

Original article

Trends and Bibliometric Impact of Research Grants of the Spanish Society of Cardiology/Spanish Heart Foundation (2007–2012)

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ABSTRACT

Introduction and objectives: The Spanish Society of Cardiology/Spanish Heart Foundation (SEC/FEC) annually awards grants for cardiovascular research projects. Our objective was to analyze the trend in these investments and their resulting scientific production from 2007 to 2012.**Methods:** A search of the publications funded by the SEC/FEC was carried out, according to the following inclusion criteria: publication in a journal indexed in MEDLINE or EMBASE, publication date after the grant, authorship by the principal investigator of the grant, and acknowledgment of SEC/FEC funding. The impact factor and subsequent citations of the articles were analyzed (Web of Science).**Results:** A total of 235 grants were awarded (39/y) with an allocation of €3 854 300 (€642 383/y), 37% of them to women. In all, 122 publications resulted from 88 research projects (37%) funded by the SEC/FEC. Up to October 2017, these publications had received 2258 citations in subsequent studies in the Web of Science, with a mean of 18.5 and a median of 8 citations/study.**Conclusions:** Despite the economic crisis, the mean number and size of the grants awarded by the SEC/FEC increased in the period analyzed. Grants were awarded on an equal opportunity basis to men and women. The bibliometric impact of the funded projects is acceptable, although efforts should be made to improve it.

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Evolución e impacto bibliométrico de las becas de la Sociedad Española de Cardiología/Fundación Española del Corazón en el periodo 2007-2012

RESUMEN

Introducción y objetivos: La Sociedad Española de Cardiología/Fundación Española del Corazón (SEC/FEC) realiza convocatorias anuales de becas para proyectos de investigación cardiovascular. El objetivo es analizar la evolución de estas inversiones y la producción científica derivada en el periodo 2007-2012.**Métodos:** Se ha realizado una búsqueda de las publicaciones financiadas por SEC/FEC, según los siguientes criterios de inclusión: publicación en revista indexada en MEDLINE o EMBASE, fecha de publicación posterior a la de la ayuda, estar firmadas por el investigador principal de la ayuda y reconocer la financiación SEC/FEC. Se analizó el factor impacto y las citas posteriores de los artículos (Web of Science).**Resultados:** Se han otorgado 235 becas (39/año) con una dotación de 3.854.300 euros (642.383 euros/año), el 37% a mujeres. Hay 122 publicaciones derivadas de 88 proyectos (37%) de investigación financiados SEC/FEC. Estas publicaciones han recibido hasta octubre de 2017 un total de 2.258 citas en estudios posteriores en la Web of Science, con una media de 18,5 y una mediana de 8 citas/estudio.**Conclusiones:** Las becas concedidas por la SEC/FEC han crecido en número y cuantía media en el periodo analizado, a pesar de la crisis económica. Las mujeres acceden a ellas en igualdad de condiciones que los varones. El impacto bibliométrico de los proyectos financiados es aceptable, aunque deben hacerse esfuerzos para mejorarlo.

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Abbreviations

FEC: Spanish Heart Foundation
SEC: Spanish Society of Cardiology

INTRODUCTION

Research on various aspects of cardiovascular disease is essential, given its high prevalence and mortality worldwide.^{1,2} This research should address both basic disease characteristics, which may one day lead to its prevention or better treatment,³ and diverse clinical and management aspects, all of which have an important social impact.^{4,5} Although the work is usually financed by different national and international groups, both public and private,⁶ there are many insufficiently funded aspects, particularly in recent years, with the economic crisis, leading to reduced research allocations. In Spain, for example, research budgets have been reduced by 44%.⁷

In line with one of their objectives, the Spanish Society of Cardiology (SEC) and the Spanish Heart Foundation (FEC) have long awarded research grants to promote cardiovascular research. These grants are aimed at both direct funding of research projects and training of young researchers. Some of these grants are directly awarded by the SEC, whereas others avail of the unconditional financial support of the health care industry; however, all are awarded with the prior and independent evaluation of the scientific committees of the SEC that select the best projects regardless of the type of funding.

