

Original article

Subsequent Full Publication of Abstracts Presented in the Annual Meetings of the Spanish Society of Cardiology

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ABSTRACT

Introduction and objectives: The Spanish Society of Cardiology holds an annual national meeting with a large number of presentations but the number of full-text publications resulting from these presentations and the journals accepting these manuscripts is unknown. This study aimed to identify the full-text publication rate of accepted abstracts and to analyze the bibliometric features of subsequent publications.

Methods: We randomly selected a sample of 300 oral presentations at the meetings of the Spanish Society of Cardiology in 2002, 2005 and 2008. Subsequent publications were identified through the Science Citation Index-Expanded, Scopus, *Índice Médico Español*, and *Índice Bibliográfico Español en Ciencias de la Salud*.

Results: Of 300 abstracts, 115 resulted in 147 full publications, representing a publication rate of 38.33%. The meeting with the highest publication rate (43%) was held in 2005. The subject category with the highest number of publications was Pediatric Cardiology/Congenital Heart Disease (58.8%). Time to full publication was usually 2 years (30.61%). Articles were published in 57 journals. The journals publishing the highest number of articles were *Revista Española de Cardiología* (n=55; 37.41%) and the European Heart Journal (n=8; 5.44%).

Conclusions: The high percentage of articles published in the upper half of journals listed in Journal Citation Reports under the category of cardiac and cardiovascular system (83%) can be taken as an objective quality indicator of the results presented at these meetings. However, more than 60% of the abstracts did not result in full publications, thus depriving the scientific community of potentially interesting results.

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Publicaciones derivadas de las comunicaciones a los congresos anuales de la Sociedad Española de Cardiología

RESUMEN

Introducción y objetivos: La Sociedad Española de Cardiología celebra anualmente un congreso nacional en el que se presentan numerosas comunicaciones. Sin embargo, se desconoce si posteriormente se publican como artículos y en qué revistas. Nuestro objetivo es identificar el grado de publicación de estas comunicaciones y analizar sus características bibliométricas.

Métodos: Se seleccionó aleatoriamente una muestra de 300 comunicaciones presentadas de forma oral durante los congresos de 2002, 2005 y 2008. La identificación de los trabajos publicados se realizó mediante búsqueda en las bases de datos Science Citation Index Expanded, Scopus, *Índice Médico Español* e *Índice Bibliográfico Español en Ciencias de la Salud*.

Resultados: De las 300 comunicaciones, 115 derivaron en 147 artículos publicados (el 38,33% de publicación). El congreso que obtuvo un mayor índice de publicaciones fue el de 2005 (43%). El mayor número correspondió al área de cardiología pediátrica/cardiopatías congénitas (58,8%). El mayor

Palabras clave:

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porcentaje de trabajos se publicó a los 2 años de la celebración del congreso (30,61%). Los artículos se han publicado en 57 revistas, de las que han publicado el mayor número de artículos REVISTA ESPAÑOLA DE CARDIOLOGÍA (n = 55; 37,41%) y *European Heart Journal* (n = 8; 5,44%).

Conclusiones: El alto porcentaje de artículos publicados en revistas de la mitad superior de la categoría *Cardiac and Cardiovascular System del Journal Citation Reports* (83%) se puede considerar un indicador objetivo de la calidad de las comunicaciones presentadas en estos congresos. Que más de un 60% de las comunicaciones no se publique priva a la comunidad científica de unos resultados potencialmente interesantes.

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Abbreviations

IF: impact factor

INTRODUCTION

Biomedical results are often initially presented at scientific meetings. However, these results are not always published as full-text articles in scientific journals, hampering access to these data among researchers. Although some organizations publish conference proceedings in a book or journal supplement, these publications usually contain only the abstracts of presentations and not full reports. Consequently, some researchers aim to publish a fuller version of work presented at meetings in scientific journals, thus achieving maximum diffusion of their results. This process has come to be known as *subsequent publication* or *full-text publication*.¹⁻³ Subsequent publication of results presented at the meetings of scientific societies or organizations has been studied in several scientific disciplines, including scientific documentation,⁴ pharmacy,⁵ marine biology,⁶ and several medical specialties such as radiology,⁷ traumatology and orthopedics,⁸ urology,⁹ drug dependence,¹⁰ pediatrics,¹¹ and nephrology.¹² In the field of cardiovascular research, 2 studies have been published: one on subsequent publication after the meetings of the Cardiac Society of Australia and New Zealand between 1999 and 2005 and another on the meeting of the International Stroke Conference in 2000.

