Enferm Clin. 2017;27(5):314–326

Enfermería Clínica

www.elsevier.es/enfermeriaclinica

SPECIAL ARTICLE

1977–2017: Nursing research in Spain after 40 years in the University☆

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Received 30 June 2017; accepted 4 August 2017
Available online 4 October 2017

KEYWORDS
Nursing research;
Support of research;
Legislation Nursing;
Specialties Nursing;
Education Nursing

Abstract Nursing research in Spain cannot be understood without analysing the development of this profession over the last 40 years. The social, political and economic context has determined the evolution of nursing research, and an analysis of the current situation is necessary to confront the immediate challenges the nursing profession has to handle. To offer a global perspective of care research in Spain as a framework for reflection and discussion on possible short and medium-term strategies that guide the planning and decision making of the different stakeholders involved in nursing research in Spain. A multi-method study combining documentary analysis with bibliometric methods was carried out. Some isolated policies to promote nursing research have been identified, a significant increase in doctoral training (49 doctoral programs) and 89 nurse research groups (1.92 groups per million inhabitants) responsible for a scientific production that puts Spain in seventh place in the world ranking of scientific production in the area of nursing. The increase in public expenditure on R&D&I and the growth in bibliometric impact are associated with a higher density of nursing research groups. Nursing research in Spain is sensitive to research promotion policies and resources, although there is no consolidated and uniform strategy that overcomes current barriers. The impact of the academic development of Spanish nursing in scientific production is still unknown.

DOI of original article: http://dx.doi.org/10.1016/j.enfcli.2017.08.003
☆ Please cite this article as: Morales Asencio JM, Hueso Montoro C, de Pedro-Gómez JE, Bennasar-Veny M. 1977-2017: La investigación enfermera en España tras 40 años en la Universidad. Enferm Clin. 2017;27:314–326.
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PALABRAS CLAVE
Investigación en Enfermería;
Apoyo a la investigación;
Legislación de Enfermería;
Especialidades de Enfermería;
Educación en Enfermería

1977-2017: La investigación enfermera en España tras 40 años en la Universidad

Resumen La investigación enfermera en España no puede ser entendida sin el análisis de la evolución de la profesión en los últimos 40 años. El contexto social, político y económico ha determinado el devenir de la investigación en cuidados y es necesario un análisis de la situación actual de cara a los retos inmediatos que la profesión enfermera tiene ante sí. Ofrecer una perspectiva global de la investigación en cuidados en España, como marco de reflexión y discusión acerca de posibles estrategias a corto y medio plazo que orienten la planificación y toma de decisiones a los distintos agentes implicados en la investigación enfermera en España. Estudio multimétodo que ha combinado análisis documental, con métodos bibliométricos. Se han identificado algunas políticas aisladas de fomento de la investigación en cuidados, un crecimiento importante de la formación doctoral (49 programas de doctorado) y 89 grupos de investigación enfermera (1,92 grupos por millón de habitantes) responsables de una producción científica que sitúa a España en el séptimo lugar en el ranking mundial de producción científica en el área de Enfermería. El incremento en el gasto público en I+D+I y el crecimiento en impacto bibliométrico se asocian a una mayor densidad de grupos de investigación enfermeros. La investigación enfermera en España es sensible a las políticas y recursos de fomento de la investigación, aunque no hay una estrategia consolidada y uniforme que supere las barreras actuales. Aún se desconoce el impacto del desarrollo académico de la Enfermería española en la producción científica.

What is known?

Throughout the past 40 years nursing research has faced the major difficulties of not being a degree course, there being limited access to doctorates, difficulties in finding funding for nursing research projects or their management, a lack of research groups on care and a paucity of scientific journals with indices of quality.

What do we contribute?

This is an analysis of the current situation of nursing research in Spain, and proposals, recommendations and strategies for the promotion of care research by the responsible bodies and institutions.

