ORIGINAL RESEARCH

Bibliometric Analysis of the Global Scientific Production on Oral Health during Pregnancy

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Abstract

Aim: To analyze the bibliometric characteristics of the global scientific production indexed in Scopus on oral health during pregnancy.

Materials and methods: Cross-sectional study with bibliometric methodology, using scientific publications indexed in Scopus as a unit of analysis. For the search, MESH terms, Boolean operators ("AND" and "OR"), and search topics (TITLE and ABSTRACT) were used. SciVal was the tool selected for the analysis of bibliometric parameters.

Results: Most of the articles were published in Q1 (30.2%) and Q2 (29.6%) quartile journals. The country with the most scientific publications was the United States (451 articles), while Spain had only 14 publications. The University of Sydney, with 16 articles, was the most productive institution and the one with the most citations per publication was Saveetha University (19.7). The author with the most articles and citations related to the topic was George Ajesh with 13 and 136, respectively. Johnson Marre had the highest impact (15.1) and expected citations with respect to the global average (FWCI: 2.49).

Conclusions: The scientific production on oral health in pregnancy has increased, with a greater preference by authors for scientific journals in the Q1 and Q2 quartile. The United States is the country with the most publications, although Australia has a greater number of institutions among the most productive.

Clinical significance: The clinical relevance could be addressed later in relation to oral health during pregnancy, however, analyzing the bibliometric characteristics of the global scientific production is essential to understand the dynamics of scientific publications on this topic.

Keywords: Bibliometric analysis, Oral health, Pregnant women.

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Introduction

Pregnancy is a temporary and unique physiological state, characterized by hormonal, physical, metabolic, and immune system changes that can affect various parts of the maternal body. The oral cavity, in a normal state, is colonized with a balanced, diverse, and complex microbiome; however, in gestation, this microbial flora can be altered and generate dental problems, such as caries and periodontal disease.[1,2]

To ensure an adequate oral health status, care should be taken before conception, by means of dental scaling and checking for dental caries. In pregnant women, early oral screening is necessary during the first trimester of pregnancy, as well as prophylactic counseling on brushing and hygiene techniques.[3]

Lack of maternal care and the absence of specialized health care can lead to adverse outcomes for the mother and her child. In fact, prematurity and low birth weight have been shown to be associated with periodontal disease and gingivitis.[4] In addition, neglect of dental and oral health in the mother affects the oral health of infants and children;[5,6] current evidence suggests that if the mother does not receive treatment for caries, there is a greater risk that her children, in infancy, will also develop caries.[5]

Currently, a large proportion of pregnant women have insufficient knowledge about oral health, and many of them are unaware of the programs that contribute to its promotion and prevention.[7] In addition, the information provided by health professionals in charge of prenatal consultations may be insufficient, which makes it clear that there is a need to promote the use of dental services.[8] Therefore, the implementation of different preventive methods is necessary to ensure good oral health in the mother and her children.[9,10]

Articles on oral health in pregnancy address this research topic from different angles and perspectives. Scientific production in this area is increasingly relevant to maternal and perinatal health, and therefore its bibliometric exploration is necessary. The bibliometric analysis allows us to understand the impact of publications, their scope, and visibility in the academic community.[11,12] Therefore, this study aims to analyze the bibliometric characteristics of the

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global scientific production indexed in Scopus on oral health during pregnancy.

Materials and Methods

Study Design

A descriptive, observational study with a bibliometric approach was carried out. The unit of analysis consisted of each of the scientific publications indexed in the Scopus database. The information search was conducted on October 31, 2022.

Search Strategy

MESH terms, Boolean operators ("AND" and "OR"), and the search topics (TITLE and ABSTRACT) were used to retrieve the publications, thus establishing the search strategy as follows: TITLE-ABS ("Oral Health" OR "Dental Clinics" OR "Oral Status" OR "Dental Health" OR "Dental Status" OR "Dental Health Surveys" OR "Diagnosis Oral" OR "Mouth Diseases" OR "Mouth Rehabilitation" OR "Mouth Hygiene" OR "Dental Hygiene" OR "Oral Care" OR "Dental Care") AND TITLE-ABS ("Pregnant Women" OR "Pregnant Woman" OR "Woman Pregnant" OR "Women Pregnant" OR "Pregnancy" OR "Pregnancies" OR "Gestation") AND (LIMIT-TO (PUBYEAR, 2022) OR LIMIT-TO (PUBYEAR, 2021) OR LIMIT-TO (PUBYEAR, 2020) OR LIMIT-TO (PUBYEAR, 2019) OR LIMIT-TO (PUBYEAR, 2018) OR LIMIT-TO (PUBYEAR, 2017))

The following inclusion criteria were considered: (a) articles indexed in Scopus; (b) original articles of any methodological design; and (c) articles on oral health in pregnancy. While the exclusion criteria were: (d) articles published before 2017 and (e) articles that could not be exported with the SciVal tool.

