

International visibility and impact of the Spanish research on prison health (2002-2011)

R Ruíz-Pérez*, N Robinson-García*

*Universidad de Granada. Grupo de investigación EC3: Evaluación de la Ciencia y de la Comunicación Científica (<http://ec3.ugr.es/>). Spain (*Granada University- esearch team EC3: assessment of Science and of Scientific Communication*)

ABSTRACT

Objective: This paper sets out to analyze the dissemination and impact of Spanish research published in international scientific journals on Prison Health over the last decade

Material and methods: Descriptive, longitudinal and retrospective analysis of scientific output. We used the Medline-Pubmed database as an information resource. We focus on the bibliometric aspects of journals, papers and authors using the indicators offered by the Web of Science, the Journal Citation Reports and the Essential Science Indicators. We identify the output of Spanish researchers, journals in which they are published, authors and main research fields.

Results: From 2002 to 2011, Spanish researchers published 159 papers, that is, nearly 2% of the world's share in Prison Health. The publication profile is mainly in international journals with an average impact on JCR. The *Revista Española de Sanidad Penitenciaria* is the most productive journal (9.09%), although its role is not prominent. Only two authors can be considered as medium-high productive authors with 10 papers in the study time period. The co-authors network shows a dense network with 14 authors along with minor fragmented networks. As regards citations, 6 papers have been cited 15 or more times and only two can be considered as highly cited. Three main research fronts have been identified: infectious diseases, drugs and psychiatric-psychological problems.

Conclusions: The Spanish research production on Prison Health represents a similar share of the world output similar to that of other disciplines (1.9%), although slightly lower (General Medicine represents 3.05%; Public Health, 2.38%; Psychiatry, 2.29%; Toxicology, 2.46%). It seems likely that this share will increase as a result of the inclusion of its main journal in Medline along with an increasing number of researchers working on this discipline at an international level. However, inclusion has not yet led to integration into high-impact journals or a larger number of citations. The average Journal Impact Factor is relatively low (2.062) and few papers are published in first-class journals (Q1). There are few articles with a good citation average according to the discipline's standard. Likewise, the collaboration pattern still shows a poor state for Spanish research on Prison Health.

Keywords: Prisons; medicine; bibliometrics; comparative study; scientific publication indicators; impact factor; periodicals; technical cooperation; research design.

Text received: 28-01-2013

Text accepted: 29-01-2013

INTRODUCTION

Research on scientific outcome and other research activities have transformed into a rather frequent practice in the scientific chore and, thus, it shouldn't be an exception in the prison healthcare field. The objective of this paper is to analyze the rebound, visibility and international impact of Spanish research published in international scientific

journals on Prison Health. With this purpose, we will analyze the research works published on the issue in the best journals, including the most prestigious databases internationally. Therefore, we must include the Medline Index-Medicus, accessible from the Pubmed platform¹, and the ones indexed in the multidisciplinary databases of the webpage Web of Science (WOS)². We will examine the journals and their impact, the research authors, the co-authorship

networks on the issue and, finally, the main research lines that are developed.

One of the aspects that characterize the Spanish scientific research activity in recent years is publications in international journals. Therefore, M. Polanyi's affirmation on Science as a State without frontiers inhabited by scientists who share their knowledge³ or M. Cajal's aspirations on the internationalization of the Spanish science at the beginning of the 19th Century have come true. M. Cajal suggested the Spanish scientists to ask for "hospitality" in foreign journals and to submit their findings to the judgment and consideration of their international colleagues⁴.

These practices of scientific communication have also enhanced the update of bibliometric research and its usefulness to detect high quality research works⁵. In the Spanish biomedical field such practices are quite extended, most of all, among other matters, in what refers to the internationalization of journals, the research activity and in specific scientific fields⁶⁻¹¹. In conclusion, Spanish research is not only welcome, but desirable, since it allows researchers to analyze its international impact and to establish the state of the matter in question.

MATERIALS AND METHODOLOGY

In this paper we present a descriptive analysis, retrospective in time, of the international presence of the Spanish scientific outcome on Prison Health over the last decade. Therefore, our main information source is the Medicus-Medline Index, database of the prestigious American National Library of Medicine (NML) and which is backed up by the National Institutes of Health (NIH). The latter institution invests the vast majority of its budget to finance research in the biomedical field across the world. The mentioned database is considered as the best and

most used biomedical information system¹². One of its distinctive characteristics, in comparison to other databases, is that for the recovery of information it uses a manual indexation made by experts through the development of a standard programming language known as Medical Subject Headings (MeSH). Jointly with the WOS' Reuters Science Citation Index, the Medline is, because of its characteristics, the most used information source in the analysis of international research activity and in the bibliometric studies¹³⁻¹⁴.

A strategy has been developed in order to identify all Spanish scientific outcome on Prison Health that can be found on this database through the use of Medical Subject Headings (MeSH)¹⁵: a vocabulary of medical terms has been produced by the same authors of the database and assigned to the bibliographic references; it is highly reliable, updates constantly and includes all the possible variations and synonyms of the terms. In the preparation of the present paper, a selection of the most appropriate terminology was done, identifying the terms relating to medical research and prison health.