Introduction

The current status of nursing research in Spain cannot be understood without studying the profession's evolution over the past 40 years. The social, political and economic context that has so notably determined the future of the nursing profession in Spain will inevitably do the same for care research. Key events have taken place on an academic level. While nursing had been a degree subject for decades in the English-speaking countries, it was not until 1977 that it became a degree course in Spain.[1] This decision enabled nursing to progress from a ''technical'' occupation to become a profession, and this coincided historically with the health services adopting a more holistic approach to care and the development of primary care. Nursing was one of the main drivers of this reorientation.

This stage, although important, had one momentous and repressive limitation: nursing was considered a university course, but of diploma rather than degree level. This automatically restricted access to postgraduate and doctorate study, with the accompanying consequences on research. Thus, Spanish nursing had to develop research outside the official academic circuit, either in a health or a university setting, through initiatives not included in doctorate programmes (or by studying degrees in other disciplines and gaining doctorates in other subjects). This was a clear symptom of what Freire describes as the ''oppressive actions'' of hegemonies to keep nurses at a lower level of education, and has been widely documented.[2] It was only when degree courses came into being, adapted to the European Higher Education Area, that Spanish nurses were no longer prevented from studying for a doctorate, and no longer had to gain a different degree.[3]

As a consequence, the thirty years between 1977 and 2007 was a period in which Spanish nurses had to develop research under conditions that were often far from optimal. However, as we shall see, the development of nursing research was not impeded.

Thus, events took place over these three decades to lessen the limitations that the restrictive academic order had imposed on research activity. In 1987, the Carlos III Health Institute (ISCIII), at that time under the Ministry of Health, decided that nurses could request competitive

funding for research and created technical evaluation committees on which nurses participated. This was the first time in history that nurses in Spain became eligible for public funding for research into care.

Moreover, in 1996, the ISCIII created a work group on the situation of nursing research in Spain, which was subsequently consolidated as INVESTEN-ISCIII and later as the Healthcare Research Unit. The Unit has maintained a formal structure since 2000 in drawing up the key points of the national nursing research programme, as well as promoting and coordinating translational and multidisciplinary research into care.[4] The Spanish centre for evidence-based healthcare was created within the Unit, in conjunction with the autonomous communities, in 2004, in order to drive initiatives to promote decision-making in the national health system structures within the framework of evidence-based healthcare towards improving health outcomes. Through all these years, in collaboration with international institutions such as the Joanna Briggs Institute or the Ontario Nurses' Association, it has driven training projects on evidence-based practice skills, funding internships in this area, and the Centres Committed to Excellence in Care® (CCEC®) strategy for the implementation, assessment and dissemination of good practice guidelines.[5]

Another important milestone was the publication in 2003 of the Act regulating the health professions (*Ley de Ordenación de las Profesiones Sanitarias*) which filled a legislative vacuum in the evolution of the professions and society. This Act explicitly recognises the research function of healthcare professionals that include nurses. Active participation in research activities is therefore an intrinsic function of the nursing profession. The Act also provides that all health centres and services that meet the appropriate conditions are considered research centres.[6]

In 2008, the contents and competencies were approved of nursing degree courses that explicitly require students to be able to base nursing interventions on scientific evidence. This means that undergraduate training courses must ensure that graduates have basic skills in using the results of research for decision making, and therefore in understanding, accessing and managing the results of research.[7]

Earlier, nursing specialisation programmes started to be developed, using the same model as medical specialities, through resident systems in accredited teaching units.[8] There were many problems that hampered their progress until very recently.[9,10] This is worth highlighting because all training programmes for nursing specialties will include research skills and some will demand a research project to be designed during the specialty[11] and enable specialist nurses direct access to doctorates, as ruled in 2011 under the legislation on doctorate studies in Spain.[12]

Another decisive factor in the development of nursing research in Spain is the decentralisation of health service management among the autonomous communities. This has enabled some of the autonomous communities to spearhead their own care research incentivisation programmes with positive discrimination strategies to promote and accelerate the inclusion of nurses in research funding. However, this is taking place at different speeds and in different ways.