Using the search strategy, 561 scientific publications were identified between 2017 and 2022. Of this number, 87 documents corresponding to review articles (67), notes (6), editorial (5), missing data (5), errata (4), conference article (3), conference review (1), and short survey (1) were excluded. Thus, the final sample of the study corresponded to 469 original articles (Flowchart 1).

Data Analysis

The export of published documents was performed with the SciVal tool of Scopus. The metadata of the articles was used to estimate the bibliometric parameters of trend, impact, and collaboration, in relation to authors, institutions, countries, and scientific journals. In addition, the Excel 2019 program was used for percentage calculation, as well as for the design of bar charts and line graphs.

Results

Papers in which there is an international collaboration between authors present a higher impact, as they have 6.3 citations per publication and 45% more expected citations with respect to the world average, although they are the least frequent, after those published with single authorship (3.2%) (Table 1).

From 2017 to 2022, scientific production on health in pregnant women has increased, mainly with articles published in scientific journals in the Q1 (30.2%) and Q2 (29.6%) quartile (Fig. 1).

Flowchart 1: Flowchart for the selection of scientific publications on oral health in pregnancy

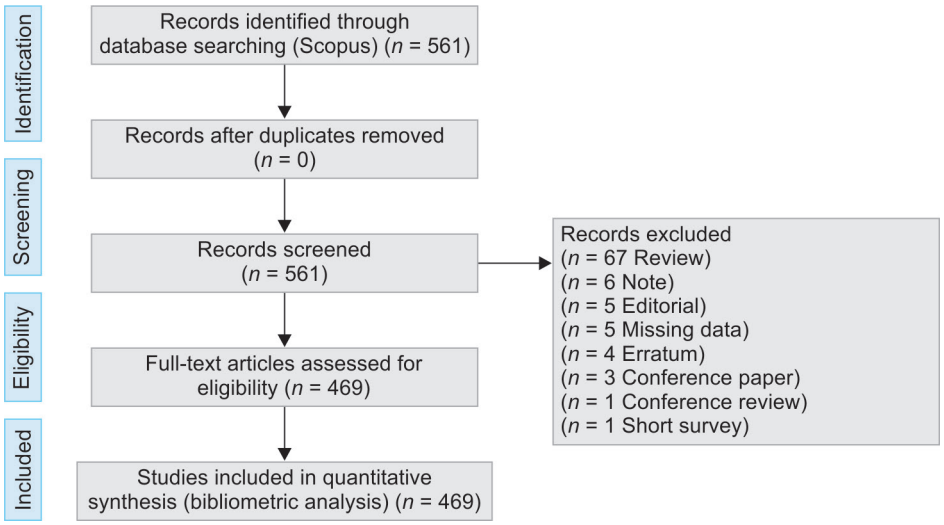


Table 1: Type of collaboration in scientific publications on oral health in pregnancy

Metric	Overall		Scholarly output	Citations	Citations per publication	FWCI
	n	%				
International collaboration	90	19.2%	90	568	6.3	1.45
Only national collaboration	189	40.4%	189	694	3.7	0.66
Only institutional collaboration	174	37.2%	174	727	4.2	0.59
Single authorship	15	3.2%	15	82	5.5	0.38

FWCI, Field-Weighted Citation Impact

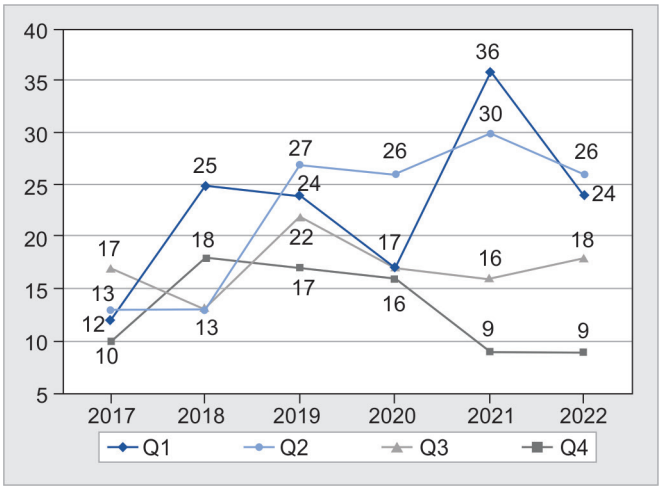


Fig. 1: Trend in the number of scientific publications on oral health in pregnancy