Because the ultimate aim of all scientific research must be its publication in indexed journals⁸ for the dissemination of the research results, the SEC, like other societies,⁹ is interested in determining the bibliometric impact of the abstracts presented at its meetings¹⁰ and of the grants awarded. In 2011, an evaluation published of the impact of the grants awarded by the SEC/FEC in from 2000 to 2006¹¹ showed that almost 60% had produced publications and that 91% of these publications had been in journals with an impact factor reported in Journal Citation Report. Therefore, the general aim of this work was to analyze the trends and bibliometric impact of the grants awarded by the SEC/FEC in the 6-year period from 2007 to 2012. The specific objectives were: *a)* to determine the trends of the SEC/FEC grants in number and size in the period considered; *b)* track in the biomedical literature the scientific articles that have been published in peer-reviewed journals as a result of research projects funded by any of the SEC/FEC calls for proposals in 2007 to 2012; and *c)* to evaluate the impact of these publications on subsequent research.

METHODS

Procurement of Project Data

The Agency for Scientific Affairs of the SEC sent the necessary information on the grants to build a data extraction sheet and obtain descriptive information on the different grants awarded and then link them to the scientific publications derived from the projects. The following variables were collected: identification number, name of the principal investigator, affiliation of the center, city of the center, type of grant, and its size.

Identification of Scientific Publications Derived From Grants Awarded to Research Projects

As part of the second specific objective, a search was performed to identify scientific publications that were possibly derived from

the development of projects financed with any of the grants awarded by the SEC/FEC in the period of interest.

To consider a publication a by-product of a research project funded by the SEC/FEC, the following inclusion criteria were established. The work needed to *a)* be published in a peer-reviewed journal and indexed in some of the main bibliographic databases in the biomedical field (MEDLINE and EMBASE were considered the main sources of information in biomedicine); *b)* have a publication date after the grant was awarded; *c)* be authored by the principal investigator receiving the grant; and *d)* acknowledge in one of their credits that the work was developed by total or partial funding from the SEC/FEC.

To identify publications, a structured search was carried out in MEDLINE (through PubMed) and EMBASE (through Ovid) in July 2017, which was supplemented by a search during the first week of October 2017 to check whether any other work had been published during the development of the project. For the design of the search, a pragmatic approach was adopted that reflected the established inclusion criteria. Thus, a search algorithm was designed that combined using the Boolean operator AND: *a)* a term related to the principal investigator receiving the funding (delimiting the search to the author list of the publication by means of [au] for the PubMed/MEDLINE search and .au. for the EMBASE search), and *b)* a term related to the title of the research project included in the competitive process for the grant (delimiting the search to the title of the publication or its title and summary with [ti] or [tiab] for the PubMed/MEDLINE search and .ti. or .ti.ab. for the EMBASE search).

Sometimes more than 1 term was defined for each of the algorithm components (principal investigator AND project title) to boost the scope of the search and thereby identify more candidate documents for inclusion. On these occasions: *a)* terms related to the principal investigators receiving the funding were added to try to reduce the ambiguity of their names and surnames, applying truncation (*) to compound names or reflecting possible alternatives to the surnames by using the Boolean search operator OR; *b)* a term was added to the algorithm related to the center of the affiliation of the principal investigator receiving the help (delimiting the search to the affiliation fields of the references with [ad] for the search in PubMed/MEDLINE) or the institution (with .in. for the EMBASE search); and *c)* terms related to the semantic field of the title were added according to the research project title used during the competitive grant process, in conjunction with the Boolean search operator OR or AND.

Selection and Extraction of Data From the Scientific Publications

The full texts of the publications identified by the search were obtained and their eligibility evaluated according to the previously described criteria. From each of the publications included, the data referring to the unique identifier of the publication in the database were recorded (MEDLINE PMID, variable PUB_ID), its year of publication (variable PUB_ID_YR), and the name of the scientific journal where it was published (variable PUB_ID_JR).