The MeSH vocabulary has a hierarchic structure with 19 different branches and up to 12 different levels of specificity. Moreover, due to its structure and the definition of terms (through the inclusion of different descriptive typologies) a greater flexibility is achieved. This allows a transversal recovery of information when there are interdisciplinary searches on a topic, such as Prison Health. In such matter, scientific outcome is not restricted to an only field, as Biomedicine, but it can be disseminated in diverse subcategories (psychology, infectious diseases, etc.). In order to identify all Spanish scientific outcomes a previous step was taken: the identification of terms related to the topic. The following are the final terms as well as their definition and hierarchic grade:

Finally, the search was limited to the outcome of researchers whose work centre was associated to

PRISONERS	PRISONS
Definition Identifies all the biomedical research related to prisoners, inmates, imprisoned people...	Definition Identifies all the biomedical research on prisons, penitentiary centres, etc.
Hierarchy Category of people Persons Inmates	Hierarchy Category Anthropology, Education and Social Phenomena Social Sciences Sociology Social Control Prisons Concentration Camps

any Spanish public institution and for a time-frame window between the years 2002 and 2011. A total of 165 documents were recovered. However, six were excluded after a manual review since they were considered unrelated to the analyzed topic.

Once all the results were gathered, they were processed by using Procite 5.0, Ms Excel 2007 and Ms Access 2007. Authors were indexed in view of the index variations and the recommendations of Ruiz, Delgado and Jiménez¹⁶. Journals that appear under the lists of the Journal Citation Reports (JCR)¹⁷ of the WOS were also identified. Such listings include the best journals of the world grouping them by disciplines or categories and include some bibliometric indicators. Further to these listings and indicators, journals are organized in hierarchic order under the corresponding category (Subject Category) forming a ranking. Among the indicators, the Impact Factors (IF) establish how journals must be ordered within the index. For such task, these factors take into consideration how many times a journal has been cited and the number of papers it publishes over a specific period of time, aiming to measure its scientific rebound.

Although citations are a basic measurement element for such indicators, they do not represent the scientific quality of papers or the quality of journals that publish them. Since such quality is a multidimensional element of complex measurement, the value of citations has extensively been discussed in the scientific literature. Probably, the terms to best express the significance of such citations are visibility and impact. We must understand such terms as the major or minor use of certain information sources in the development and the explicit acknowledgement of scientific research, including among such sources the contributions of other colleagues to the same issue¹⁸⁻¹⁹.

Table 1 synthesizes the bibliometric indicators that have been measured and analyzed in this paper and the information sources used to obtain them.

Firstly, the Spanish scientific outcome and visibility on Prison Health is here analyzed in view of the group of indicators that takes into account the number of research papers produced and their international contextualization as well as the percentage of these that have been published in journals with an international impact and their significance. Afterwards, we have valued the extent and diffusion of such outcome in

Table 1. Analyzed bibliometric indicators.

	Indicator	Definition	Acronym	Source
OUTCOME	Publications	Number of papers published by authors associated to a Spanish Institution of Prison Health	NDOC	PubMed
	Spanish outcome percentage	Proportion of papers published by authors associated to a Spanish Institution in view of international outcome on prison health	%NDOC	PubMed
	International publications	International outcome on prison health	NDOC _{INT}	PubMed
	JCR Publications	Number of works published in journals indexed in the Journal Citation Reports by authors associated to a Spanish Institution of Prison Health	NDOC _{JCR}	Web of Science
	JCR Publications percentage	Proportion out of the total Spanish outcome published on prison health in journals indexed in the Journal Citation Reports	%NDOC _{JCR}	Web of Science
VISIBILITY	Average Impact Factor	Impact factor average in journals indexed in the Journal Citation Reports in which authors associated to a Spanish institution on prison health published	PROM IF	Web of Science
	Inclusion in JCR in 2011	Presence of the journal in the 2011 Journal Citation Reports edition	JCR ₂₀₁₁	Web of Science
	2011 Impact Factor	Impact Factor of the journal in the 2011 Journal Citation Reports edition	IF ₂₀₁₁	Web of Science
	2011 Journal quartile	Position of the journal in the 2011 Journal Citation Reports edition	Q ₂₀₁₁	Web of Science

journals on the issue. Finally, in third place, we have identified the most productive authors and, through the examination of co-authorship networks, we have identified the main groups that exist in the field of Prison Health. For such purpose we have used the program Pajek (<http://pajek.imfm.si/doku.php>) and the representation algorithm is Kamada-Kawai²⁰ for separate components. This algorithm aims to distinguish groups of authors that collaborate in their works. Therefore, the nodes in the graphic identify the authors and the lines establish the co-authorship relations. As a result, the wider these lines are, the more co-authored research works published.

Finally, for the analysis of the topics covered by research we have used the software VOSviewer (<http://www.vosviewer.com>). It is a bibliometric program for the creation of networks of key-words in view of their correspondence. Such networks establish the links between the words in the titles of the research works. Therefore, the program considers there is a similarity when two words concur in more than one title. If there is no such coincidence or if it is lower, words will be more distant and, thus, this shows topic dissimilarities between the researches.

RESULTS

Further to the Medline database and results gathered in Table 2, between 2002 and 2011 159

research works on Prison Health were published in international journals, in which at least one of the authors is Spanish or has signed with a Spanish filiation. These 159 researches represent 2% of the 8,367 published worldwide on prison health over the same period of time. Out of the 159 Spanish researches, 101 (61.21%) were published in journals indexed in the JCR index. The average impact factor (PROM IF) of all these researches is 2.062.

In view of the outcome per year, there is a constant production rhythm, even if there isn't a linear increasing tendency, which averages 15.5 papers per year. Nevertheless, there are two important oscillations: the first in 2008 when the production increased to 24 researches and the second in 2011 when there were 37 researches, doubling the average production over the analyzed period. The latter increase converges in time with the entrance of the Spanish Journal on Prison Health in the PubMed-Medline database.