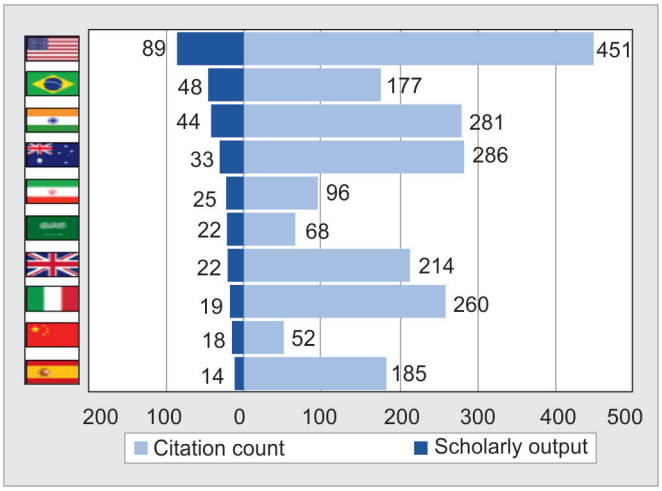


Fig. 2: Top 10 countries with the most scientific publications on oral health in pregnancy

The United States, Brazil, and India are the countries with the highest contribution to scientific production on oral health in pregnancy, with 89, 48, and 44 articles published, respectively. The countries with the highest citation counts were the United States (451), Australia (286), and India (281). Spain was the country expecting the highest number of citations relative to the world average (FWCI: 5.19) (Fig. 2).

Among the 10 institutions with the highest production, most were from Australia; in fact, the University of Sydney published the most on oral health in pregnancy (16 articles). Western Sydney University (28) and Johns Hopkins University (27) have the most authors linked to this topic. The institution with the most citations per publication (19.7) was Saveetha University, India (Table 2).

The scientific journals with the highest production are mainly located in the first and second quartiles. BMC Oral Health, from the United Kingdom, has the highest contribution and the highest normalized impact (SIN: 1.785); however, the International Journal of Dentistry and the International Dental Journal have the highest impact, with 12 and 8.6 citations per published paper. The only Latin American Journal ranked among the most productive was Pesquisa Brasileira em Odontopediatria e Clinica Integrada (Table 3).

The 10 authors with the highest productivity published their last article in the last 2 years. George Ajesh had the most articles (13) and the most citations (136). The author with the highest impact was Johnson Maree with the most citations per published article (15.1) and with more citations than expected citations relative to the overall mean (FWCI: 2.49). Blinkhorn Anthony S is the author with the best *h*-index (38) (Table 4).

Discussion

During pregnancy there are changes that can increase the prevalence of oral problems; therefore, it is necessary to promote oral health care during this period in order to reduce the risk of adverse maternal and perinatal outcomes. Therefore, it is necessary to promote correct evaluation, diagnosis, and timely treatment of oral cavity problems, based on up-to-date scientific evidence.[13,14]

Oral health during the gestational process is a field that has generated greater interest among researchers in recent years; in fact, the findings of the present study show that the publication of articles has increased, especially in journals that generate greater interest in the scientific community (quartile Q1 and Q2).

A scientometrics study showed that the United States ranks first among the countries with the highest scientific productivity in oral health literacy.[15] In this regard, Almario et al.[16] found that this country had the highest scientific production related to health in pregnant women up to 2014; likewise, the findings of this research support the fact that the United States continues to lead scientific production in this field of knowledge.

Among the most influential institutions, Australian participation stands out, with the University of Sydney as the most productive with 16 articles published. In this country, it has been shown that at least one-third of adults present dental cavity problems, which is probably why this is a country with the greatest interest in exploring and implementing solutions to this problem. The active role of Saveetha University, India, is noteworthy, as it is the one that shows the greatest impact due to citations per publication (19.7) and weighted citations (FWCI: 2.46). This shows that national collaborative networks are being prioritized over international inter-institutional work.