Since 1987, the Spanish Society of Cardiology (SEC) has held a widely-attended annual meeting (approximately 4000 attendees) with a large number of presentations, both oral and in other formats; in the last few years, the number of these presentations has exceeded 1000. Given the relationship between the scientific impact of a meeting and its quality, it would be interesting for both the SEC and for the specialty of cardiology as a whole to identify subsequent full-text publications and their bibliometric characteristics, as well as the possible factors determining publication and nonpublication. The aim of this study was to follow up a sample of abstracts selected from 3 nonconsecutive meetings of the SEC and to analyze some of the bibliometric characteristics of subsequent full-text articles.

METHODS

Selection of Meetings and Presentations

To observe the pattern of the distinct variables to be analyzed, subsequent publications was analyzed in a sample of abstracts accepted for meetings of the SEC held in 3 nonconsecutive years (2002, 2005, and 2008). Of 1028 abstracts submitted in 2002, 600 were accepted for presentation (233 of these as oral presentations); of 1246 abstracts submitted in 2005, 719 were accepted (282 as oral presentations); of the 1.276 sent in 2008,

827 were accepted (394 as oral presentations). The abstracts accepted for oral presentation were those receiving the highest scores from the evaluating scientific committee. Of a total of 909 oral presentations, we randomly selected a sample of one-third of their corresponding abstracts (300 in total). Random selection was stratified for each meeting (100 presentations each) and for each subject area, so that one-third of the presentations in each subject area were selected: ischemic heart disease (n=60), heart failure, transplantation, and cardiomyopathy (n=59), interventional cardiology (n=51), heart rhythm (n=43), cardiac imaging (n=38), risk factors (n=32) and pediatric cardiology/congenital heart disease (n=17).

The 3 meetings were chosen for 2 reasons: first, the need to leave a sufficient period after the meeting for termination of research and publication of its results, and second, to leave sufficient time to allow comparative analyses.

The information allowing identification of the selected presentations was provided by the SEC and was introduced into an Access database for subsequent use. This information consisted of the following: the names of the authors of the presentation, title, subject area, the authors' institutional affiliations, and the year of the meeting.

Information Sources. Bibliographic Databases

Full-text publications were identified in both national and international databases. The international databases were Science Citation Index-Expanded (SCI-E),¹⁵ included in Thomson Reuters' Web of Science, and Elsevier's Sciverse Scopus¹⁶ (which includes all the journals indexed in Medline). The Spanish databases used were *Índice Médico Español*¹⁷ and *Índice Bibliográfico Español en Ciencias de la Salud*.¹⁸

Document Retrieval Strategy

Reports were retrieved using a method similar to that used by other authors,^{7,10,19,20} and taking into account the methodological implications of a meta-analysis by Scherer et al.,³ who tried to guarantee the accuracy of the data by using the following multiple search terms: name of the first author and coauthors, their institutional affiliations, and keywords of the title of the presentation, including synonyms and acronyms. Articles with only partial concordance between the abstract and the full-text publication were subsequently revised by a cardiologist who decided their suitability for inclusion or exclusion.

Analysis of Bibliometric Indicators

On the basis of the information gathered, we identified the publication rate of each meeting and subject area, the national and international journals accepting the articles for publication, the number of citations received by these articles, and the impact factor (IF) of the journal. The search was performed in December 2012.

Table 1
Full-text Publication by Subject Category and Year of Meeting

Subject area	2002			2005			2008			Total Abs.	Total FTP	% FTP/Abs.
	No. Abs.	No. FTP	% FTP/Abs.	No. Abs.	No. FTP	% FTP/Abs.	No. Abs.	No. FTP	% FTP/Abs.			
Pediatric cardiology/ Congenital heart disease	2	–	0	13	10	76.92	2	–	0	17	10	58.82
Ischemic heart disease	24	14	58.33	20	11	55.00	16	5	31.25	60	30	50.00
Risk factors	8	2	25.00	16	9	56.25	8	6	75.00	32	17	53.13
Cardiac imaging	10	8	80.00	15	6	40.00	13	4	30.77	38	18	47.37
Heart failure, transplantation, and cardiomyopathy	19	8	42.11	20	12	60.00	20	5	25.00	59	25	42.37
Interventional cardiology	16	5	31.25	10	5	50.00	25	13	52.00	51	23	45.10
Heart rhythm	21	8	38.10	6	6	100.00	16	10	62.50	43	24	55.81
Total	100	45	45.00	100	59	59.00	100	43	43.00	300	147	49.00