Regarding the international production distributed by groups of journals, figure 1 shows that the published papers follow the pattern of the majority of scientific disciplines; pattern that has been identified and formulated in the Bradford Law. Under this law, a group of journals that comprise the vast majority of researches produced on a certain issue can be identified in all the fields of scientific knowledge. The rest of researches and journals in the same field come out from that core of journals. Therefore, if

Table 2. Outcome and international visibility of Spain on Prison Health (2002-2011)

YEARS	NDOC	NDOC _{INT}	%NDOC	NDOC _{JCR}	% NDOC _{JCR}	PROM IF
2002	12	637	0.14	6	3.646	2.104
2003	11	659	0.13	4	2.424	1.812
2004	9	720	0.11	6	3.636	1.527
2005	14	828	0.17	8	4.848	2.607
2006	10	850	0.12	7	4.242	1.698
2007	18	892	0.22	13	7.879	2.918
2008	24	851	0.29	19	11.515	1.930
2009	11	1015	0.13	8	4.848	2.238
2010	13	954	0.16	9	5.455	1.801
2011	37	961	0.44	21	12.727	1.800
TOTAL	159	8367	1.90	101	61.212	2.062

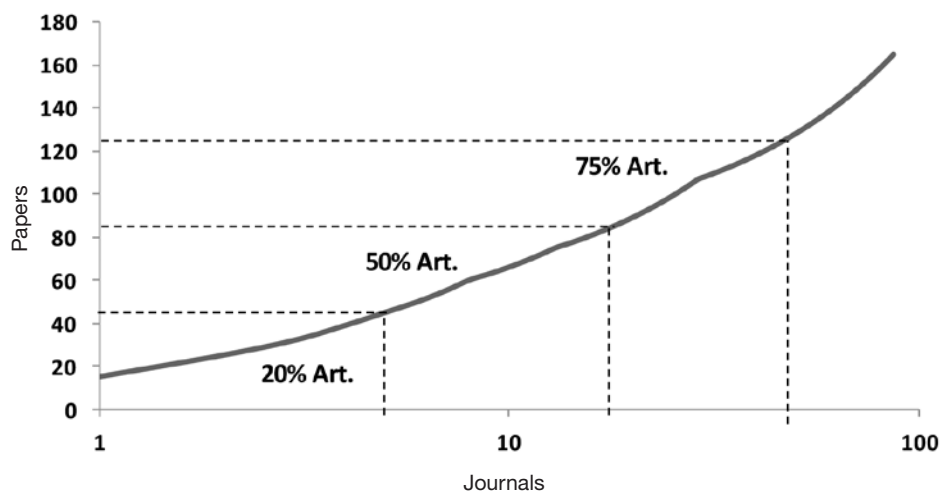


Figure 1. Distribution of papers per journals

we were to divide the total number of publications in quartiles, the distribution of papers per journal follows a logarithmic distribution. In our case, we see how 40% of research works is concentrated in 10 journals while the rest 60% is distributed in 75 different journals. In fact, out of the 85 journals that were published over the last 10 years on prison health, 74 (85%) were signed by Spanish authors. Therefore, over the last decade, 16 journals have published two research works signed by Spanish authors and 58 journals, one (Table 3).

If we analyze the most productive journals (Table 3) at international level, and we take into account that the *Revista Española de Sanidad Penitenciaria* (Spanish Journal on Prison Health) was only indexed in 2011 in the examined database, it is positioned as the most productive journal in the issue with 15 research papers (9% of the total). It is followed by *Enfermedades Infecciosas y Microbiología Clínica* (Journal on Infectious Diseases and Clinical Microbiology) (10 papers) and the *Journal of Theoretical Biology* and the *Revista Española de Sanidad Pública* (Spanish Journal on Public Health), both count 7 published papers. The Spanish Journals *Psicothema* and *Gaceta Sanitaria*, as well as the *American International Journal of Offender Therapy and Comparative Criminology* and the *Journal of Forensic Sciences* are to follow with 5 to 6 papers each.

Attending to the nationality of the published journals, and even if all are to be considered international since they are gathered under the Medline database, it is interesting to point out that the vast majority of Spanish researchers prefer to use foreign journals to publish and disseminate their papers. Foreign journals

represent 81.6% of the examined group opposite to Spanish journals that represent 18.4%. However, if we were to attend to the total published papers the aforementioned percentages are 60% and 40% respectively. Thus, the difference in the visibility of foreign and Spanish journals decreases.

In reference to the visibility and the international impact of journals in which Spanish authors publish (Table 3) 23 out of 27 journals that count two or more papers signed by Spanish authors are indexed in the PubMed and the JCR Thomson Reuters' databases. Thus, in journals considered to have an international impact. Therefore the Spanish research on Prison Health at international level has a publication impact in journals positioned in the second and third quartile (Q2 and Q3) of JCR categories. Meaning by this that Spanish research, in the international ranking of journals on the issue, is positioned in the intermediate zone. For example, 5 researches were published in the *J Forensic Sci* journal that has position 8 out of 15 and another 5 were published in the *Int J Offender Ther Comp Criminol* journal which holds position 24 out of 50. However, some of the research papers have been published in high impact journals (Q1). Two research papers were published in the best worldwide journals of their corresponding speciality, such as *Addiction*, that usually holds the first or second position within the international ranking of its category (SUBSTANCE ABUSE). We could number many other examples that have been published in the TOP3 or TOP5 of their corresponding category, such as the paper published in *AIDS Res Hum Retrov*, that holds position 4 out of 32 in the VIROLOGY-2011 category. However, such papers do not have a

Table 3. Visibility and impact of journals with two or more papers published by Spanish authors on Prison Health. Period 2002-2011.

