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Clinical Research in Dermatology and Venereology in Spanish Research Centers in 2005 Through 2014: Results of the MaIND Study[☆]



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Abstract

Background and objective: Bibliometric indicators provide a useful measure of the number of clinical research articles published in scientific journals and their quality. This study aimed to assess the amount and quality of research carried out in Spanish dermatology centers and to describe the research topics.

Material and method: Bibliometric study of clinical research articles that met the inclusion criteria and had a definitive publication date between 2005 and 2014 in MEDLINE or Embase in which the corresponding author's affiliation was a Spanish hospital dermatology department or other center.

Results: Of 8,617 articles found, 1,104 (12.81%) met the inclusion criteria. The main reason for excluding articles was that they did not have an evidence level of 4 or better. The main vehicle for reporting was the journal ACTAS DERMOSIFILIOGRÁFICAS, which published 326 articles (29.53%). Melanoma, the disease the researchers studied most often, accounted for 134 articles (12.13%).

Limitations: A limitation to bear in mind when interpreting the results is that we relied on the corresponding author's affiliation to identify articles reflecting research from a Spanish dermatology center. Thus, studies in which dermatologists participated would not be recognized if they were directed by other specialists.

Conclusion: Only a small portion of articles published from Spanish dermatology centers can be considered clinical research, mainly because many publications provide a low level of scientific evidence. Most publications are case reports.

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PALABRAS CLAVE

Bibliometría;
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Investigación clínica;
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española;
Evidencia científica

Investigación clínica en dermatología y venereología de centros e instituciones españolas, 2005-2014. Resultados del estudio MaINDH

Resumen

Antecedentes y objetivo: Los artículos de investigación clínica publicados en revistas científicas y los indicadores bibliométricos que de ellos derivan son un método útil para medir la cantidad y la calidad de la investigación clínica realizada. El objetivo de este estudio es conocer la cantidad, calidad y temática de la producción científica de centros e instituciones de dermatología españoles.

Material y método: Estudio bibliométrico de los artículos de investigación clínica con fecha definitiva de publicación entre el año 2005 al 2014, ambos inclusive, en las bases de datos Medline o Embase, en cuya dirección de autor de correspondencia figure un centro o institución de dermatología española y que cumplan los criterios de investigación clínica en dermatología.

Resultados: De los 8.617 artículos encontrados, 1.104 (12,81%) cumplieron los criterios de inclusión. El principal criterio de exclusión —67,37% de los artículos— fue tener un nivel de evidencia científico mayor de 4. La revista en la que se publicaron más artículos fue *ACTAS DERMOSIFILIOGRÁFICAS* con 326 artículos (29,53%). La enfermedad con un mayor número de artículos fue el melanoma, con 134 artículos (12,13%).

Limitaciones: El criterio para atribuir una publicación científica a una institución dermatológica española en función de la dirección del autor de la correspondencia hace que estudios en los que participan dermatólogos que trabajan en estudios dirigidos por instituciones no dermatológicas no sean incluidos.

Conclusiones: Solo una pequeña proporción de los artículos que publican las instituciones de dermatología españolas pueden ser considerados investigación clínica. El principal motivo es el bajo nivel de evidencia científica. La mayoría de las publicaciones son reportes de casos clínicos.

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Introduction

Scientific research and the institutions that carry it out are an important component of the global economy and knowledge-based society. Clinical research articles published in scientific journals and bibliometric indicators derived therefrom are a useful method for measuring the quantity and quality of clinical research. An increasing number of bibliometric studies make use of data from biomedical databases. This approach can provide information on the number of articles, impact factor, and number of bibliographic citations. However, current indexing methods do not allow automated assessment of some of the most important aspects of research articles, namely, the type of research (basic or clinical) and the level of scientific evidence of the publications.

Several bibliometric studies have investigated the field of Spanish dermatology. For example, Belinchon et al.¹ performed a bibliometric study of scientific output of Spanish centers and institutions in international journals. Miralles et al.²⁻⁴ performed a detailed study, published in 3 parts, of scientific output in *Actas Dermatosifiliográficas*, while Alexandre Benavent et al.^{5,6} analyzed scientific output of several Spanish dermatology journals. More recently, Batalla et al.⁷ and Aranegui et al.⁸ presented significant results concerning scientific output, funding, and levels of scientific evidence of Spanish dermatology centers in comparison with centers in other countries in 2008.

To date, no study has analyzed scientific output in terms of type of investigation, research topic, and level of

evidence of clinical research performed over a period of more than 1 year.