No. Abs., number of abstracts analyzed; No. FTP, number of full-text publications subsequent to meetings; % FTP/Abs., percentage of full-text publications by number of abstracts; Total Abs., total number of abstracts analyzed; Total FTP, total number of full-text publications.

RESULTS

Of the 300 abstracts analyzed, 115 resulted in 147 full-text articles, representing a subsequent publication rate of 38.33%. The overall percentage of abstracts resulting in subsequent publications was 49%. The meeting with the highest publication rate was that held in 2005 (59%), followed by 2002 (45%) and 2008 (43%). Analysis of subsequent publication by subject area of the SEC revealed that the highest number of full-text articles corresponded to interventional cardiology (58.8%), followed by heart rhythm (55.81%), risk factors (53.13%) and ischemic heart disease (50%) (Table 1). Of the 115 abstracts converting to full-text publications, 88 (76.52%) resulted in 2 articles, 23 in 2 articles (20%), 3 in 3 articles (2.6%), and only 1 converted to 4 articles (0.84%).

Time to publication was 2 years in 30.61% (45 articles), followed by 1 year in 28.53% (42 articles), and less than 1 year in 14.97% (23 articles) (Fig. 1).

The articles were published in 57 journals, of which 9 were Spanish journals and 48 were international journals (Table 2). The journals publishing the largest number of reports were *Revista*

Española de Cardiología (n=55; 37.41%), the *European Heart Journal* (n=8; 5.44%) and the *Journal of Cardiovascular Electrophysiology* (n=5; 3.40%). Of these 57 journals, 17 published more than 1 article and, obviously, most were journals publishing cardiovascular research (47 journals), while the remaining 10 journals published articles on emergency medicine, diabetes, infectious diseases and clinical microbiology, nursing, and general and internal medicine, among other specialties.

The total number of citations received in Science Citation Index-Expanded was 1872, representing a mean citation rate of 12.73 per article. This number increased 14.4 when we excluded the 17 articles published in journals not included in the Web of Science: *Clínica e Investigación en Arteriosclerosis* (n=2), *Current Cardiology Reviews* (n=1), *Enfermería Clínica* (n=2), *Expert Review of Cardiovascular Therapy* (n=1), *Investigación Cardiovascular* (n=3), *Mapfre Medicina* (n=1), *Revista de Medicina de la Universidad de Navarra* (n=1), and *SEMERGEN* (n=1).

The journal receiving the highest number of citations was *Revista Española de Cardiología* (n=272), followed by the *Journal of*