Journals	NDOC	JCR 2011	IF 2011	Q 2011	JCR CATEGORY	RANK 2011*
Rev Esp Sanid Penit	15					
Enferm Infecc Microbiol Clin	10	Positive	1.491	Q3	Microbiology	82/114
J Theor Biol	7	Positive	2.208	Q1	Mathematical and Computer biology	11/47
Rev Esp Salud Pública	7	Positive	0.706	Q4	Public, Environmental and Occupational Health	107/131
Psicothema	6	Positive	1.016	Q2	Psychology, Multidiscipline	60/125
Gac Sanit	5	Positive	1.326	Q2	Public, Environmental and Occupational Health	62/131
Int J Offender Ther Comp Criminol	5	Positive	0.84	Q2	Criminology	24/50
J Forensic Sci	5	Positive	1.229	Q3	Legal Medicine	8/15
Med Clin (Barc)	3	Positive	1.385	Q2	Legal and Internal Medicine	66/155
Rev Derecho Genoma Hum	3					
Span J Psychol	3	Positive	0.74	Q3	Psychology, Multidiscipline	72/125
Actas Esp Psiquiatr	2					
Addiction	2	Positive	4.313	Q1	Substance abuse	2/14
Adicciones	2	Positive	0.8	Q4	Substance abuse	13/14
AIDS Care	2	Positive	1.603	Q2	Social Sciences, Biomedicine	11/37
Curr HIV Res	2	Positive	1.745	Q3	Infectious diseases	50/70
Epidemiol Infect	2	Positive	2.843	Q1	Public, Environmental and Occupational Health	31/158
Eur J Clin Microbiol Infect Dis	2	Positive	2.859	Q2	Infectious diseases	30/70
Farm Hosp	2					
Forensic Sci Int	2	Positive	2.301	Q2	Legal medicine	5/15
Gastroenterol Hepatol	2	Positive	0.727	Q4	Gastroenterology and Hepatology	65/74
Inj Prev	2	Positive	1.392	Q3	Public, Environmental and Occupational Health	87/158
Int J STD AIDS	2	Positive	1.086	Q4	Infectious Diseases	60/70
Psychiatry Res	2	Positive	2.524	Q2	Psychiatry	56/130
Public Health	2	Positive	1.35	Q2	Public, Environmental and Occupational Health	91/158
Rev Clin Esp	2	Positive	2.008	Q2	General and Internal Medicine	44/155
Rev Neurol	2	Positive	0.652	Q4	Clinical Neurology	171/193
58 more journals with one paper	58					

*Ranking 2011. Position of the journal regarding to the total journals of its corresponding JCR category ordered by their Impact Factor

reflection in Table 3 since it only gathers those journals that have published two or more research papers signed by Spanish authors, and not those that have only published one.

Regarding the authorship of research papers, the analysis of co-authorship networks identifies the main groups that work on Prison Health in Spain and that

publish their papers in international journals. Figure 2 represents co-authorship networks settling as limit value the collaboration of the same author in three different papers. The image reflects a first group with a very intense network in which 14 different authors take part. The nodes identify the authors and the lines and their intensity identify the co-authorship relations

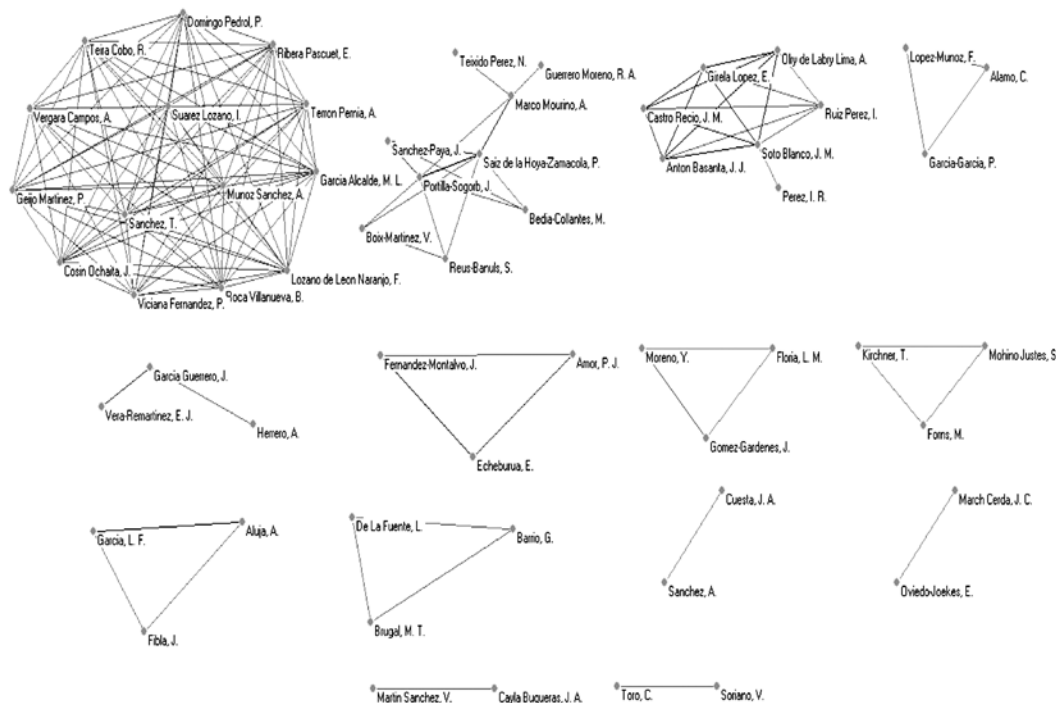


Figure 2. Co-authorship networks with more than 2 collaborations on Public Health. Period 2002-2011.

among them. Ribera Pascuet, Domingo Pedrol, Suarez Lozano and Muñoz Sánchez are the main, most active and productive authors of this network. The collaboration pattern in this well-defined network could be the participation of its authors in studies carried out in different centres. In second place, there are two little co-authorship groups: a first one, formed by 8 members, quite fragmented and that doesn't count with the collaboration of all of them, being the main author Saiz de la Hoya-Zamacola; and a second network, formed by 6 members who collaborate among them and in which one of them additionally has a collaboration relationship with a seventh author, who isn't part of the total network. In the aforementioned cases the collaboration pattern could be the existence of a more or less consolidated research group. Finally, there are six little networks formed by 3 authors and four other networks formed by two authors. The collaboration pattern in these could be the circumstantial collaboration between authors that work in the same centre, although this is not an essential condition.