Finally, in addition to the government initiatives, Spanish nursing research has been driven by professional and scientific organisations, which have included in their activities training and incentivisation through research grant schemes, prizes, organising scientific meetings, etc. In this regard, worthy of note are projects such as *Fundación Index*,[13] a scientific body that has worked in nursing knowledge management since the mid eighties, developing research lines and groups, creating the CUIDEN database, undertaking training activities and promoting scientific meetings, the *Fundación para el Desarrollo de la Enfermería* (Foundation for the Development of Nursing) with training, advice, and dissemination of research projects,[14] and the actions of some professional bodies and scientific societies that over the years have funded calls for applications for research prizes and project grants.

As we can see, the sequence of events and circumstances has been intermittent, with fluctuations and grey areas, with more barriers than facilitators, and with no planned global strategy for the development of care research between the agencies involved. Yet, these 40 years have culminated in an important juncture for the future of nursing research in our country, which raises some questions as to its current status.

The aim of this analysis is to offer a global perspective of care research in our country, from various points of view and with a marked inter-autonomous community approach, due to the way our health services are configured, which as we have mentioned, has generated certain variations that need to be taken into consideration. The final purpose of this analysis is essentially to elicit thought and debate as to possible short and medium term strategies to guide planning and decision-making among the different agents involved in nursing research in Spain.

Method

A multimethod study was undertaken that combined documentary analysis with bibliometric methods from an ecological perspective. Searches were carried out of websites and institutional and corporate databases of universities, hospitals, primary care centres, research institutions and health research foundations. Data on public spending on research, innovation and development (R&I&D) were also consulted, as well as GDP per capita and the population of each autonomous community, from the National Statistics Institute. Data from government agencies and higher education institutions were also gathered, since these are the two main sources of R&I&D funding to which nurses have regular access. Individual contact was also made with research unit managers in the event of any doubts concerning the available institutional information.

The bibliometric analysis was completed with the information available in *SCImago Journal & Country Rank* for the period 1996–2015, *Fundación Index*' Evidence-based Nursing Observatory, *Fundación Index*' catalogue of periodical publications, Google Scholar Metrics and the bibliometric analysis of the Spanish Foundation for Science and Technology, for the most part SCOPUS-based, taking into account the relative activity index data in the field Nursing per Autonomous

Community (percentage of the total production of articles in all subject areas compared to the global quota of nursing articles: a value of one indicates that a community's nursing research activity corresponds exactly to the activity in Spain in that area; values above one indicate that there is more nursing production in that community and lower values indicate precisely the opposite).

Analysis

The information was categorised into scientific policies and strategies for care research, resources and structures for research (research groups, official postgraduate programmes, R&D&I investment), and activity and production (bibliometric production and nursing journals). All the data were analysed aggregated at autonomous community level, when the data were available at this breakdown level.

It is important to highlight that in the information on research groups, in order to be able to make inter-autonomous community comparisons, some national groups have been calculated as such, in the knowledge that they are included per component from several autonomous communities, but, whose breakdown at autonomous community level would not make sense.

Descriptive statistics were performed, with measures of central tendency and dispersion, bivariate analysis by correlation, and multivariate linear regression analysis taking the number of nursing research groups variable as dependent and public spending on R&D&I inputs, relative activity index, GDP per capita and population as predictors. All the analyses were completed with $p < 0.05$ levels of significance and SPSS 23 and STATA 14 software.

Results

Scientific policies and strategies for care research

The nursing collective itself has attempted over the years to set certain generic[15] and community nursing[16] research lines and priorities (Table 1).

Moreover, at ISCIII level and in some autonomous communities, there have been calls for grants to fund care research projects, either specifically for nursing, or calls granting access to nurses, or positive discrimination for care research proposals. In the period 1996–2004, 673 projects were submitted to the ISCIII, of which 28% were funded.[17] Other initiatives have been added to these, such as research activity intensification, human resources for research and further study scholarships, among others, to which nurses have become eligible to a greater or lesser extent.

