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ORIGINAL ARTICLE

Scientific Output of Spanish Dermatology Departments in International Journals, 1997-2006

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Abstract. *Background.* The aim of this study was to determine the scientific output in international journals by Spanish dermatologists between 1997 and 2006 using PubMed.

Material and methods. Publications were identified with the following search query: (dermat*) and (Spain or Espagne or Espanha or Espana or Spanien), with the limit «affiliation». Articles described in PubMed as «journal articles» or «reviews» were included and those published in Spanish journals excluded.
Results. We identified 1018 articles: 492 published between 1997 and 2001, and 526 published between 2002 and 2006. The majority were case reports (705, 69.3 %), but there were also 120 reviews (11.8 %). Most of the articles were published in dermatology journals with Science Citation Index impact factors (877, 86.1 %), with the following representing the main ones: *Contact Dermatitis* (129, 12.7 %), *Journal of the European Academy of Dermatology and Venereology* (115, 11.3 %), and the *British Journal of Dermatology* (86, 8.4 %). Nine institutions accounted for more than 50 % of the articles published. Notable among them were the following: Hospital Universitario La Princesa in Madrid (78, 7.7 %), Hospital Santa Creu i Sant Pau in Barcelona (71, 7.1 %), and Hospital Clínic in Barcelona (63, 6.2 %). Seven provinces produced 80 % of the publications, with Madrid (257, 25.2 %), Barcelona (244, 24.0 %), and A Coruña (98, 9.6 %) accounting for the highest proportion. Five autonomous communities accounted for 82 % of the publications: Madrid (257, 25.2 %), Catalonia (251, 24.7 %), Galicia (116, 11.4 %), the Autonomous Community of Valencia (112, 11.0 %), and Andalusia (96, 9.4 %).
Conclusions. The scientific output in international journals has remained stable over the last decade. Authors and institutions from Barcelona and Madrid continued to be the most productive.

Key words: bibliometrics, scientific output, dermatology, Spain.

PRODUCCIÓN CIENTÍFICA DE LOS SERVICIOS DE DERMATOLOGÍA ESPAÑOLES EN REVISTAS INTERNACIONALES: 1997-2006

Resumen. *Introducción.* El objetivo del estudio es conocer la producción científica en revistas internacionales de los dermatólogos españoles en la última década (1997-2006) mediante PubMed.
Material y métodos. La estrategia para localizar los documentos ha sido: (dermat*) y (*Spain or Espagne or Espanha or Espana or Spanien*) en «*affiliation*». Hemos localizado los documentos considerados *journal article or review*. Los artículos de revistas españolas han sido excluidos.
Resultados. Hemos identificado 1.018 documentos, con 492 en la primera mitad (1997-2001) y 526 en la segunda (2002-2006). Principalmente eran casos clínicos (705; 69,3 %), pero también hubo 120 revisiones (11,8 %). La mayoría de las publicaciones se han recogido en revistas de dermatología con factor de impacto (877; 86,1 %), siendo las principales: *Contact Dermatitis* (129; 12,7 %), *Journal of European Academy of Dermatology and Venereology* (115; 11,3 %) y *British Journal of Dermatology* (86; 8,4 %). Nueve centros publicaron más del 50 % de los documentos y entre ellos destacaban: Hospital Universitario La Princesa (78; 7,7 %), Hos-

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pital Santa Creu i Sant Pau (71; 7,1%) y Hospital Clínic (63; 6,2%). Siete provincias produjeron el 80% de los documentos, con Madrid (257; 25,2%), Barcelona (244; 24,0%) y A Coruña (98; 9,6%) a la cabeza. El 82% de los documentos partió de cinco comunidades autónomas: Madrid (257; 25,2%), Cataluña (251; 24,7%), Galicia (116; 11,4%), Comunidad Valenciana (112; 11,0%) y Andalucía (96; 9,4%).
Conclusiones. La evolución de la producción científica en revistas internacionales se mantiene estable a lo largo de esta última década. Además los autores y centros de Barcelona y Madrid mantienen el liderazgo.

Palabras clave: bibliometría, producción científica, dermatología, España.

Introduction

In recent years, bibliometric indicators have been applied to the evaluation of science as objective indicators of research results, making it possible to overcome the limitations inherent to the traditional evaluation method used by scientists themselves. In order to carry out these bibliometric studies, bibliographic databases are used as the main source of information.