The objectives of this study were to: 1) describe the number of clinical research articles with respect to the total scientific output of Spanish dermatology and venereology centers and institutions between 2005 and 2014 inclusive; 2) identify the most frequent clinical research topics and those with greatest cumulative scientific impact; and 3) determine the level of scientific evidence of published clinical research articles.

Material and Methods**Design**

Bibliometric study of clinical research articles published between 2005 and 2014, inclusive.

Inclusion and Exclusion Criteria for Publications

The inclusion criteria were as follows:

- 1) Articles indexed in Medline or Embase in which the affiliation (field for correspondence) indicates the author belongs to a Spanish dermatology and venereology institution or center. The affiliations of other authors were not considered as this information is not available in a consistent fashion in the databases analyzed and for all journals over the study period.

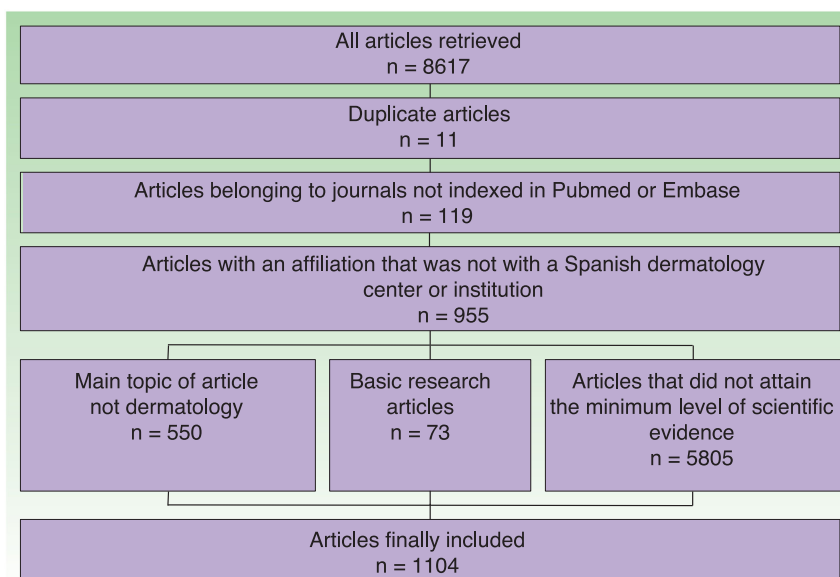


Figure 1 Schematic of flow of articles included in and excluded from the study.

- 2) Articles with definitive publication date between 2005 and 2014, inclusive
- 3) Articles that met the following 3 criteria to be considered as clinical research.⁸ a) Studies performed in patients, individuals, health systems, or articles based on patients. This includes study of samples obtained from patients and healthy individuals, such as biopsies, dermoscopic images, laboratory measurements, etc. b) Studies answering a research question that can be posed in clinical practice, with the aim of resolving practical problems concerning patient management, including investigation of the etiology, diagnosis, prognosis, treatment, prevention, and prevalence of diseases and investigation of the economics of health systems. We included systematic reviews of these fields. c) Studies with level of evidence ≤ 4 according to the Centre for Evidence-Based Medicine (CEBM) (Oxford) classification.⁹ That is, case reports and publications based on expert opinion without explicit evaluation methodology (which would make them systematic reviews), or those based on physiology, laboratory research, or basic science were excluded.⁹

To assign the level of evidence, an investigator (AML) reviewed the title and abstract of all articles included, and if the information was not sufficient to determine the level of evidence, the full text was inspected. If doubts about the level of evidence persisted after review of the full text, the articles were reviewed by another investigator (IGD or MD), and the level of evidence was assigned according to a consensus decision of the two.

The exclusion criteria were as follows:

- 1) Principally nondermatological topics of the article
- 2) Articles without a definitive publication date (Epub ahead of print)

Variables of Interest

The main variables of interest are grouped according to whether the variables were quantitative, topical, or qualitative.

Quantitative indicators included the number of articles of clinical research/articles published; number of articles/journal and rate of annual growth, defined as (number of articles selected per year-number of articles in previous year) divided by number of articles selected in the year.

The topic objective of the research articles was assessed by absolute frequency of repetition of words referring to dermatological diseases. Three sources of information were analyzed separately: title, keywords provided by the author, and keywords.

The qualitative indicator used was level of scientific evidence corresponding to each article according to the CEBM classification.

Electronic Search

Articles were retrieved with the Scopus database. Scopus was preferred to other alternatives as the database for searches because it includes all documents indexed in Medline and Embase and because information on citations to each document can be extracted.