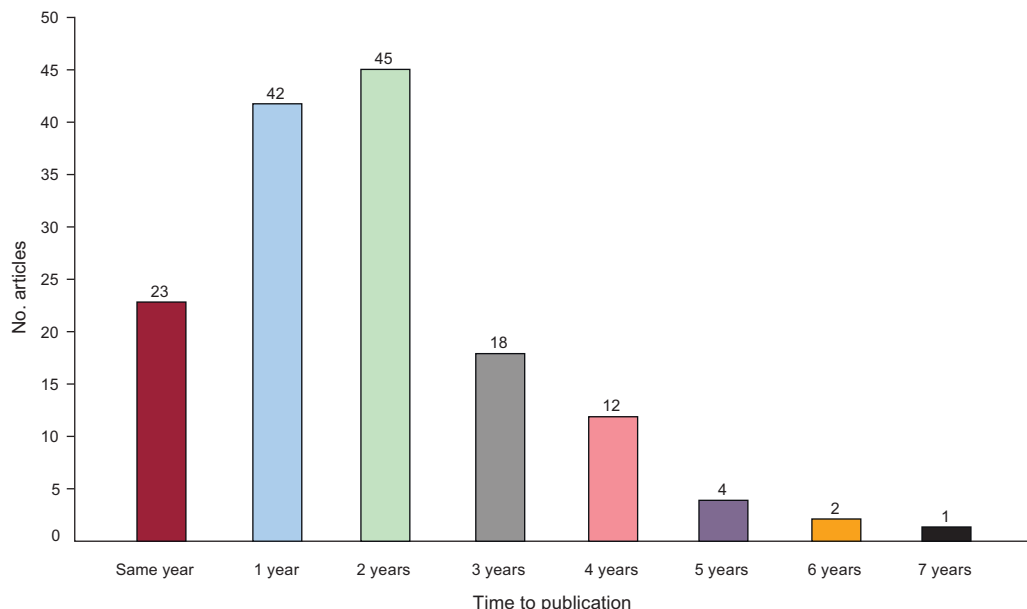


Figure 1. Time between presentation of results at meetings and year of publication in full.

Table 2
Journals Publishing Full-text Reports of Abstracts Presented at Meetings. Citations Received and Number of Citations per Article

Journal	2002			2005			2008			Total FTP	Total Cit	Total Cit/FTP	Mean IF	Quartile	Ranking in subject category
	No. FTP	No. Cit	Cit/FTP	No. FTP	No. Cit	Cit/FTP	No. FTP	No. Cit	Cit/FTP						
<i>Revista Española de Cardiología</i>	19	78	4.11	21	127	6.05	15	67	4.47	55	272	4.95	2.017	2	48 (117)
<i>European Heart Journal</i>	1	4	4	4	151	37.75	3	49	16.33	8	204	25.5	7.961	1	3 (117)
<i>Journal of Cardiovascular Electrophysiology</i>	1	36	36	2	27	13.5	2	2	1	5	65	13	3.106	2	39 (117)
<i>American Journal of Cardiology</i>	2	16	8	2	36	18	--	--	--	4	52	13	3.412	2	33 (117)
<i>International Journal of Cardiology</i>	2	24	12	2	4	2	--	--	--	4	28	7	3.896	1	7 (117)
<i>Journal of the American College of Cardiology</i>	1	15	15	1	58	58	2	140	70	4	213	53.25	10.113	1	2 (117)
<i>Circulation</i>	2	79	39.5	1	85	85	--	--	--	3	164	54.67	11.786	1	1 (117)
<i>European Journal of Echocardiography</i>	1	--	--	2	6	3	--	--	--	3	6	2	1.917	2	53 (117)
<i>Heart</i>	1	42	42	1	17	17	1	13	13	3	72	24	4.266	1	21 (117)
<i>Heart Rhythm</i>	--	--	--	--	--	--	3	30	10	3	30	10	4.559	1	24 (117)
<i>Investigación Cardiovascular</i>	3	--	--	--	--	--	--	--	--	3	--	--	--	--	NO JCR
<i>American Journal of Hypertension</i>	--	--	--	1	44	44	1	6	6	2	50	25	3.119	2	17 (67)
<i>Cardiovascular Research</i>	--	--	--	1	27	27	1	14	14	2	41	20.5	5.814	1	13 (117)
<i>Clínica e Investigación en Arteriosclerosis</i>	--	--	--	1	--	--	1	--	--	2	--	--	--	--	NO JCR
<i>Enfermería Clínica</i>	--	--	--	1	--	--	1	--	--	2	--	--	--	--	NO JCR
<i>Europace</i>	--	--	--	2	7	3.5	--	--	--	2	7	3.5	1.609	3	62 (117)
<i>Journal of Interventional Cardiac Electrophysiology</i>	--	--	--	2	20	10	--	--	--	2	20	10	1.168	4	89 (117)

Cit, citations; FTP, full-text publications; IF, impact factor; JCR, Journal Citation Reports.

The subject category Cardiac & Cardiovascular System includes 117 journals in Journal Citation Reports (2011). Subject category Peripheral Vascular Diseases includes 67 journals in Journal Citation Reports (2011).

the *American College of Cardiology* (n=213), the *European Heart Journal* (n=204) and the *Lancet* (n=172) (Table 2). When the number of citations per article was taken into account, the highest number of citations was received by the *Lancet*, which published a single article that received 172 citations, followed by *FEBS Letters*, which published a single article with 127 citations. Other notable journals were *Circulation* with 54.67 citations per article and the *Journal of the American College of Cardiology*, with 53.25. The journal with the highest mean IF was the *Lancet* (IF=21.713), a journal in the first quartile of the subject category of general and internal medicine, followed by *Circulation* (IF=11.786), which is ranked highest in the subject category of cardiac and cardiovascular

systems and the *Journal of the American College of Cardiology* (IF=10.113).