Studies on the output of Spanish dermatology researchers began in 1994 and were published in the journal *Actas Dermo-Sifiliográficas* in the section Spanish Dermatology Outside Spain, analyzing citations to articles by Spanish authors in a selection of international dermatology journals. A marked increase in the number of international publications was observed, and this motivated various bibliometric studies at a national and international level on the scientific output of Spanish dermatology departments. Our working group studied the international output of Spanish dermatologists between 1987 and 2000, finding a general increase in the number of publications in international journals.[1-5]

Since that time, the scientific dermatologic community in Spain has continued to assume that output is still increasing. Thus, our aim was to study the scientific output of Spanish dermatologists published in international journals during the last decade. We analyzed the characteristics of articles published by dermatologists based in Spanish dermatology departments in international journals and included in the PubMed database between 1997 and 2006.

Material and Methods

The MEDLINE database was chosen for the study and accessed using PubMed. Publications from dermatology departments were identified by selecting the term "dermat*" in the affiliation field. The category "dermat*" included all words with this root, such as *dermatología*, dermatology, dermatopathology, etc. National publications were identified by including the word "Spain" and the variations "Espana," "España," "Espagne," "Spagna," "Spanien," or "Espanna" in the affiliation field. The search was restricted to 1997-2006. Articles described in the PubMed database as journal articles or reviews were included, whereas editorials and letters were excluded. Articles published in Spanish journals were also excluded as well as those whose lead author was not a member of a Spanish dermatology department. A total of 1333 articles were retrieved from which the following were excluded: 238 articles published in *Actas Dermo-Sifiliográficas*, 35 published in other Spanish journals with an impact factor, 34 articles in Spanish journals without an impact factor, and 8 articles published in international journals by departments other than dermatology.

The analysis included the following variables: number of articles, distribution by year, type of article, subject, number of authors, number of articles per journal, the departments with the greatest output, and geographical area. The PubMed classification of publication types was used to identify the articles as case reports or reviews; a review could also be a case report. The articles were classified by subject area based on the indexes of the main dermatology textbooks.[1-3] PubMed was searched using Reference Manager 8.5 software (Thomson Scientific, New York, New York, USA). Subsequently, the data were imported into an Excel database (Microsoft, Redmond, Washington, USA). Statistical analysis was performed with SPSS version 12.0 software (SPSS, Chicago, Illinois, USA). The χ^2 test for trend was used to assess how the publication of articles had evolved over time, using a P value of <.05 as a cutoff for statistical significance.

Results

A total of 1018 articles by authors affiliated to Spanish dermatology departments were identified in international journals for the period 1997-2006. The number of articles published did not increase significantly during this period, since 492 articles were identified in the first 5-year period

(1997-2001) and 526 in the second (2002-2006). The annual distribution is shown in the Figure. Although case reports formed the majority of articles (705, 69.3%), there were also 120 case reviews and general reviews (11.8%). The number of case reports published decreased during the period studied (χ^2 for trend, 17.6; P<.001).

Table 1 presents the subjects covered by the articles and shows that the main ones were therapy (191, 18.8%) and oncology (146, 14.3%). There was a significant increase during the second period in the percentage of articles on dermatoscopy (P<.001), oncology (P=.001), and pharmacotherapy (P=.02) and a decrease in dermatopathology (P=.005) and research (P=.03).

Most of the articles were published in dermatology journals with an impact factor (877, 86.12%); the others were published in journals that had an impact factor but were not included in the dermatology section (88; 8.6%), in international dermatology journals without an impact factor (47, 4.6%), and in non-dermatology journals without an impact factor (6, 0.6%). A total of 1018 articles were

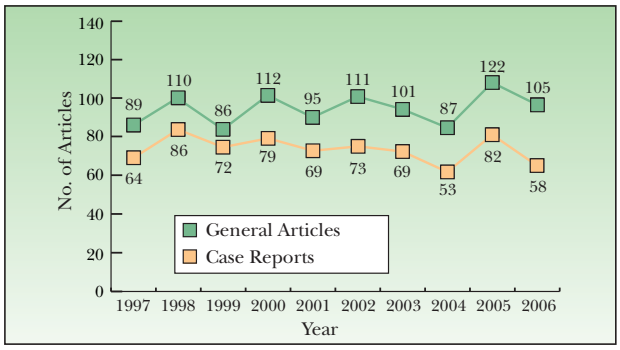

Figure. Annual distribution of the number of general articles and case reports.