Table 4 reflects those collaboration partnerships that have more papers in common. Saiz de la Hoya-Zamacola and Portilla-Sogorb are the authors who share more co-authored papers in the period 2002-

2011. Anton Basanta, Girela Lopez and Orly de Labry Lima have a high collaboration index.

Table 4. Co-authorship partners with 4 or more collaborations.

Author 1	Author 2	Papers
Portilla-Sogorb, J	Saiz de la Hoya-Zamacola, P.	6
Aluja, A.	García, L. F.	5
Anton Basanta, J. J.	Girela Lopez, E.	5
Anton Basanta, J. J.	Olry de Labry Lima, A.	5
Anton Basanta, J. J.	Soto Blanco, J. M.	5
Echeburua, E.	Fernandez-Montalvo, J.	5
Girela Lopez, E.	Olry de Labry Lima, A.	5
Girela Lopez, E.	Soto Blanco, J. M.	5
Marco Mourino, A.	Saiz de la Hoya-Zamacola, P.	5
Olry de Labry Lima, A.	Soto Blanco, J. M.	5

Regarding the outcome per authorship, Table 5 gathers a list of the most productive authors during the examined period, considering as such those allocated above the cut-off point of 4 or more published papers. However, logically, in medicine the international

Table 5. Authors with 4 or more international publications on Prison Health. Period 2002-2011

Authors	NDOC	Most cited paper	Citations
Marco Mouriño, A.	10	Effectiveness of tuberculosis control programmes in prisons, Barcelona 1987-2000. <i>Int J Tuberc Lung Dis</i> 2002, 6(12), 1091-7	11
García Guerrero, J.	10	Prevalence of HIV-1 drug resistance mutations among Spanish prison inmates. <i>Eur J Clin Microbiol Infect Dis</i> 2006, 25(11), 695-701	8
Saiz de la Hoya-Zamacola, P.	8	Predictive markers of HIV and HCV infection and co-infection among inmates in a Spanish prison. <i>Enferm Infecc Microbiol Clin</i> 2005, 23(2), 53-7	19
Echeburua, E.	7	Psychopathological profile of men convicted of gender violence: a study in the prisons of Spain. <i>J Interpers Violence</i> 2003, 18(7), 798-812	19
Soto Blanco, J. M.	7	Adherence to antiretroviral therapy among HIV-infected prison inmates (Spain). <i>Int J STD AIDS</i> 2005, 16(2), 133-8	6
Portilla-Sogorb, J.	6	Predictive markers of HIV and HCV infection and co-infection among inmates in a Spanish prison. <i>Enferm Infecc Microbiol Clin</i> 2005, 23(2), 53-7	19
Soriano, V.	6	Prevalence of HIV infection among young adult injecting and non-injecting heroin users in Spain in the era of harm reduction programmes: gender differences and other related factors. <i>Epidemiol Infect</i> 2007, 135(4), 592-603	11
Aluja, A.	5	Sensation seeking, sexual curiosity and testosterone in inmates. <i>Neuropsychobiology</i> 2005, 51(1), 28-33	15
López-Muñoz, F.	5	Psychiatry and political-institutional abuse from the historical perspective: the ethical lessons of the Nuremberg Trial on their 60th anniversary. <i>Prog Neuropsychopharmacol Biol Psychiatry</i> 2007, 31(4), 791-806	10
Olry de Labry Lima, A.	5	Adherence to antiretroviral treatment in prisons. <i>AIDS Res Hum Retroviruses</i> 2005, 21(8), 683-8	3
Fernández-Montalvo, J.	5	Psychopathological profile of men convicted of gender violence: a study in the prisons of Spain. <i>J Interpers Violence</i> 2003, 18(7), 798-812	19
Bedia-Collantes, M.	5	Predictive markers of HIV and HCV infection and co-infection among inmates in a Spanish prison. <i>Enferm Infecc Microbiol Clin</i> 2005, 23(2), 53-7	19
Brugal, M. T.	5	Evaluating the impact of methadone maintenance programmes on mortality due to overdose and aids in a cohort of heroin users in Spain. <i>Addiction</i> 2005, 100(7), 981-9	74
Antón Basanta, J. J.	5	Adherence to antiretroviral treatment in prisons. <i>AIDS Res Hum Retroviruses</i> 2005, 21(8), 683-8	3
Cayla Buqueras, J. A.	5	Effectiveness of tuberculosis control programmes in prisons, Barcelona 1987-2000. <i>Int J Tuberc Lung Dis</i> 2002, 6(12), 1091-7	11
Girela López, E.	5	Adherence to antiretroviral treatment in prisons. <i>AIDS Res Hum Retroviruses</i> 2005, 21(8), 683-8	3
García, L. F.	5	Sensation seeking, sexual curiosity and testosterone in inmates. <i>Neuropsychobiology</i> 2005, 51(1), 28-33	15
De La Fuente, L.	4	Late diagnosis of HIV infection in the era of highly active antiretroviral therapy: consequences for AIDS incidence. <i>AIDS</i> 2002, 16(14), 1945-51	109
Vera-Remartínez, E. J.	4	Mutations of resistance of HIV-1 in previously untreated patients at penitentiary centers of the Autonomous Community of Valencia, Spain. REPRICOVA study. <i>Med Clin (Barc)</i> 2002, 118(7), 247-50	3
March Cerda, J. C.	4	Drugs and social exclusion in ten European cities. <i>Eur Addict Res</i> 2006, 12(1), 33-41	31
Amor, P. J.	4	Psychopathological profile of men convicted of gender violence: a study in the prisons of Spain. <i>J Interpers Violence</i> 2003, 18(7), 798-812	19
Castro Recio, J. M.	4	Influence of antiretroviral treatment on quality of life in seropositive inmates. <i>Int J STD AIDS</i> 2008, 19(3), 172-7	2