Figure 2 shows the number of full-text publications resulting from each meeting and the citations received by these articles and shows the predominance of the meeting held in 2005, with 59 subsequent publications, which received 850 citations. Most of the journals publishing these reports were ranked in the first quartile of journals in the same subject category in Journal Citation Reports (23 journals, 40.35%); these journals published 43 articles (29.25% of the articles) (Fig. 3). A further 15 journals (26.32%) were ranked in the second quartile and published 79 articles (53.74%). In this second quartile, a notable finding was that *Revista Española de*

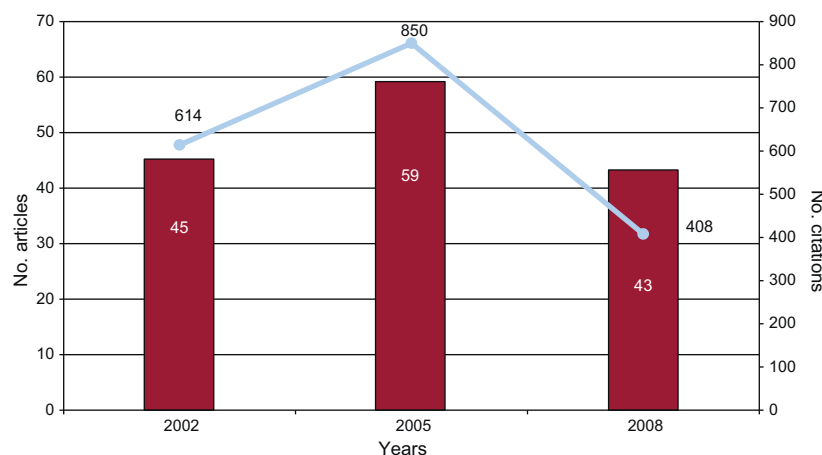


Figure 2. Full-text articles and the citations received by these articles by year of meeting.

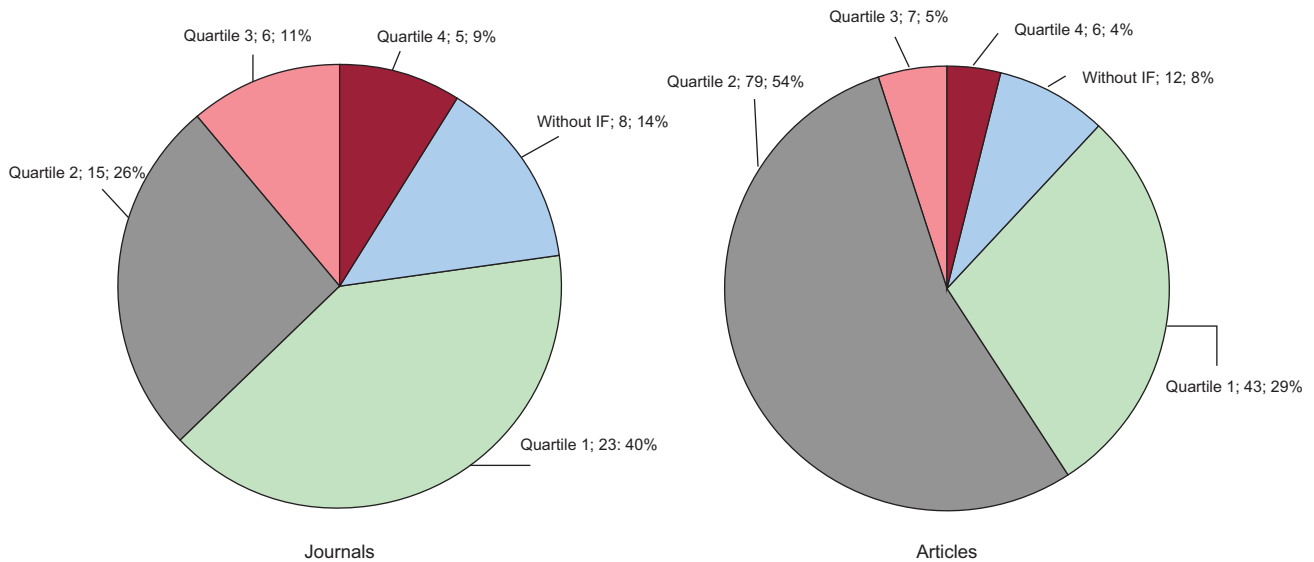


Figure 3. Distribution of journals publishing full-text articles and distribution of articles by Journal Citation Reports quartiles. IF, impact factor.