The Health Strategy Action, developed via the National Training, Incorporation and Mobility Subprogrammes of the National Programme for Talent Promotion and Employability and the National Subprogrammes of Institutional Strengthening and Knowledge Generation, of the National Programme for High Level Scientific and Technical Research, allows nurses access to all their modalities.[18] Specifically, a research line ''Promotion of research into care'' is established in article 3, on subject priorities and priority research lines, in section (c) promotion of research into public health, environmental health, occupational health and dependence and health services, towards better functional quality of life in the population.[19]

At autonomous community level, research project funding in Andalusia in the period 2005–2014 had specific incentives for nursing research in each of the public calls for health research. According to data provided by the Progress and Health Foundation, under the Health Ministry of the Andalusian Government, 31,700,164 euros went towards public calls for research project funding in the period 2005–2014. During this period 5694 projects were presented and 1132 were funded, which was a success rate of 20%. Of the total number of projects requested, 687 (12.07%) had a nurse as the principal researcher and 143 were funded, constituting a success rate of 20.8%. The total amount of funding granted to these 143 projects was 1,790,488€ (5.6%).

Along the same lines, other autonomous communities have also been promoting the funding of research projects to which nurses are eligible or that are specific to nursing, such as the Canary Islands (Canary Island Foundation for Healthcare Research). There is no specific data on the number of projects and amounts funded.

Other initiatives, have been good drivers for nurse training in research. These include the quid-INNOVA programme,[20] developed between 2005 and 2010, set up to train nurses in research methodology and PICuida – Care Strategy of Andalusia,[21] in place since 2015, with a clear mission to incorporate research and innovation towards excellent care.

Resources and structures for research

Doctorate programmes

In academe, 48 of Spain's 83 universities (50 public and 333 private) offer doctorate programmes open to nurses for either specific nursing science doctorates (20.4%), or multidisciplinary doctorates in health sciences (79.5%). The greatest number of nursing doctorates is offered by the public universities (n = 39, 81.30%).

Research groups

The heterogeneity of institutions and groups make it difficult to obtain a thorough record of nursing research groups. A total of 87 research groups have been located throughout Spain: 84 regional groups and 3 recorded as ''national'' (Palliative care, Spanish Network of Nursing Taxonomies and Healthcare Research Unit) (Table 2). The autonomous communities with the highest number of groups are Andalusia (28.1%), Catalonia (18.0%) and Murcia (12.4%). The data adjusted by population record 1.88 nursing research groups per million inhabitants (Table 3). On comparison between the autonomous regions, Murcia has the highest density of research groups per population, followed by Cantabria and Navarra. Adjusting the data by nursing research group according to GDP per inhabitant, Andalusia comes first and is followed by Murcia and Catalonia (Fig. 1).

Table 1 Nursing research priorities in Spain.

Priorities (2010)

1. Evaluation of the efficacy of nursing interventions
2. Health promotion: development of strategies to involve the user in their care
3. Evidence-based care: implementation and evaluation of results in clinical practice
4. Measuring the quality of nursing care
5. Palliative care and quality of care for terminal patients and their families
6. Health promotion in vulnerable populations
7. Quality of life of elderly people and their carers
8. Health promotion and disease prevention in childhood and adolescence
9. Care resources and interventions in the elderly
10. Self-care and decision-making with regard to the health of the individual, him or herself

Lines of research in community nursing (2011)

1. Care management
2. Quality of life and healthy living habits
3. Life styles and health education for children and adolescents
4. Preparing and validating nursing evaluation tools
5. Patient safety
6. Accessibility of care and self-care
7. Gender and health
8. Knowledge management
9. Assessment of the care needs of people and their carers
10. Users expectations of home care
11. Nurse prescription
12. Transcultural adaptation of care
13. Expectations of users of nursing consultation
14. Prevention of accidents in the home
15. Occupational health

The institutions that most commonly accommodate nursing research groups are the universities (58.4%), followed by the research institutes (23.6%) (Table 3).

Investment in R&D&I

Investment in the period 2005–2015 showed a positive variation rate in all the autonomous regions, although with notable differences between them. By contrast, this same analysis performed in the period 2009–2015, coinciding with the economic crisis, which had a major impact on funds allocated for R&D&I, showed a general pattern of disinvestment for this item in all the autonomous communities, apart from the Basque Country. Although there was significant variability between the autonomous communities (Table 3).