The date of the search was November 6, 2015. The search strategy was as follows: (AFFILCOUNTRY (spain OR espana OR spanien OR espagne OR espanha) AND AFFILORG (dermat*)) AND PUBYEAR > 2004 AND PUBYEAR < 2015

Results

Scientific Output

The search returned 8617 articles, of which 12.81% (1104 articles) met the inclusion criteria. The reasons for exclusion

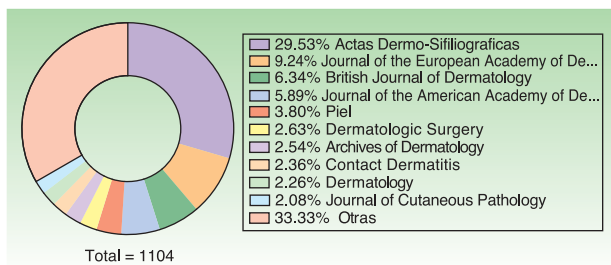


Figure 2 Ten journals with most number of publications.

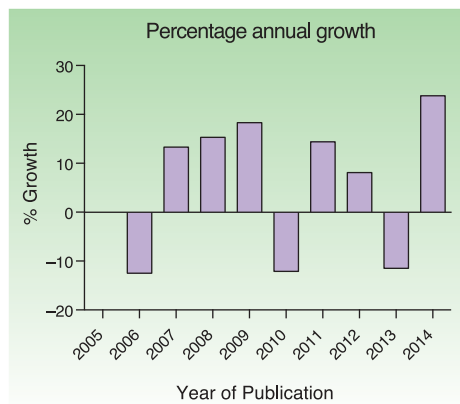


Figure 3 Percentage annual growth in the study period.

of articles are shown in Figure 1. The main reason for exclusion was not reaching minimum required level of scientific evidence according to the CEBM, 5805 articles (67.37%).

The journal with the largest number of published articles was *Actas Dermatosifiliográficas*, which accounted for 29.53% (326 articles). The 10 journals with the largest number of articles are shown in Figure 2. The annual rate of growth of scientific output is shown in Figure 3. The year with greatest growth was 2014, with a rate of 23.8%.

Research Topics

The dermatological diseases for which most articles were published were melanoma, with 134 articles (12.13%), psoriasis with 120 (10.86%), nonmelanoma skin cancer with 125 (11.32%), and eczema/dermatitis with 86 (7.79%). Table 1 shows the frequency of these terms. With respect to article topics with most number of bibliographic citations, melanoma was once again the most frequent topic (Table 1).

Level of Scientific Evidence

When the articles were classified according to the level of evidence of the CEBM, we found that 93.39% (1031 articles) had level of evidence 4, that is, they were case reports or publications based on expert opinion without an explicit assessment, or based on physiology, laboratory research, or basic science. The classification of articles is reflected in Table 2.

Discussion

Main Findings

We present a bibliometric study in terms of output, topic, and level of scientific evidence of Spanish dermatology centers or institutions across a broad period with the inclusion of all articles included in the main databases.

Scientific Output

In the study period, we see a notable overall scientific output. However, articles that meet the criteria to be considered as clinical research only represent a small percentage of the total. The main reason for exclusion of studies was failure to attain a level of scientific evidence of 4 or less according to the CEBM classification. This suggests that most of the publications are primarily reports of single isolated cases or, alternatively, publications based on expert opinion without an explicit methodology for assessment. Aranegui et al.,⁸ in a previous study of publications in 2008, showed that the level of scientific evidence of articles published by Spanish dermatologist was lower than that of other countries such as France or the United Kingdom.

The journal with the most number of articles was *Actas Dermatosifiliográficas*, the journal of the Spanish Academy of Dermatology and Venereology (abbreviated in Spanish as AEDV). This might be explained by the fact that Spanish dermatologists are more familiar with this journal and also because it is possible to publish in Spanish. Furthermore, access to this journal is free for academics and almost 97% of practicing dermatologists in Spain are affiliated to the institution.¹⁰ The time period for the study was chosen taking into account when *Actas Dermatosifiliográficas* became fully indexed on the assumption that a large number of articles by Spanish centers would be published in this journal.

With regards the rate of annual growth, we see a clear trend towards progressive growth in the number of articles published, and positive increases during several consecutive years followed by discrete percentage decreases.