Table 1. Articles Retrieved by Subject

	Total		*1997-2001*		*2002-2006*		*Difference*[a]
	No. of Articles	*%*	*No. of Articles*	*%*	*No. of Articles*	*%*	
Treatment	191	18.8	82	20.7	109	16.7	–4.0
Adverse reactions other than contact dermatitis	69	6.8	32	6.5	37	7	0.5
Laser phototherapy, photosensitivity	50	4.9	27	5.5	23	4.4	–1.1
Systemic and topical pharmacotherapy[b]	45	4.4	14	2.8	31	5.9	3.1
Surgery, cryotherapy, and other (sclerosis, etc)	20	2.0	7	1.4	13	2.5	1.1
Radiation therapy, radiation-induced dermatitis	4	0.4	2	0.4	2	0.4	0.0
Biologic therapy	2	0.2	0	0	2	0.4	0.4
Cosmetic	1	0.1	0	0	1	1	1.0
Oncology, hematology[c]	146	14.3	52	10.6	94	17.9	7.3
Contact dermatitis	131	12.9	58	11.8	73	13.9	2.1
Dermatopathology[d]	112	11.0	68	13.8	44	8.4	–5.4
Infections	110	10.8	61	12.4	49	9.3	–3.1
Pediatrics	108	10.6	57	11.6	51	9.7	–1.9
Autoimmune diseases	54	5.3	31	6.3	23	4.4	–1.9
Pathophysiology, research[e]	40	3.9	26	5.3	14	2.7	–2.6
Trichology	20	2.0	10	2	10	1.9	–0.1
Dermatoscopy[f]	19	1.9	0	0	19	3.6	3.6
Other	87	8.5	47	9.6	40	7.6	–2.0
Total	1018	100.0	492	100	526	100	

[a]Difference: percentage of articles from 2002–2006 minus percentage of articles from 1997-2001. [b]P=.02. [c]P=.001. [d]P=.005. [e]P=.03. [f]P<.001.

Table 2. Journals in Which the Articles Were Published

Journals	No. of Articles	%	Cumulative %
Contact Dermatitis	129	12.7	12.7
J Eur Acad Dermatol Venereol	115	11.3	24.0
Br J Dermatol	86	8.4	32.4
J Am Acad Dermatol	68	6.7	39.1
Pediatr Dermatol	63	6.2	45.3
Int J Dermatol	54	5.3	50.6
Dermatol Surg	48	4.7	55.3
Clin Exp Dermatol	47	4.6	59.9
Dermatology	45	4.4	64.3
Eur J Dermatol	42	4.1	68.5
J Cutan Pathol	38	3.7	72.2
Skin	28	2.8	75.0
Am J Dermatopathol	27	2.7	77.6
Arch Dermatol	25	2.5	80.1
Am J Contact Dermat/ Dermatitis	16	46	81.7
Acta Derm Venereol	15	1.5	83.2
J Dermatolog Treat	9	0.9	84.0
J Dermatol	7	0.7	84.7
Dermatol Online J	6	0.6	85.3
Lasers Surg Med	6	0.6	85.9
Melanoma Res	6	0.6	86.4
Int J STD AIDS	5	0.5	86.9
J Drugs Dermatol	5	0.5	87.4
J Invest Dermatol	5	0.5	87.9
Allergy	4	0.4	88.3
Clin Dermatol	4	0.4	88.7
Exp Dermatol	4	0.4	89.1
Lupus	4	0.4	89.5
Photodermatol Photoimmunol Photomed	4	0.4	89.9
4 journals with 3 articles	12	1.2	91.1
15 journals with 2 articles	30	2.9	94
61 journals with 1 articles	61	6.0	100

identified in 111 journals. The main ones were *Contact Dermatitis* (129, 12.7%) and the *Journal of the European Academy of Dermatology and Venereology* (115, 11.3%) (Table 2). Table 3 shows the annual distribution of the number of articles in the main journals. During the period studied there was an increase in the number of articles in the *Journal of the European Academy of Dermatology and Venereology* ($P<.001$) and *Dermatological Surgery* ($P=.002$), and a decrease in *Dermatology* ($P<.001$), the *British Journal of Dermatology* ($P=.02$), the *Journal of the American Academy of Dermatology* ($P=.01$), and *Pediatric Dermatology* ($P=.01$).