Evaluation of the Impact Factors of the Journals Publishing the Work

To develop the third specific objective, the impact factors of the journals publishing the identified articles were verified by consulting the publication Journal Citation Reports (through Web of Science) for the year corresponding to the publication of the work. We recorded the data referring to the impact factor of the journal publishing the article (variable PUB_ID_IF), the clinical category for each scientific journal (variable PUB_ID_category), the

quartile occupied by the scientific journal in its category (variable PUB_ID_Q), and if the magazine was classified in the first decile of its category (variable PUB_ID_D).

Research Impact of the Publications and Their Penetration in the Literature

To complete the development of the third specific objective, we verified the number of citations received by the articles identified and their citation in reviews of the biomedical literature and clinical practice guidelines as an indicator of the impact of knowledge transfer and the consideration of the research results as useful information for decision-making. For this reason, each of the included articles was searched for in the Web of Science Core Collection (produced by Clarivate Analytics). The analysis period was selected to allow at least 4 years of follow-up, which is a reasonable time to analyze the fruits of the research.¹²

Each work was identified in this database by combining terms related to the researcher of interest, the title of the work, and its year of publication. We recorded the data referring to the number of citations received by the work since its publication (variable PUB_ID_WoK), as well as how many of them were reviews of the scientific literature (variable PUB_ID_WoK_reviews) and how many of them were systematic reviews (variable PUB_ID_WoK_SR).

The penetration of the publications derived from the research projects funded was analyzed through a search of citations of the included works registered in Google Scholar, which indicates the impact that a specific publication has had on other academic texts. We searched for the title of each included work and recorded information on the number of direct citations (variable PUB_ID_GoogleScholar) and how many of these were clinical practice guidelines, consensus documents, or position papers (variable PUB_ID_GoogleScholar_Guidelines).

Division of the Different Types of Grants

The grants were divided into 4 categories. The first category comprised SEC/FEC grants, including those related to registries. The second category comprised grants awarded by the health care industry. The third category comprised grants for stays in foreign centers, both by the SEC and its various sections. The fourth category comprised grants from the sections and working groups of the SEC.

RESULTS

In the 6-year period from 2007 to 2012, the SEC/FEC awarded 235 grants (39/y), with a total amount of €3 854 300 (Table 1). The number of grants awarded annually fluctuated between 42 (2007) and 33 (2012), reflecting the considerable impact of the economic crisis in the last year of the study period. The annual amounts awarded showed a similar variation, dropping from €719 200 in 2007 to €582 500 in 2012, the time of the greatest impact of the economic crisis; this gives an annual average of €642 383 dedicated to supporting research.

In total, 37% of grants were awarded to women. Although there were fluctuations, this percentage showed a clear tendency to increase in the period studied, from 29% in 2007 to 39% in 2012 (Table 2).

Table 1 Annual distribution of the number of grants according to type and amount in euros

	2007		2008		2009		2010		2011		2012		Total	
	Grants, No.	Amount, €	Grants, No.	Amount, €	Grants, No.	Amount, €	Grants, No.	Amount, €	Grants, No.	Amount, €	Grants, No.	Amount, €	Grants, No.	Percentage of total
SEC/FEC grants, including registry funding	9	115 000	17	259 200	13	195 000	10	180 000	17	292 000	10	180 000	76	32
Industry grants	10	145 200	7	88 000	7	79 200	17	275 000	7	88 000	4	51 000	52	22
Grants for stays in foreign centers (from the SEC and its sections)	14	342 000	8	190 800	8	189 000	8	193 000	6	150 000	9	225 000	53	23
Grants from sections and working groups	9	117 000	8	92 000	9	95 200	7	60 000	11	126 200	10	126 500	54	23
Total	42	719 200	40	630 000	37	558 400	42	708 000	41	656 200	33	582 500	235	100
														3 854 300

FEC, Spanish Heart Foundation; SEC, Spanish Society of Cardiology.