Cardiología published 55 articles. Lastly, the 6 journals in the third quartile published 7 articles (4.76%) and 5 journals in the fourth quartile published 6 articles (4.08%). Eight journals with no IF published 12 articles (8.16%). The distribution of the journals and of the articles in the quartiles of Journal Citation Reports are illustrated in the 2 diagrams in Figure 3. The largest percentage of articles was grouped in journals in the second quartile, because of the high number of articles published by *Revista Española de Cardiología*.

Fourteen articles received more than 30 citations in Science Citation Index-Expanded. The journals publishing these hot papers were highly varied and—except for *Circulation*, which published 3 reports, and the *European Heart Journal*, which published 2 articles—the remaining journals published only 1 report. These journals were the *American Journal of Cardiology*, the *American Journal of Hypertension*, *Cytokine*, *FEBS Letters*, *Heart*, the *Journal of Cardiovascular Electrophysiology*, the *Journal of Pharmacology and Experimental Therapeutics*, the *Journal of the American College of Cardiology*, and the *Lancet*.

DISCUSSION

Scientists frequently attend meetings for several reasons. On the one hand, meetings are an ideal forum to learn about new research tendencies and discuss ongoing research. On the other hand, meetings allow attendees to meet fellow professionals and to create or broaden their professional networks, thus increasing their prestige and reputation.^{1–3} The annual meetings of the SEC allow attendees to exchange ideas and present results of importance in their field. Although abstracts submitted to the meetings of the SEC are reviewed by experts who select those of the highest quality, the only way to ultimately validate these results continues to be their publication in peer-reviewed journals indexed in the international bibliographic databases, because this process involves more rigorous evaluation of a study's design, methods, and conclusions.

The overall percentage of abstracts accepted by meetings of the SEC that were subsequently published in full was 38%. This percentage is higher than that reported by Chand et al.¹³ for the meetings of the Cardiac Society of Australia and New Zealand (1995–2005), which was 28%. However, this percentage was lower than that reported by Sanossian et al.¹⁴ for the International Stroke

Conference of 2000 of the American Stroke Association (62.3%), and by Goldman and Loscalzo²¹ for the American College of Cardiology Scientific Sessions; however, the latter study was published in 1980 and publication patterns may have changed considerably in the more than 30 years that have passed since then. Other biomedical specialties show widely diverging publication rates. For example, the publication rate was 37.7% in urology²² but was 51%, 62%, and 75% in pediatrics, emergency medicine, and gynecology, respectively.^{23–25} The publication rates of radiology meetings^{26–28} ranged from 9% to 37%. In some pharmacology meetings⁵ the publication rate was between 11% and 33%. In drug dependence,¹⁰ the publication rate of results presented at the meeting of the College on Problems of Drug Dependence in 1999 was 36.9%. In nonbiomedical subject categories, we identified widely differing publication rates, ranging from 13% for presentations at the Ninth ACRL Conference (Association of College Research Libraries),⁴ to 36.7% for results presented at meetings of the International Society for Scientometrics and Informetrics.²⁰

The results obtained in the present study are in agreement with those of a meta-analysis published in 2003, which was based on 64 studies and concluded that one-third of the abstracts submitted to biomedical meetings were subsequently published in full.² Moreover, this meta-analysis revealed that oral presentations were associated with a higher subsequent publication rate, suggesting that, in some meetings, only the highest quality abstracts are accepted as oral presentations. However, no contrasting evidence was available to support this possibility.²

The journal publishing the largest number of full reports of results presented at the meeting of the SEC was *Revista Española de Cardiología*, but publication in international journals with IF was common. This finding is unsurprising, given that *Revista Española de Cardiología* is the official journal of the SEC and, moreover, enjoys international prestige, as demonstrated by its inclusion in the main bibliographic databases, including Science Citation Index-Expanded, and that its IF places it in the top half of the world ranking for its subject category and it is second of all Spanish journals—irrespective of subject category—in the Journal Citation Reports-Science Edition (IF=3.204 in 2012). Despite biases, criticisms and controversies, IF continues to be one of the indicators most widely used to evaluate journal quality.^{29,30} Consequently, the high percentage of articles published in journals ranked in the top half of the cardiac and cardiovascular system subject category of Journal Citation Reports (up to 83%) can be

taken as an objective indicator of the quality of presentations at meetings of the SEC.