The 1018 articles were produced by 102 centers. The main centers were Hospital Universitario La Princesa (78, 7.7%) and Hospital Santa Creu i Sant Pau (71, 7.0%). Five centers accounted for 25% of the articles published, and around 50% came from a total of 11 centers (Table 4).

The autonomous communities of Madrid (257, 25%) and Catalonia (251, 24.7%) produced half the articles, and another 30% were produced by Galicia (116, 11.4%), the Region of Valencia (112, 11.0%), and Andalusia (96, 9.4%). When scientific output was adjusted for population, Navarre, Madrid, Galicia, Catalonia, and the Region of Valencia were found to be above the national average (Table 5). Madrid and Barcelona produced 49% of the articles, followed by A Coruña, Valencia, Seville, Navarre, Alicante, and Asturias, which together contributed 23% of the output (Table 6). The provinces of A Coruña, Navarre, Soria, Barcelona, Valladolid, Madrid, Valencia, Alava, and Seville produced more articles than the national average when adjusted for population size.

Discussion

The results show that the scientific output in international journals remained stable from 1997 to 2006, without a significant increase, unlike the situation during the period 1987-2000.[1-4] The main type of article published in international journals continued to be case reports, but in terms of subject area, there was a trend toward more articles on treatment and oncology rather than the traditional leaders of dermatopathology and allergic contact dermatitis, which still continue to be published in reasonable numbers. In addition, there was a significant increase during the second period in the percentage of articles on pharmacotherapy, oncology, and dermatoscopy, a finding which is understandable when the huge advances in these areas in recent years are taken into account.

In relation to publications, the main journal continues to be *Contact Dermatitis*, but the *Journal of the European Academy of Dermatology and Venereology* has now taken second place, surpassing the *Journal of the American Academy of Dermatology*, *Dermatology*, and the *International Journal*

Table 3. Annual Distribution of the Number of Articles in the 10 Journals With the Most Articles Identified

Journals	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*	*χ^2 for Trend*	*P*
Contact Dermatitis	4	20	7	160	110	140	150	110	180	130	0.4	.5
J Eur Acad Dermatol Venereol	0	5	9	9	100	100	150	170	220	180	25.8	<.001
Br J Dermatol	10	17	7	100	3	9	6	9	8	7	5.4	.02
J Am Acad Dermatol	12	9	5	7	5	9	5	7	4	5	6.4	.01
Pediatr Dermatol	11	9	4	8	3	6	6	5	8	3	5.2	.02
Int J Dermatol	5	3	7	7	5	5	6	5	6	5	0.09	.8
Dermatol Surg	1	1	3	2	8	6	3	7	9	8	9.8	.002
Clin Exp Dermatol	5	6	4	6	3	4	4	5	5	5	0.4	.5
Dermatology	*13*	*8*	*4*	*5*	*2*	*4*	*1*	*2*	*3*	*3*	*18.4*	*<.001*
Eur J Dermatol	0	3	5	6	5	8	7	3	4	1	0.1	.9

Table 4. Centers With the Most Articles Published

Centers	*No. of Articles*	*%*	*Cumulative %*
Hospital Universitario La Princesa, Madrid	78	7.7	7.7
Hospital de la Santa Creu i Sant Pau, Barcelona	71	7.0	14.6
Hospital Clínic, Barcelona	63	6.2	20.8
Complejo Hospitalario Universitario, Santiago de Compostela	54	5.3	26.1
Fundación Jiménez Díaz, Madrid	46	4.5	30.6
Complejo Hospitalario Juan Canalejo, A Coruña	43	4.2	34.9
Hospital Universitario Virgen de la Macarena, Sevilla	42	4.1	39.0
Hospital General Universitario de Valencia, Valencia	41	4.0	43.0
Clínica Universitaria de Navarra, Navarra	36	3.5	46.6
Hospital General Universitario de Alicante, Alicante	30	2.9	49.5
Hospital Universitario 12 de Octubre, Madrid	28	2.8	52.3
Hospital del Mar, Barcelona	23	2.3	54.5
Hospital del Niño Jesús, Madrid	23	2.3	56.8
Ciutat Sanitaria i Universitaria de Bellvitge, Barcelona	22	2.2	58.9
Hospital Universitari Germans Trias i Pujol, Badalona	21	2.1	61.0
Hospital Universitario Central de Asturias, Oviedo	19	1.9	62.9
Hospital Universitario Gregorio Marañón, Madrid	18	1.8	64.6
Instituto Valenciano de Oncología, Valencia	18	1.8	66.4
Hospital Universitario de Valladolid, Valladolid	18	1.8	68.2
Complejo Hospitalario de Pontevedra, Pontevedra	17	1.7	69.8
Hospital Clínico de Valencia, Valencia	16	1.6	71.4
Hospital Clínico San Carlos, Madrid	13	1.3	72.7
Instituto Nacional de Medicina y Seguridad en el Trabajo, Madrid	13	1.3	74.0
Hospital Ramón y Cajal, Madrid	13	1.3	75.2
Hospital Universitario de Cruces, Bilbao	12	1.2	76.4
Hospital Universitario Reina Sofía, Córdoba	12	1.2	77.6
Hospital Universitario La Paz, Madrid	11	1.1	78.7
Hospital Universitario de Canarias, Tenerife	10	1.0	79.7
Hospital Santiago Apóstol, Vitoria	10	1.0	80.6