The number of nursing research groups was analysed with respect to the variation rate in R&D&I in the period 2005–2015, and no correlation was found ($r = 0.21$; $p = 0.417$). Neither was a correlation found with the variation rate in the period 2009–2015 ($r = 0.142$; $p = 0.586$), with and without adjusting by GDP per inhabitant. By contrast, a significant correlation was found between the population volume and that of the research groups per autonomous community (rho = 0.52; $p = 0.031$).

Table 2 Nurse research groups in Spain, per institution types.

Institution	No.	%
University	52	58.4
Health services	8	9.0
Research institutes	21	23.6
Research foundation	5	5.6
Scientific society	3	3.4

Activity and production

Spain ranks high in terms of nursing's scientific production. According to data from the SCImago Journal & Country Rank (SJR) for the period 1996–2015,[22] Spain is seventh in the world in scientific production in the area of nursing, from a total of 257 countries analysed. Table 4 shows the disaggregated data from the 10 most productive countries.

The Spanish Foundation for Science and Technology's report on scientific production in Spain in the period 2005–2014 shows that Catalonia and Madrid are the most scientifically productive communities in Spain. However, in neither case does the normalised impact factor include nursing as a major discipline (Catalonia is the leader in normalised impact in neurosciences, medicine and the multidisciplinary category and Madrid focuses on immunology and microbiology, neuroscience and medicine). Andalusia is the community where nursing appears as the discipline with the greatest increase in relative activity index in the period 2005–2014 (relative increase in RAI of 1.40), followed by the community of Valencia (relative increase in RAI of 1.31), then Murcia (1.25) and Navarra (1.25) (Table 3).

Table 3 Nurse research groups per autonomous community and total public spending on R&D&I (2005–2015 series).

Community (n. groups)	Groups/million inhab.	Groups per GDP[a]/1000 inhab.	RAI Nursing 05–09	RAI Nursing 10–14	RAI[b] Nursing 05–14	Δ relative RAI 05–09 vs 10–14	Variat. public spending on R&D&I 05–15 (%)[b]	Variat. public spending on R&D&I 09–15 (%)	Public spending on R&D&I 05[b] (% GDP[b])	Public spending on R&D&I 09[b] (% GDP[b])	Public spending on R&D&I 15[b] (% GDP[b])
Andalusia (25)	2.98	1.46	1.14	1.60	1.37	1.40	36.29	−9.80	711,196 (0.34)	1,074,535 (0.66)	969,282 (0.67)
Aragon (2)	1.51	0.08	1.20	1.39	1.30	1.16	48.07	−11.09	96,152 (0.41)	160,132 (0.41)	142,372 (0.4)
Asturias (0)	0.00	0.00	0.84	1.00	0.92	1.19	20.87	−33.85	72,217 (0.27)	131,960 (0.53)	87,292 (0.39)
Balearic Islands (4)	3.54	0.17	1.69	1.87	1.78	1.11	60.84	−10.38	47,001 (0.5)	84,357 (0.28)	75,598 (0.28)
Canary Islands (3)	1.41	0.16	1.01	0.99	1.00	0.98	1.09	−13.44	164,139 (−0.01)	191,692 (0.49)	165,927 (0.39)
Cantabria (2)	5.14	0.14	0.93	0.42	0.68	0.45	104.71*	−31.18*	31,283 (1.08)	93,049 (0.62)	–
Castilla y León (2)	0.97	0.09	1.29	1.28	1.29	0.99	27.55	−2.72	194,282 (0.25)	254,740 (0.49)	247,806 (0.42)
Castilla-La Mancha (2)	0.81	0.11	1.22	1.11	1.17	0.91	41.62	−36.08	71,106 (0.38)	157,535 (0.28)	100,702 (0.27)
Catalonia (16)	2.16	0.58	1.44	1.21	1.33	0.84	56.80	−3.42	841,817 (0.49)	1,366,749 (0.61)	1,319,969 (0.65)
C. of Valencia (6)	1.22	0.29	0.77	1.01	0.89	1.31	10.68	−10.24	541,284 (0.1)	667,391 (0.57)	599,079 (0.61)
Extremadura (1)	0.92	0.06	1.31	1.67	1.49	1.27	21.30	−28.31	79,390 (0.17)	134,330 (0.68)	96,297 (0.52)
Galicia (0)	0.00	0.00	0.93	0.67	0.80	0.72	19.09	−6.32	229,161 (0.13)	291,333 (0.52)	272,919 (0.47)
Madrid (6)	0.94	0.19	1.09	1.19	1.14	1.09	19.59	−15.84	1,235,039 (0.08)	1,754,902 (0.82)	1,476,947 (0.75)
Murcia (11)	7.51	0.59	1.51	1.89	1.70	1.25	49.20	−5.04	94,049 (0.44)	147,760 (0.5)	140,319 (0.5)
Navarra (3)	4.72	0.10	2.56	3.20	2.88	1.25	34.39*	−2.20*	87,802 (0.25)	1,206,49 (0.6)	–
Basque Country (2)	0.92	0.07	1.37	0.93	1.15	0.68	79.64	6.69	184,154 (0.67)	310,076 (0.38)	330,810 (0.52)
Rioja (0)	0.00	0.00	0.01	0.73	0.37	73.00	1.54	−1.66	14,552 (1.44)	37,622 (0.41)	36,998 (0.43)