Authors	NDOC	Most cited paper	Citations
Díez, M.	4	Determinants of patient delay among tuberculosis cases in Spain. <i>Eur J Public Health</i> 2004, 14(2), 151-5	15
Mohino Justes, S.	4	Identifying the risk of deliberate self-harm among young prisoners by means of coping typologies. <i>Suicide Life Threat Behav</i> 2008, 38(4), 442-8	3
Sánchez-Paya, J.	4	Predictive markers of HIV and HCV infection and co-infection among inmates in a Spanish prison. <i>Enferm Infecc Microbiol Clin</i> 2005, 23(2), 53-7	19
Arroyo-Cobo, J. M.	4	Public health gains from health in prisons in Spain. <i>Public Health</i> 2010, 124(11), 629-31	2
Muñoz Sánchez, A.	4	Survival of HIV-infected injection drug users (IDUs) in the highly active antiretroviral therapy era, relative to sex- and age-specific survival of HIV-uninfected IDUs. <i>Clin Infect Dis</i> 2007, 45(3), 370-6	12
Guerrero Moreno, R. A.	4	Effectiveness of tuberculosis control programmes in prisons, Barcelona 1987-2000. <i>Int J Tuberc Lung Dis</i> 2002, 6(12), 1091-7	11

average production of authors depends on factors such as their specific scientific field of specialization, their main dedication, either clinical or healthcare related, their participation or not in research or work groups, etc. However, in Spain, the National Evaluation Commission of Research Activity (in Spanish, Comisión Nacional Evaluadora de la Actividad Investigadora, CNEAI²¹) considers that in order to award an author scientific recognition and the so-called *sexenios de investigacion* (six year long research periods) he has had to publish at least five papers in international journals of high and medium impact. If we are to take such values as a reference, in order to consider that a paper has a medium-high international impact, the average publication index has to be of one published paper per year. Those authors who publish more than two papers of impact per year would be considered exceptional.

Consequently, if we focus on papers signed by only one author in our case study (Table 5) only two authors (Marco Mouriño and García Guerrero) reach a medium-high productivity level with up to 10 published papers in international journals during the examined period. The third position is held by Saiz de la Hoya-Zamacola with 8 published papers and under him there are three other authors with 7 to 8 papers. Below, a numerous group of 12 authors with 5 to 6 papers, that form the group of medium-low international productivity authors.

We can find the same results when analysing productivity in reference to citations and behavioural patterns. Even if citations are of significance for other case studies, we cannot take them into account in the present one since they can be conditioned by several factors such as geographical, idiomatic and

disciplinary areas. Thus, there are scientific disciplines in which citations are common and frequent (such as immunology) while in others the number of citations is low (for example, mathematics). The visibility of the journal in which a paper has been published and its internationalization are also conditioning factors²². No matter what the case is, the question that arises is whether 10 to 15 citations are a lot or just a few for a specific research paper. The answer is laid out by relating the number of citations in a specific paper to the average of citations in the corresponding discipline or speciality in the same year of its publication. For such purpose, we count with the data provided by the “Essential Indicators”, specifically the “Average Citation Rates”, product of the WOS database from the same citations that the database processes²³. For example, for the papers published under the “Immunology” JCR category in 2005, the average citation rate is 31.25 whilst the one for a paper under the “Mathematics” category is 5.87.

In this paper, if we focus on the most cited papers of the most productive authors (Table 5) there are huge differences: from papers with 3, 8, 10 or 15 citations to a paper that counts 109 citations. The latter, a paper signed by De La Fuente I. and published in 2002 in the journal *AIDS*, is a highly cited paper of great impact. This is if we are to consider that the referred journal is within the “Immunology” JCR category, in which the average citation rate raises to 39.25 citations. Table 6 gathers the Spanish scientific research papers on Prison Health that have been more cited and their international contextualization within their corresponding discipline.

In addition to the referred paper of De la Fuente, we also have to consider as a highly cited paper the

Table 6. Most cited international papers on Spanish Prison Health

Papers	Publication Year	JCR Category	Citations	Average of citations per paper in the corresponding category
Amor P. J.; Fernández-Montalvo J. Psychopathological profile of men convicted of gender violence: a study in the prisons of Spain. <i>J Interpers Violence</i> 2003, 18(7), 798-812	2003	Psychology	19	23,86
March Cerda J. C. Drugs and social exclusion in ten European cities. <i>Eur Addict Res</i> 2006, 12(1), 33-41	2006	Psychiatry	31	16,05
De La Fuente L. Late diagnosis of HIV infection in the era of highly active antiretroviral therapy: consequences for AIDS incidence. <i>AIDS</i> 2002, 16(14), 1945-51	2002	Immunology	109	39,25
García L. F.; Aluja A. Sensation seeking, sexual curiosity and testosterone in inmates. <i>Neuropsychobiology</i> 2005, 51(1), 28-33	2005	Neuroscience & Behavior	15	28,92
Brugal M. T. Evaluating the impact of methadone maintenance programmes on mortality due to overdose and aids in a cohort of heroin users in Spain. <i>Addiction</i> 2005, 100(7), 981-9	2005	Psychiatry	74	18,58
Portilla-Sogorb J.; Saiz de la Hoya-Zamacola P; Bedia-Collantes M. Predictive markers of HIV and HCV infection and co-infection among inmates in a Spanish prison. <i>Enferm Infecc Microbiol Clin</i> 2005, 23(2), 53-7	2005	Microbiology	19	25,29

one authorised by Brugal M T, that has a citation level four times higher than the average in Psychiatry, followed in importance by the paper of March Cerda, which practically doubles such average.