Table 5. Absolute Scientific Output and Output Number of Inhabitants by Region[a]

	No. of Articles	*%*	*Articles/100 000 Inhabitants*
Total	1018		2.38
Andalusia	96	9.4	1.26
Aragon	9	0.9	0.73
Asturias (Principality)	24	2.4	2.23
Balearic Isles	1	0.1	0.11
Canary Isles	23	2.3	1.21
Cantabria	5	0.5	0.91
Castile - La Mancha	4	0.4	0.22
Castile - León	45	4.4	1.81
Catalonia	251	24.7	3.74
Region of Valencia	112	11.0	2.51
Extremadura	4	0.4	0.37
Galicia	116	11.4	4.22
Madrid (Region)	257	25.2	4.66
Murcia (Region)	10	1.0	0.79
Navarre (Region)	37	3.6	6.40
Basque Country	24	2.4	1.14

[a]Population figures as registered on January 1, 2003 (Spanish National Institute of Statistics). Centers in La Rioja, Ceuta, and Melilla did not produce any articles.

of Dermatology, which occupied a higher position during the previous study.

The authors and centers located in Barcelona and Madrid maintained their lead regarding scientific output in international journals, although provinces such as A Coruña, Alicante, Asturias, and Valladolid are also achieving prominence. The main centers were Hospital Universitario La Princesa and Hospital Santa Creu i Sant Pau, taking the lead from Hospital Clínic de Barcelona, which for many years had been the indisputable leader regarding publications by Spanish dermatologists.

Conflicts of Interest

The authors declare no conflicts of interest.

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Table 6. Absolute Scientific Output and Output Adjusted for Number of Inhabitants by Province[a]

	No. of Articles	*%*	*Articles/100 000 Inhabitants*
Total	1018		2.38
A Coruña	98	9.6	8.74
Álava	10	1.0	3.40
Albacete	2	0.2	0.53
Alicante	33	3.2	2.02
Asturias	24	2.4	2.23
Ávila	2	0.2	1.21
Badajoz	4	0.4	0.60
Balearic Isles	1	0.1	0.11
Barcelona	244	24.0	4.83
Cádiz	9	0.9	0.78
Cantabria	5	0.5	0.91
Córdoba	12	1.2	1.55
Gerona	3	0.3	0.48
Granada	9	0.9	1.09
Huesca	1	0.1	0.47
Jaén	1	0.1	0.15
Las Palmas	12	1.2	1.22
León	6	0.6	1.21
Lleida	3	0.3	0.79
Madrid	257	25.2	4.49
Málaga	14	1.4	1.02
Murcia	10	1.0	0.79
Navarre	37	3.6	6.40
Ourense	1	0.1	0.29
Pontevedra	17	1.7	1.83
Salamanca	8	0.8	2.30
Seville	51	5.0	2.86
Soria	5	0.5	5.50
Tarragona	1	0.1	0.15
Tenerife	11	1.1	1.20
Toledo	2	0.2	0.36
Valencia	79	7.8	3.40
Valladolid	24	2.4	4.74
Vizcaya	14	1.4	1.24
Zaragoza	8	0.8	0.91

[a]Population figures registered on January 1, 2003 (Spanish National Institute of Statistics).

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