RAI: relative activity index.

[a] *Source*: National Statistics Institute.

[b] *Source*: Spanish Foundation for Science and Technology.

* Data from 2015 not available, calculations made from the latest available year.

Among the most outstanding areas of growth in citations over the period studied are medicine (+0.29), nursing (+0.27), computer science, dentistry, pharmacology, toxicology and pharmacy (all +0.19) and decision science (+0.18). The report also highlights as areas with the greatest growth in normalised impact of downloads: nursing (47% growth), medicine (25.3%), economics, econometry and finance (2.3%) and physics and astronomy (19%). Finally, the three areas of particularly high growth in international collaboration, between 2005 and 2014, are the arts and humanities (32%), nursing (25%) and social sciences (24%).[23]

In 2015, the Evidence Based Nursing Observatory of the *Fundación Index* performed a survey on nurses on the use of scientific information. In total 914 responses were gathered, in the main from Spanish nurses with clinical practice. When the respondents were asked where they had last obtained a text on clinical practice, more than 75% answered that they used an electronic resource. Forty-eight point four percent used scientific databases, 23.1% used websites on the Internet, while 7.1% used social network.

Figure 1 Distribution of research groups adjusted by GDP per 1000 inhabitants.

The respondents showed an appropriate level of knowledge and management of electronic reference resources. PubMed, COCHRANE, CUIDEN, CINAHL, SCOPUS, Web of Science, are highlighted, and a wide range of resources on scientific evidence, those providing access to clinical practice guidelines received special mention.

As an example, the growth in the management of electronic scientific resources can be seen in Fig. 2, which shows

Table 4 SJR per country in the area of nursing, in the period 1996–2015 Beginning of the form.

Position	Country	Documents	Citable documents	Citations	*h*-Index
1	United States	193,819	171,586	2,940,245	373
2	United Kingdom	61,730	52,419	846,269	249
3	Australia	26,168	23,228	341,667	163
4	France	25,265	22,614	249,586	172
5	Canada	24,794	22,186	406,479	191
6	Germany	23,082	20,561	323,890	191
7	Spain	16,289	13,860	197,624	148
8	Brazil	13,050	12,507	86,638	87
9	Japan	12,907	12,026	196,953	142
10	Italy	12,761	11,406	241,581	166