The publication rate differed by section of the SEC. This rate was highest for pediatric cardiology/congenital heart disease and was lower for heart failure, transplantation and cardiomyopathy. The possible reasons for differences by subject area are unclear. A previous study¹⁴ reported a high publication rate for studies on vascular physiopathology and experimental ischemia, and a lower publication rate for those on cardiovascular risk and diagnosis, but the authors offered no possible explanations for these findings.

In agreement with the results of other studies,^{10,14,20,31} our results indicate that time to full publication was usually 2 years, although some full-text articles were published later. One explanation for this finding is that some abstracts may contain the results of the initial stages of research projects that will take several years to complete; another explanation is that the authors may decide to broaden and improve their research project with the aim of publishing their results in international journals with high IF.⁷ A possible explanation for the finding that the publication rate was lowest (43%) for the 2008 meeting could be that insufficient time has passed for publication of some of the results, such as those of follow-up studies or works in progress, which can require 5 years for full publication.³²

Publication rates are higher for the meetings of some scientific societies than for others, but the reasons for this difference are unclear and are difficult to elucidate because they are multifactorial. One factor that could lead to a higher publication rate might be greater or lesser rigor in the selection of abstracts: meetings whose scientific committee apply rigorous selection procedures will have higher subsequent publication rates, while those tending to accept all—or almost all—submitted abstracts will obviously have a lower publication rate. If correct, this hypothesis would support the view that the publication rate of a meeting is an effective indicator of its overall quality, a concept that includes its organization, academic quality, scientific program, institutional support, and the application of rigorous selection criteria when accepting results for presentation, among other factors.^{1–3,7}

Another factor that could influence publication or nonpublication is subsequent publication of conference proceedings. Authors whose results have been fully published in conference proceedings may not feel the need to publish their work in a journal, although this would not apply to poster presentations. In some subject areas, conference proceeding may be the only publication outlet and may even be a more important information source than journals.³²

Several reasons have been identified for the nonpublication of results presented in abstracts submitted to meetings.¹⁴ The most commonly cited reason is lack of time, in some specialties due to the high burden of clinical workload, as well as teaching or management commitments;^{3,25,33} additional reasons are a lack of resources and research funds. Other major obstacles to publication are the low priority given to publication by some researchers and confusion surrounding which investigator—or investigators—is responsible for drafting the manuscript. Only a minority of authors attributed nonpublication to methodological defects.^{14,26,34} Nonpublication can also be due to personal reasons, such as a negative attitude among some investigators who believe their work to be of sufficient interest for presentation at a conference but not to be of adequate quality for acceptance in a peer-reviewed journal.³³

Limitations

This study has some limitations. First, we analyzed a sample of abstracts accepted by only 3 meetings of the SEC and consequently do not know how the variables analyzed might behave in in other meetings. However, our approach sheds light on issues that would be difficult to determine by other methods. Second, although we

searched the main national and international databases, we may have missed reports published in national journals not included in these databases. Third, some abstracts discuss highly preliminary results and their titles are also provisional; subsequent changes to their titles or in their authorship might have made their retrieval from databases impossible.

CONCLUSIONS

More than one-third of the results presented at annual meetings of the SEC are subsequently published as full-text articles in journals indexed in bibliographic databases. *Revista Española de Cardiología* publishes the highest number of these articles, but publication in other high-IF journals is common. The nonpublication of more than 60% of these abstracts deprives the scientific community of potentially interesting results, and consequently researchers presenting their results at meetings of the SEC should be encouraged to submit them for publication in full. Our study leaves some unanswered questions, which could be analyzed in future work. For example, it would be interesting to determine the association between some of the variables of studies presented at meetings of the SEC and their subsequent publication, such as the type of presentation (oral or poster), originality, design, methodological quality, and the positive or negative direction of their results.

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CONFLICTS OF INTEREST

None declared.

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