The journal BMC Oral Health is the one with the best production indicators, with 27 publications and 126 citations; it is also the one with the highest normalized impact. This journal, in addition to the International Journal of Environmental Research and Public Health, both located in the first quartile, is the one with the most authors who have published on oral health in pregnancy. This demonstrates the interest that researchers have in the dissemination of their articles in influential journals in the scientific community and of high impact. Despite this, it is worth noting that the journal Pesquisa Brasileira em Odontopediatria e Clinica Integrada, from Brazil, is the only one in Latin America that is among the 10 most productive, with articles that explore the knowledge and behaviors of pregnant women regarding their oral health or the reasons for seeking dental care.[17–19]

The 10 most productive authors present their latest publication in the last 2 years, demonstrating the interest and validity in the field of dentistry in maternal health. George Ajesh (*h*-index: 20) is an author whose publications are widely cited, including those that sought to determine oral health status and outcomes at delivery,

Table 2: Top 10 institutions with the most scientific publications on oral health in pregnancy

Institution	*Country*	*Scholarly output*	*Citations*	*Authors*	*Citations per publication*	*FWCI*
University of Sydney		16	148	19	9.3	1.55
University of New South Wales		14	143	15	10.2	1.74
Western Sydney University		14	143	28	10.2	1.74
Ingham Institute		14	143	14	10.2	1.74
University of North Carolina at Chapel Hill		12	45	22	3.8	0.46
Johns Hopkins University		11	60	27	5.5	1.13
Saveetha University		10	197	26	19.7	2.46
University of Adelaide		9	94	14	10.4	0.93
University of California at San Francisco		9	42	22	4.7	0.68
University of Maryland, Baltimore		9	53	9	5.9	0.89

FWCI, Field-Weighted Citation Impact

Table 3: Top 10 scientific journals with the most scientific publications on oral health in pregnancy

Scopus source	*Publications*	*Citations*	*Authors*	*Citations per publication*	*SNIP*	*CiteScore 2020*	*SJR*	*Quartile*	*Country*
BMC Oral Health	27	126	137	4.7	1.785	3.6	0.79	Q1	
International Journal of Environmental Research and Public Health	18	84	101	4.7	1.44	4.5	0.814	Q1	
Oral Health and Preventive Dentistry	10	28	50	2.8	0.678	1.9	0.351	Q2	
Maternal and Child Health Journal	10	55	44	5.5	1.143	3.5	0.823	Q1	
Pesquisa Brasileira em Odontopediatria e Clinica Integrada	7	16	35	2.3	0.438	1.6	0.195	Q3	
Open Dentistry Journal	6	20	37	3.3	0.722	2.4	0.29	Q3	

JDR Clinical and Translational Research	6	36	30	6	1.226	4.5	0.674	Q1	
International Dental Journal	5	43	19	8.6	1.471	4.2	0.678	Q1	
Journal of Public Health Dentistry	5	9	30	1.8	0.969	3.4	0.486	Q2	
International Journal of Dentistry	5	60	17	12	1.305	2.7	0.5	Q2	

SJR, SCImago Journal Rank; SNIP, source-normalized impact per paper

Table 4: Top 10 authors with the most scientific publications on oral health in pregnancy

Name	*Scholarly output*	*Most recent publication*	*Citations*	*Citations per publication*	*FWCI*	*h-index*
George, Ajesh	13	2022	136	10.5	1.76	20
Dahlen, Hannah G	10	2022	121	12.1	1.99	37
Ajwani, Shilpi	9	2022	113	12.6	2.1	19
Quiñonez, Rocío Beatriz	9	2022	41	4.6	0.52	21
Bhole, S	8	2022	85	10.6	1.82	20
Jamieson, Lisa	7	2021	57	8.1	0.79	28
Srinivas, Ravi	7	2022	39	5.6	1.08	7
Johnson, Maree	7	2021	106	15.1	2.49	30
Sousa, Mariana S	6	2022	47	7.8	1.37	8
Blinkhorn, Anthony S	6	2021	86	14.3	2.46	38

FWCI, Field-Weighted Citation Impact

as well as the role of dentists in oral health care in pregnant women.[20,21]

This study has some limitations inherent to bibliometric methodology. The first is that the analysis of the metadata of all the articles may have been affected because they were not complete in the indexing. In addition, it is not possible to generalize the findings of the scientific production on oral health in pregnancy,[22] since the search for articles was only carried out in one database (Scopus).

Conclusions

From 2017 to 2022, oral health in pregnancy is a topic that has generated greater interest in researchers, reflected in an increase in the number of publications in this period, with priority in dissemination in scientific journals of the first and second quartile, before those of the third and fourth quartile. The United States is the country with the most articles published and cited, while Australia is the country with the most institutions among the 10 most productive.

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