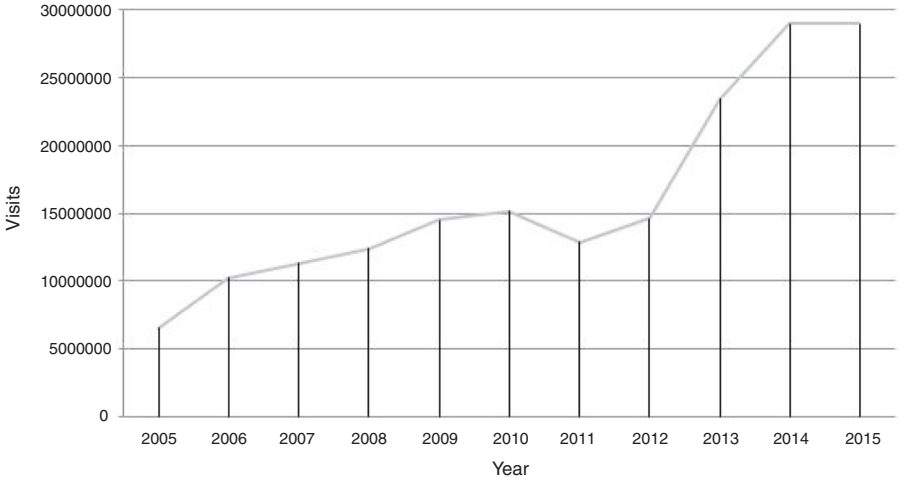

Figure 2 Evolution of visits to CIBERINDEX.

the evolution of the number of hits on CIBERINDEX. This website includes different nursing science knowledge dissemination resources which are being recognised in Spain.

Finally, a multivariate linear regression model was constructed into which were entered as explanatory variables the variation rates in R&D&I, population numbers in 2015, GDP per inhabitant of each autonomous community, the relative activity index in nursing 2010–2014 and the relative increase of RAI in 2005–2014. The number of research groups was entered as a dependent variable. The model offered an acceptable explanatory capacity (r^2: 0.69; $p = 0.001$) and adequate adjustment conditions, showing how the population volume, together with the growth in public spending on R&D&I and the increased RAI in nursing, are associated with a greater presence of nurse research groups (Table 5).

Scientific nursing journals in Spain

According to the *Fundación Index*'[24] catalogue of periodical publications, 111 scientific journals are published in Spain. The presence of these journals in the world impact rankings

Table 5 Multivariate regression model for the number of nurse research groups per autonomous community.

	B	Stand. Coef.	*p*	95%CI	
				Inf	Sup
(Constant)	−0.043		0.988	−6.34	6.20
Population 2015	0.00002	0.998	0.000	0.000	0.000
GDP per inhabitant 2015	−0.001	−0.408	0.001	−0.001	0.000
Variation in public spending on R&D&I 2005–2015	0.111	0.460	0.001	0.058	0.163
Nursing RAI 2010–2014	4.460	0.429	0.000	2.37	6.55
Relative increase nursing RAI	0.136	0.358	0.005	0.049	0.222

Table 6 CUIDEN citation ranking—2015 and *h*5 index of Google Scholar Metrics 2015.

Journal title	RIC factor	Quartile	Position	*h*5 index 2015[a] (median *h*5)[b]
Index Enfermería	1.711	1	6	10 (12)
Enfermería Global	0.904	2	17	13 (16)
Enfermería Clínica	0.731	2	21	11 (15)
Matronas Profesión	0.607	2	26	5 (7)
Enfermería Nefrol	0.537	3	28	7 (10)
Gerokomos	0.5	3	29	8 (16)
Enfermería Intensiva	0.478	3	30	10 (12)
Temperamentvm	0.435	3	31	n.d.
Cultura de los Cuidados	0.396	3	33	10 (12)
Evidentia	0.342	3	35	3 (4)
Revista ENE Enfermería	0.324	3	36	4 (6)
Nure Investigación	0.279	3	39	5 (7)
Enfermería Comunitaria	0.25	4	40	n.d.
Metas Enfermería	0.212	4	42	7 (8)
Enfermería Docente	0.192	4	43	n.d.
Revista Rol Enfermería	0.152	4	45	4 (6)
Hygia de Enfermería	0.091	4	49	3 (3)
Archivos de la Memoria	0.083	4	50	2 (3)
Revista Ética de los Cuidados	0.067	4	51	n.d.
Revista Paraninfo Digital	0.053	4	52	n.d.
Biblioteca Lascasas	0.028	4	53	n.d.
Enfermería integral	n.d.			3 (4)
Ágora de Enfermería	n.d.			1 (2)
REDUCA	n.d.			4 (4)
Enfermería Dermatológica	n.d.			3 (4)

[a] Index *h* of the articles published in the last 5 full years. This is the highest *h* number where *h* articles published between 2011 and 2015 should have at least *h* citations each year.
[b] Median number of citations of the articles that comprise the *h*5 index.

is unequal. Currently no Spanish nursing journal is indexed in the Journal Citation Reports, although several journals are accessible on the Web of Science environment through Scielo Citation Index[25] and *Enfermería Clínica* is currently selected on the Emerging Sources Citation Index of Claryvate,[26] which is the step prior to inclusion in this index.