Table 2 Annual distribution by sex of the principal investigators of the grants according to each grant type analyzed

Grant group	2007		2008		2009		2010		2011		2012		Total from 2007 to 2012		Total men and women		Total from 2007 to 2012		
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men, %	Women, %	
SEC/FEC grants, including registry funding	8	1	12	5	11	2	7	3	10	5	6	4	54	20	74	73	27		
Industry grants	8	2	3	4	6	1	12	5	6	2	3	1	38	15	53	72	28		
Grants for stays in foreign centers (from the SEC and its sections)	8	6	6	2	5	3	4	4	5	1	6	3	34	19	53	64	36		
Grants from sections and working groups	7	2	6	2	4	5	3	4	5	6	5	5	30	24	54	56	44		
Total	31	11	27	13	26	11	26	16	26	14	201	13	156	78	234	67	37		
Women, %		27		33		30		38		37		39							

FEC, Spanish Heart Foundation; SEC, Spanish Society of Cardiology.

Grants According to Type Considered

The amount dedicated to each type of grant per year is shown in [Table 1](#). At the end of the period, the greatest reduction of the grants with respect to their peak occurred for those of the SEC/FEC (–77%), those of the biomedical industry (–60%), and those given for training abroad (–35%), whereas those granted by the different sections remained stable.

The sexes of the principal investigators awarded grants according to grant type are shown in [Table 2](#). Women, who on average comprised 37%, received more grants to study abroad (44%) and fewer directly from the SEC/FEC (27%).

Distribution of Grants Awarded by Autonomous Communities

The distribution of the grants awarded by autonomous community is shown in [Table 3](#). Extremadura and the autonomous cities of Ceuta and Melilla did not receive any assistance from the SEC/FEC for projects. In the rest of the communities, the distribution was highly variable: Catalonia (75 grants, 35% of the total amount) and the Community of Madrid (63 grants, 28% of the total amount) received the highest number of grants and the highest amounts, followed at a great distance by the Valencian Community (20 grants, 7.5%) and Andalusia (16 grants, 6%).

Grants Whose Results Were Published

A total of 122 publications derived from 88 research projects financed by SEC/FEC grants in the 2007 to 2012 period were identified, indicating that 37% of the 235 projects financed resulted in a publication. Several authors who had received different grants participated in 6 of these publications, so that 116 unique publications were counted as a result of these research projects (0.49 publications per project).

Although most projects (n = 93; 76%) resulted in only 1 publication, a number of research projects (n = 29; 24%) produced 2 or more: 25 projects with 2 publications, 3 projects with 3, and 1 project with 4.

The time between the awarding of the funding and the publication of the results varied, with an average of 3.6 years and a median of 3 (range, 1–8 years). The publications registered were from 2007 to 2017.

Impact of Publications

Of all publications, 101 were made in indexed journals. Two-thirds of these publications (n = 66) were concentrated in the clinical category “Cardiac & Cardiovascular Systems”, the most obvious category for the results of the funded projects, given their subject matters ([Table 4](#)). The other publications (n = 35) corresponded to clinical categories such as vascular diseases, neurology, transplantation medicine, and endocrinology. Finally, the other publications were distributed in a variety of medical categories or in more specific categories such as genetics, physiology, pharmacology, or other multidisciplinary sciences.

Notably, 20% of articles in its category were published in *Revista Española de Cardiología*, although a number of projects also managed to publish their results in internationally renowned journals (eg, *J Am Coll Cardiol*, *Int J Cardiol*, and *Eur Heart J*).

The impact of the work can be deduced by the publication of half of the articles in journals of the first quartile of their specialty (80% were published in journals in the first 2 quartiles). This trend is consistent over time. In addition, 2 out of every 10 studies were published in a journal situated in the first decile of the specialty.