Finally, we have to refer to the map of associated terms that appear in the titles of the papers herein examined. This map provides us a close view on the specific topics that such papers cover. Figure 3 reflects that the main topics subject to study are those related to AIDS, gender violence and substance abuse.

CONCLUSIONS

Although it is soon to make a definitive balance of the state of internationalization of Spanish research on Prison Health, and being optimistic, we could say that such internationalization is underway. The present paper reveals that such research activity represents almost 2% of worldwide scientific outcome, percentage similar to the Spanish productivity in other areas, although still slightly inferior. Under the data provided by the WOS, General and Internal Medicine for the same examined period represent 3.05% and Public, Environmental and Occupational Healthcare 2.38%. These percentages are similar to those gathered

by González-Alcaide²⁴. The latter reflect that the Spanish research outcomes at international level are 3.75% in Legal Medicine, 2.29% in Psychiatry and 2.46% in Toxicology. Many of these disciplines have a contribution in Spanish journals that are well-consolidated among international databases. This could mean that Spanish Healthcare in Prisons could be highly important at international level after the entrance of the Spanish Health Journal in the Medline database.

There is also an increasing collective of authors who have entered the so-called international research trend, represented by the WOS and Medline journals. Our authors have started to publish in these journals and share the scientific objectives and methodology that these journals represent and promulgate. The number of authors that publish in these journals is high, probably excessively high, due to the fact that there is not a specific journal of international reference on Prison Health and, thus, all the papers that work and examine the imprisoned population or part of it, would be comprised under the same category. Oppositely, the Spanish authors seek to publish in journals of their corresponding field of study. The Spanish Journal on Prison Health, with its new international scope, could cover the referred

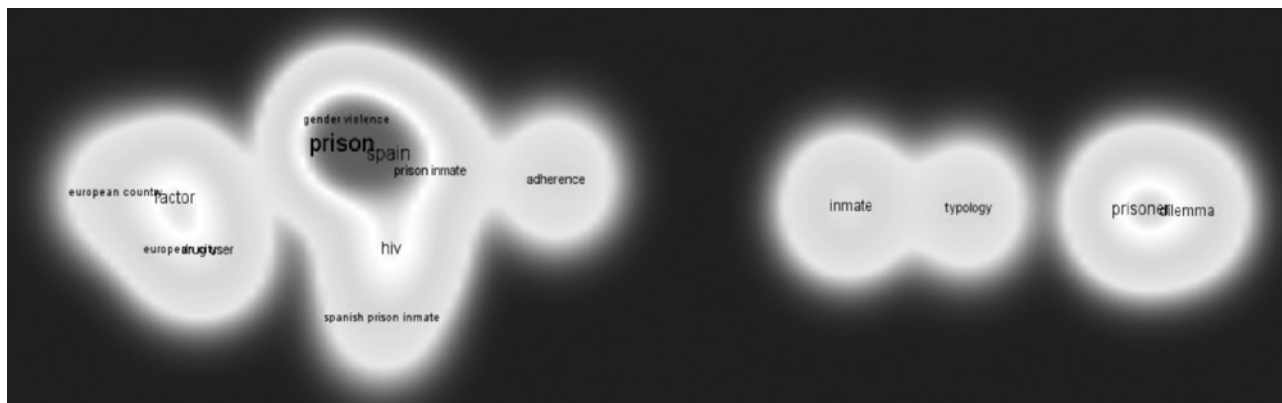


Figure 3. Map of associated terms.

gap. The distribution of papers and journals makes us think this way since under the Bradford Law this journal is positioned at the core of those specialized in the issue.

As to the consolidation of our authors, their entrance in the international arena, which is already underway, has not entailed their integration to all the effects, especially in reference to publications in high-ranking journals and to the number of citations. Over the last decade, our researchers have continued to use journals with a low “Indicator Factor” (2.062) and the papers that have been published in high-ranking journals (Q1) are few. In reference to the number of citations, only a few papers have reached an acceptable number of average citations in their corresponding field.

The analysis of co-authored papers reflects that there is only one consolidated network although some other collaboration groups have started to emerge, but still the collaborations are sporadic. This co-authorship pattern reflects an immature state of development of the Spanish research on Prison Health although it is just starting to take off in the same way it is happening in other professional disciplines²⁵.

In reference to the topics subject to research we can identify two lines of investigation. A first, related to diseases as AIDS and other infectious pathologies derived from the use of drugs and a second line resulting from the psychological and psychiatric field that analyzes the behaviour of inmates and their mental health.

ACKNOWLEDGEMENTS

Nicolás Robinson-García currently holds an FPU internship financed by the Ministry of Economy and Competitiveness.