Research Topics

The skin diseases with the most number of corresponding publications are in line with data from other studies with different designs.^{11,12} Skin cancers, with melanoma at the head, are the topic with most number of publications. Melanoma is a skin disease with increasing incidence in which important progress has been made in recent years with the incorporation of new molecular targets and therapeutic options.¹³ It is also one of the main causes of death in young subjects, and so has substantial media coverage.¹⁴ The above factors are probably responsible for the large number of publications on this process. The next skin disease on the list is psoriasis, which is also one of the diseases that has undergone a therapeutic revolution in recent decades and which also represents a systemic inflammatory disease with a high prevalence of multiple physical and psychological comorbidities.¹⁵ Nonmelanoma skin cancer, given its frequency and morbidity and mortality in our population,

Table 1 Most Frequent Keywords in the Articles Analyzed With Reference to Skin Diseases, Classified According to Their Presence in the Title, Keywords Assigned by the Journal, and Keywords Assigned by the Author, and Most Frequent Keywords that Make Reference to Skin Diseases of Articles With Most Number of Citations.

Most Frequent Keywords That Make Reference to Skin Diseases of Articles of Clinical Research						
Topic Group	Title	N	Journal	N	Authors	N
Skin tumors	Skin neoplasms	314	Melanoma	91	Melanoma	63
	Melanoma	134	Carcinoma	54	Squamous cell carcinoma	14
	Basal cell carcinoma	76	Baseline	36	Basal cell carcinoma	13
	Skin tumor	62	Squamous	28		
	Squamous cell carcinoma	49	nevi	20		
	Nevus	67	Actinic keratosis	16		
	Total	702	Total	245	Total	90
Psoriasis	Psoriasis	120	Psoriasis	92	Psoriasis	63
Dermatitis	Dermatitis	86	Contact	41	Allergic contact dermatitis	23
	Allergic contact	44			Contact dermatitis	13
					Atopic dermatitis	10
Total	130	Total	41	Total	46	
Most Frequent Keywords That Make Reference to Skin Diseases of Most Cited Articles						
Title	N	Journal	N	Authors	N	
Melanoma	35	Skin neoplasms	100	Melanoma	21	
Psoriasis	23	Melanoma	54	Psoriasis	14	
Dermatitis	16			Contact dermatitis	12	
Carcinoma	13					

and contact dermatitis, probably due to the support from very active working group in Spain, complete the ranking of diseases with most number of publications.

The skin diseases present in the most cited number of articles correspond to the diseases with the most number of articles published.

Level of Scientific Evidence

On analysis of the level of scientific evidence of the articles of clinical research included, it is noteworthy that most have a level of evidence of 4. This group includes case series and cross-sectional studies. These types of studies may be more numerous because of the easier design and conduct compared with other studies. However, a recent study assessed the scientific impact and quality of articles published in dermatology anywhere in the world found that countries from northern Europe such as Norway and Sweden have a lower overall number of publications but a high level of methodological quality with high scientific impact.¹⁶

Limitations

The results of this study should be considered in light of certain limitations. First, the criterion for attributing a scientific publication to a Spanish dermatology institution according to the affiliation of the corresponding author means that studies in which dermatologists who work or collaborate in studies directed by non-dermatological institutions would not be included. Therefore some national and international publications in which Spanish dermatologists have participated might not have been included. We chose

Table 2 Level of Scientific Evidence of Clinical Research Articles of Spanish Centers and Institutions Published Between 2005 and 2014 According to the Centre of Evidence Based Medicine Classification.

Level of Scientific Evidence	N	%
1a	6	0.54
1b	5	0.45
2a	2	0.18
2b	33	2.99
2c	2	0.18
3a	1	0.09
3b	24	2.17
4	1031	93.39

1a: systematic review with homogeneity of randomized clinical trials; 1b: randomized clinical trial with narrow confidence interval; 2a: systematic review with homogeneity of cohort studies; 2b: cohort studies or low quality randomized clinical trials; 2c: ecological studies; 3a: systematic review with homogeneity of case-control studies; 3b: case-control studies; 4: case series or poor quality cohort and case-control studies.

this criterion because indexing of the affiliations of authors in the bibliographic database would provide more complete information, but it is not homogeneous over time and cannot be used to establish temporal comparisons. Second, the study period analyzed ranged from 2005 to 2014, inclusive. This range was not larger because regular indexing of the main Spanish journal of dermatology and venereology, *Actas Dermatológicas*, did not begin until 2005.

Conclusions

The results of this study enable an overall and also temporal assessment of scientific output of Spanish dermatology centers and institutions. The level of scientific evidence of most of the articles was 4, corresponding to cases series and cross-sectional studies. Although case reports are of high educational value and can sometimes represent scientific novelty, the literature of greatest interest and utility for clinicians is that with a high level of evidence.¹⁷ The results of this study can serve as a point for reflection for the Spanish dermatology community and a stimulus for improving the methodological quality of the research that is performed. We should focus our efforts on high quality scientific output with a high level of evidence.

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Conflicts of Interest

The authors declare that they have no conflicts of interest.

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