Table 3

Distribution of SEC/FEC grants by autonomous community

Autonomous Community	No.	Amount, €	Average, €	Grants, % of total	Amount, % of total
Catalonia	75	1 360 800	18 144.00	31.91	35.31
Community of Madrid	63	1 073 900	17 046.03	26.81	27.86
Valencian Community	20	290 800	14 540.00	8.51	7.54
Andalusia	16	218 300	13 643.75	6.81	5.66
Region of Murcia	11	137 700	12 518.18	4.68	3.57
Chartered Community of Navarre	11	173 500	15 772.73	4.68	4.50
Galicia	12	146 500	12 208.33	5.11	3.80
Balearic Islands	4	99 000	24 750.00	1.70	2.57
Aragon	3	55 000	18 333.33	1.28	1.43
Castile and León	4	44 200	11 050.00	1.70	1.15
Principality of Asturias	5	77 300	15 460.00	2.13	2.01
Canary Islands	5	87 000	17 400.00	2.13	2.26
Castile-La Mancha	2	13 500	6 750.00	0.85	0.35
Basque Country	2	46 600	23 300.00	0.85	1.21
Cantabria	2	30 200	15 100.00	0.85	0.78

FEC, Spanish Heart Foundation; SEC, Spanish Society of Cardiology.

Penetration of Publications

Until October 2017, the 122 publications considered had received 2258 citations in subsequent studies in the Web of Science, with a mean of 18.51 citations and a median of 8 per study (Table 5). The number of publications in Google Scholar was 3713, with an average of 30.45 citations and a median of 14 per study. These data indicate that the research conducted was able to establish the basis or background for future research or was taken into account for the development of decision-making tools.

A quarter of the citations received by the evaluated publications were from reviews of the scientific literature and 41 of the studies (34%) were included in systematic reviews. Equally remarkable is the inclusion of the evaluated publications in the preparation of 39 clinical guidelines, consensus documents, or position papers. In the period analyzed, 426 489 impact factor points were obtained (average, 5017), with a cost of €9037.28 per impact factor point. The average cost per citation was €1707 for the Web of Science and €1037 for Google Scholar.

DISCUSSION

Our results show that the SEC continues to award grants for research projects, with the support of the biomedical industry. The grants have maintained an acceptable, but improvable, rate of publication of articles in indexed scientific journals and a significant penetration of these publications in the scientific literature.

The role of scientific societies in research varies, but is important and growing. In Spain, although the state makes the largest contribution to research, complementary support such as that of the SEC¹³ and pharmaceutical industry is welcome, as long as conflicts of interest are avoided.¹⁴ There has been a significant decrease in the research allocation due to the economic crisis: from a record high of €10 600 million in 2008 to €5967 million in 2013 (–44%). Since then, although there have been small increases (2.2% in 2016 and 4.1% in 2017), the budget earmarked specifically for scientific research decreased by 0.8% in 2017 (€714.8 million). The *Instituto de Salud Carlos III* in Madrid had a budget of €160 000 in 2016 to support biomedical research; its program for promoting health research had a budget of €465 000.¹⁵

The funding allocated by the SEC to research has grown as a whole. Despite the decrease in the last year, the annual average dedicated in this 6-year period from 2007 to 2012 (€642 383) represents an increase of 34% vs the €467 268 average in the 2000 to 2006 period.¹¹ In parallel, there was a similar increase (34%) in the number of grants awarded, from an average of 29 per year to 39. There was also an increase in grants aimed at facilitating overseas training (from 29% to 33%), which are usually linked to the development of specific research projects, with a decrease in the relative weight of those directly awarded for projects (from 47% to 32%); grants awarded by the health care industry through the SEC have remained stable (18% vs 19% today) while there was an increase in grants given by the sections (from 6% to 16%).

In the distribution by autonomous community, the communities with the best research infrastructure and most members of the SEC were those that obtained the highest number of grants and, consequently, a greater economic endowment, data similar to those observed in the 2000 to 2006 period.¹¹

There was an increase in the percentage of women who received a grant (37% vs 26%). This percentage is similar to the current percentage of female members in the SEC (35% in 2017) but higher than when the study was performed (16% in 2008). This indicates both the interest of the SEC in counteracting the underrepresentation of women^{16,17} and their growing role in cardiovascular research. This finding lies in contrast to the conclusions of other authors,¹⁸ although we should continue to be alert to possible future problems.¹⁹