CORRESPONDENCE

Rafael Ruiz-Pérez
E-mail: rruiz@ugr.es
Universidad de Granada. *Information and documentation Department*. Granada. Spain

BIBLIOGRAPHIC REFERENCES

1. Pubmed [Internet]. Bethesda: National Library of Medicine; 2013 [actualizada 2012 dec 18; citada 2013 En 21]. Disponible en: <http://www.ncbi.nlm.nih.gov/pubmed>.
2. Web of Science [Internet]. London: Thomson Reuters; 2013 [actualizada 2013 en 08; citada 2013 En 20]. Disponible en: <https://apps.webofknowledge.com/WOS>.
3. Polanyi M. The republic of Science. *Minerva*. 1962; 1 (1): 54-73.
4. Legado Cajal, CSIC, Madrid. En Mainer, JC, editor. CAJAL: una reflexión sobre el papel social de la ciencia. Zaragoza: Institución «Fernando el Católico»; 2006.
5. Weightman AL, Butler CC. Using bibliometrics to define the quality of primary care research. *BMJ*. 2011; 342: d1083
6. Delgado López-Cózar E. Evaluación del grado de ajuste de las revistas españolas de ciencias de la salud a las normas internacionales de presentación de publicaciones periódicas. *Rev Esp Salud Pública*. 1997; 71: 531-46.
7. Camí J, Zulueta MA, Fernández MT, Bordons M, Gómez I. Spanish scientific production in biomedicine and health-sciences during the period 1990–1993 (Science-Citation-Index and Social-Science Citation Index) and comparison to period 1986–1989. *Med Clin (Barc)*. 1997; 109(13): 481-96.

8. Granda-Orive JI, Alonso-Arroyo A, Villanueva Serrano SJ, Aleixandre-Benavent R, González-Alcaide R, García-Río F, et al. Comparación entre dos quinquenios (1998/2002 y 2003/2007) de la producción, repercusión y colaboración en tabaquismo de autores españoles a través del Science Citation Index. *Arch Bronconeumol*. 2011; 47: 25-34.
9. Aleixandre Benavent R, Valderrama Zurián JC, Castellano Gómez M, Miguel-Dasit A, Simó Meléndez R, Navarro Molina C. National and international impact factor of Revista Española de Cardiología. *Rev Esp Cardiol*. 2004; 57(12): 1241-4.
10. Ruiz-Pérez R, Delgado López-Cózar E, Jiménez Contreras E. Anales de Medicina Interna: standardization, dissemination and bibliometric indicators. (II) Bibliometric analysis. *An Med Interna*. 1997; 14(8): 384-93.
11. Ruiz-Pérez R, Delgado López-Cózar E, Jiménez Contreras E. Evaluación de Archivos de la Sociedad Española de Oftalmología según criterios del 'Institute for Scientific Information' para la selección de revistas científicas. *Archivos de la Sociedad Española de Oftalmología*. 2006; 81: 245-68.
12. Delgado López-Cózar E, Ruiz-Pérez R, Jiménez Contreras E. Criterios Medline para la selección de revistas científicas. Metodología e indicadores. Aplicación a las revistas médicas españolas con especial atención a las de salud pública. *Rev Esp Salud Pública*. 2006; 80(5): 521-551
13. Leydesdorff L, Rotolo D, Rafols I. Bibliometric perspectives on medical innovation using the Medical Subject Headings of PubMed. *J Am Soc Inf Technol*. 2012; 63: 2239-53.
14. Pestaña A. Suitability of MEDLINE for the study of the Spanish scientific production in biomedicine and medical sciences. A comparative appraisal with the Science Citation Index. *Med Clin (Barc)*. 1997; 109(13): 506-11.
15. Mesh [Internet]. Bethesda: National Library of Medicine; 2013 [actualizada 2012 dec 18; citada 2013 En 17]. Disponible en: <http://www.nlm.nih.gov/mesh/>
16. Ruiz-Pérez R, Delgado López-Cózar E, Jiménez Contreras E. Spanish personal name variations in the national and international biomedical databases: implications for information retrieval and bibliometric studies. *J Med Libr Assoc*. 2002; 90: 411-430.
17. Journal Citation Reports [Internet]. London: Thomson Reuters; 2013 [actualizada 2012 dec 18; citada 2013 En 24]. Disponible en: <http://ip-science.thomsonreuters.com/es/productos/jcr/>
18. Glanzel W, Moed HF. Journal Impact measures in bibliometric research. *Scientometric*. 2002; 53(2): 171-93.
19. Bordons M, Fernández MT, Gómez I. Advantages and limitations in the use of impact factor measures for the assessment of research performance in a peripheral country. *Scientometric*. 2002; 53(2): 195-206.
20. Kamada-Kawai S. A simple method for computing general position in displaying three-dimensional objects. *Comput Vis Graph Image Process*. 1998; 41: 43-56.
21. Ruiz-Pérez R, Delgado López-Cózar E, Jiménez Contreras E. Principios y criterios utilizados en España por la Comisión Nacional Evaluadora de la Actividad Investigadora (CNEAI) para la valoración de las publicaciones científicas: 1989-2009. *Psicothema*. 2010; 22(4): 898-908.
22. Yue WP, Wilson CS. Measuring the citation impact of research journals in clinical neurology: a structural equation modeling analysis. *Scientometric*. 2004; 60(3): 317-332.
23. Web of Science [Internet]. London: Thomson Reuters; 2013 [actualizada 2013 en 08; citada 2013 En 19]. Disponible en: <http://esi.webofknowledge.com/baselinespage.cgi>.
24. González Alcaide G, Bolaños Pizarro M, Villanueva Serrano SJ, Ruiz Ros V, González de Dios J, Granda Orive JI, et al. Dinámicas de citación y flujos de conocimiento interdisciplinar de la Biomedicina española. IX Congreso ISKO-Spain, 11-13 marzo. 2009: 149-170.
25. Gutiérrez-Vela MM, Díaz-Haro A, Berbel-Salvador S, Lucero-Sánchez A, Robinson-García N, Cutando-Soriano A. Bibliometric analysis of research on regenerative periodontal surgery during the last 30 years. *J Clin Exp Dent*. 2012.