one in the 23-year publication period, authored by a physician, addressed pre- and post-radiation therapy care⁽¹⁴⁾. Although concern with the rehabilitation of these patients is manifested by the frequency of articles published, the results stand out for the small number of studies on the necessary care for such patients and the absence of articles published by nurses.

It is worth reviewing the definition of nursing by the American Nursing Association⁽¹⁵⁾, which includes protection, promotion, and optimization of health and abilities, alleviation of suffering through the diagnosis and treatment of human response, and appropriate care of individuals, with the latter based on the best scientific evidence. The results indicate the need for studies that reveal the necessary inclusion of nursing in the care of patients with cancer of the oral cavity.

At the international level, it is important to note that Germany was the leader in scientific production of articles on this topic in the Scopus database. This is perhaps due to the high level of incidence of this type of cancer (29.5) in Germany compared to the two other countries that come next on the list of highest number of articles published, i.e., the United Kingdom where the rate was 19.9 in 2012, and the United States with a rate of 10.5 in 2014⁽¹⁶⁻¹⁷⁾.

In this study, the journals *Plastic and Reconstructive Surgery* and *Periodontology 2000* were the most prominent, both with SJR>1, supposedly with higher quality or relevance for the theme under study, in the selected database. SJR identifies that the quality and reputation of a journal has a direct effect on the value of a citation. However, the qualitative aspect of the journals based on SJR indicated a gap between the published articles and high-impact journals, because SJR was less than 1 in most of the journals analyzed.

In the list of first authors, based on the ten most cited authors, the phenomenon known as the elitist process or Matthew effect in science was observed, i.e., "For whosoever hath, to him shall be given, and he shall have more abundance: but whosoever hath not, from him shall be taken away even that he hath."^(18:3) From this perspective, it can be concluded that the first four authors, supposedly of greater eminence, produce more and are consequently more cited, as shown by their h-indexes. It would appear that the more an author publishes, the easier it becomes to publish a new article, and researchers who publish more interesting results gain more recognition and access to resources that enhance their research⁽¹⁹⁾. Inversely, a larger number of authors, supposedly less prestigious, have little production.

Scientific dissemination in the field of health primarily occurs in the format of articles, making this medium one of the main forms of communication in the academic community. Therefore, journals need to be analyzed with a certain frequency to help improve articles being published and address continuing education and the rigor of scientific production⁽²⁰⁾.

● FINAL CONSIDERATIONS

The measurement of scientific productivity, through bibliometrics, made it possible to estimate the magnitude of the theme of mouth neoplasms and mouth rehabilitation. In this area of knowledge, there was no production from the area of nursing registered in the Scopus database. The highest frequency corresponded to articles solely from the field of medicine, with a focus on rehabilitation.

The study shows that the theme has not yet reached its scientific maturity from the point of view of volume of production, especially due to the absence of specific journals in the field of nursing. It would seem that the theme, which has still not aroused much interest in nursing, represents a concrete possibility for research that would serve to enhance the quality of life of cancer patients in need of mouth rehabilitation, despite the fact that its specificity is directed toward medicine and dentistry. However, in the results presented, there is a limitation in the study due to the use of only one database.

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