The impact and penetration in the scientific literature of projects funded by the SEC were acceptable but improvable. In total, 37% of the projects led to a publication, which seems at first glance to be less than the 59% obtained in the first report.¹¹ Nonetheless, this apparent difference can be explained by methodological differences between the 2 studies: the present study included only articles that acknowledged the funding received, whereas this was not an inclusion criterion in the previous study. In fact, that study indicated that only 50% of the selected articles mentioned the funding; thus, about 29% of the publications collected in the previous study mentioned the grant in their credits, a figure lower than that observed in this new report (37%). Despite this possible explanation, it is clear that a relatively small percentage of grants give rise to publications. Thus, the SEC should identify ways to improve the publication rate of its grants.

Table 4

Impact indicators for publications derived from research projects funded by SEC/FEC grants

Cardiac & Cardiovascular Systems category (66 publications)												
Journal	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
<i>Acta Cardiol</i>			1 (0.604)		1 (0.605)							2
<i>Am Heart J</i>					1 (4.651)							1
<i>Am J Cardiol</i>					1 (3.368)	1 (3.209)		1 (3.276)			1 (3.398)	4
<i>Atherosclerosis</i>						1 (3.706)						1
<i>Basic Res Cardiol</i>							1 (5.955)					1
<i>Cardiol J</i>										1 (1.256)		1
<i>Cardiovasc Drug Ther</i>								1 (3.189)				1
<i>Cardiovas Res</i>				1 (6.051)								1
<i>Circ Arrhythm Electrophysiol</i>					1 (6.462)							1
<i>Circ Heart Fail</i>								1 (5.867)				1
<i>Circ J</i>											1 (3.544)	1
<i>Circulation</i>				1 (14.432)	1 (14.739)							2
<i>Clin Res Cardiol</i>										1 (4.760)		1
<i>Eur Heart J</i>				1 (10.052)	2 (10.478)	1 (14.097)				1 (10.212)		5
<i>Europace</i>			1 (1.871)			2 (2.765)	1 (3.050)					4
<i>Heart</i>			1 (5.385)			1 (5.014)						2
<i>Heart Rythm</i>					1 (4.102)			2 (5.076)				3
<i>Int J Cardiol</i>			1 (3.469)		1 (7.078)	1 (5.509)		1 (4.036)	1 (4.638)	1 (6.189)		6
<i>J Am Coll Cardiol</i>	1 (11.054)	1 (11.438)			2 (14.156)		2 (15.343)					6
<i>J Am Heart Assoc</i>								1 (4.306)				1
<i>J Cardiovasc Pharmacol</i>			1 (2.826)	1 (2.406)								2
<i>J Cardiovasc Pharmacol Ther</i>											1 (3.000)	1
<i>J Heart Lung Transplant</i>			1 (3.541)									1
<i>J Moll Cell Cardiol</i>				1 (5.499)					1 (4.874)			2
<i>JACC Cardiovasc Imaging</i>								1 (7.188)	1 (7.815)			2
<i>Rev Esp Cardiol</i>			1 (2.746)	2 (2.157)	2 (2.530)	1 (3.204)		3 (3.792)	3 (4.596)		1 (5.166)	13

FEC, Spanish Heart Foundation; SEC, Spanish Society of Cardiology.

Table 5 Research penetration indicators for publications derived from research projects funded by SEC/FEC grants

Year of publication	Citations received (Web of Science)				Citations received (Web of Science) (reviews)				Citations received (Web of Science) (systematic reviews)				Citations received (Google Scholar)				Citations received (Google Scholar) (clinical practice guidelines)			
	Total	Mean	Median	Range	Total	Mean	Median	Range	Total	Mean	Median	Range	Total	Mean	Median	Range	Total	Mean	Median	Range
2007	358	119.33	69	5-284	67	22.33	19	0-48	3	1	0	0-3	590	196.66	112	5-473	2	0.66	0	0-2
2008	86	43	27	2-84	27	13.5	13.5	1-26	2	1	1	1-1	180	90	90	6-174	4	2	2	0-4
2009	214	17.83	12	0-60	67	5.58	5	0-17	4	0.33	0	0-2	342	28.50	16.5	8-81	3	0.25	0	0-2
2010	230	25.55	19	1-97	57	6.33	5	0-15	5	0.55	0	0-4	347	38.55	31	1-129	5	0.55	0	0-4
2011	549	26.14	15	0-192	68	3.24	3	0-15	13	0.62	0	0-3	934	44.47	28	2-307	9	0.43	0	0-6
2012	252	18	11	1-59	71	5.07	1	0-23	7	0.50	0	0-2	405	28.93	16	3-102	8	0.57	0	0-5
2013	175	17.5	13	0-77	58	5.8	3	0-22	1	0.10	0	0-1	301	30.1	20	4-122	4	0.4	0	0-3
2014	277	14.58	11	0-38	65	3.42	2	0-12	5	0.26	0	0-2	429	22.58	17	2-55	4	0.21	0	0-1
2015	84	7.63	5	0-22	20	1.82	1	0-8	0	0.00	0	0	125	11.36	7	1-29	0	0.00	0	0
2016	24	2.67	2	2-11	4	0.44	0	0-2	1	0.11	0	0-1	40	4.44	2	0-17	0	0.00	0	0
2017	9	0.75	0	0-4	4	0.33	0	0-2	0	0.00	0	0	20	1.83	0	0-12	0	0.00	0	0
Total	2,258	18.51	8	0-284	508	4.45	2	0-48	41	0.33	0	0-4	3,713	30.45	145-473	0-473	39	0.32	0	0-6

FEC, Spanish Heart Foundation; SEC, Spanish Society of Cardiology.

The large percentage of publications in first-quartile journals should also be recognized, as well as the significant number of subsequent citations.

In the ongoing and still unresolved²⁰ debate on whether it is more productive to finance the projects of experienced⁹ or junior²¹ researchers, it seems that the balance applied in the SEC grants is reasonable if the number of publications obtained by the funding is used as the sole quality criterion; this datum compares very positively with that found in the United States, where Kaltman et al.⁹ indicated a citation impact of 1.2 to 6.4 per million dollars invested that varied according to prior researcher productivity. The peer-review system used for the awarding of grants produces reasonable results, as indicated by other authors.²²

The average time to the publication of results—a median of 3 years after grant awarding—seems appropriate, given that Cohen et al.²³ indicate that 50% of the publications of researchers who dedicate 1 year exclusively to research are published within 18 months of that research being concluded, which corresponds to what was observed in this case counting the time from grant awarding.

This study has some limitations typical of bibliometric analyses.²⁴ The search strategy used might have failed to recover articles whose title omits a word included in the title of the grant project or articles whose title includes very general terms. Articles published in journals not included in the consulted databases may also have been missed. Another limitation is that the publication of a large number of articles derived from a single grant could be due to the unacceptable strategy of data fragmentation, which cannot be completely ruled out. Finally, it should be considered that publications derived from grants awarded in recent years, particularly in 2012, have had less time to produce publications, which may have decreased the percentage of derived publications. However, the average delay to publication of 3.6 years makes it unlikely that this was a general problem. The change in the bibliometric methodology from the previous study¹¹ has hindered the direct comparison of the 2 studies, although not the fundamental information.

CONCLUSIONS

The mean number and size of the grants awarded by the SEC/FEC increased in the period analyzed. The bibliometric impact of the funded projects is acceptable, although efforts should be made to improve it.

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CONFLICTS OF INTEREST

None.

WHAT IS KNOWN ABOUT THE TOPIC?

- The SEC/FEC awards grants for research and researcher training.
- The bibliometric impact of grants awarded from 2000 to 2006 is known, but later information is lacking.

WHAT DOES THIS STUDY ADD?

- In the study period, there was an increase in the amount allocated and in the number of grants awarded by the SEC/FEC.
- The number of women receiving SEC/FEC grants has grown.
- The bibliometric impact of the funded projects is reasonable, although efforts should be made to improve it.

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