CUIDEN citation is the ranking in which the Spanish journals have most presence, which provides information on nursing journals in the Ibero-American scientific knowledge space. Fifty-three journals are included in the ranking published in 2015,[27] of which 22 (41.5%) are Spanish (Table 6).

In a study performed through Google Scholar Metrics,[28] 366 nursing journals appeared as indexed in the period 2008–2012, of which 17 were Spanish. The 2015 *h*5 index shows five Spanish journals with values equal or above 10 on this indicator (Table 6).

The indexing of Spanish nursing journals in SCImago Journal & Country Rank (SJR)[29] is heterogeneous in relation to the areas of knowledge. In 2015, in the area of nursing we found 5 indexed journals out of a total of 575 and another 4 appeared in other related areas of knowledge, while a further 8 were catalogued within the area of nursing but are not nursing journals (Table 7).

Discussion

This study seeks to offer an analysis of the current situation of nursing research, four decades since nursing became a university course, during which time decisive events and circumstances have coincided for research.

The results obtained in terms of research groups produce a density of 1.88 groups per million inhabitants. It was not possible to find similar data with other countries regarding nursing research groups, and only data from the World Bank was available which calculated in 2014, on a global level for all the disciplines, a total of 2642 researchers dedicated to research and development, per million inhabitants. However, this data is not comparable, since it concerns people and not groups and covers all the scientific disciplines.[30] An approximate idea of the volume of nursing research groups compared to other references might be that of the CIBER and CIBERNED consortia, who are only one part of the health research system in our country. In addition, more than 400 research groups participate from hospitals, universities and public research bodies. Of course, our study faced the limitations of a possible lack of data available on the institutional databases, and these did not always reflect reality. There are also groups with activities that we do not identify in our analysis but whose institutional affiliation through the normal channels was not fruitful, which is an issue that questions the institutional visibility of nursing research. It is not easy to determine whether this density of research groups is poor or sufficient and only analysis of scientific production, and the social impact and transference of the research produced by these groups can establish whether they are adequate. It is possible that without sufficient critical mass, impact and transference might prove an enormous effort but it is also true that a set number of groups is no guarantee of high-quality and impactful research.

With all the reservations involved with ecological analysis, multivariate analysis shows how the increase in public spending on R&D&I and the growth in bibliometric impact are associated with a greater density of research groups. Moreover, in some cases this growth coincides with that within the autonomous communities where there have been positive discrimination policies, and where nursing research has been promoted.

It is feasible for groups with research activities to exist with no funding,[31] and this is characteristic of emerging groups and disciplines that do not have a long research tradition. However, Moreno-Casbas et al. identified how nurses who obtain funding for research display a more favourable attitude towards research and perceive the barriers to research differently, these aspects, a priori, favour the creation of research groups.[32] The evidence indicates that incentivisation policies for care research are a strategy that all national and regional organisations should consider, especially at a time when many of the current health challenges associated with complex chronicity, coordination and continuity of care, promotion of self care and clinical safety, and incorporating the opinions of patients and their family carers might benefit from research by one of the disciplines best placed to approach these problems.[33–35] Bearing in mind the decentralised structure of our healthcare system, positive discrimination should be uniformly reinforced throughout the autonomous communities as a common strategy to prevent the current geographical inequality in the development of research groups.

Research funds do not necessarily have to come from public institutions, but it seems that private industry has no particular interest in care research groups, apart from the areas where there is a clear commercial interest because of the influence of nurse decision-making on their products, in the areas of wound care, catheters, etc. Some emerging alternative routes such as crowd-funding might be worth exploring in the future and might become an indirect way of increasing the social visibility of nursing care and research.[36]

Furthermore, research nurses are definitely included in multidisciplinary research groups, with scientific production in collaboration, that do not appear in our analysis, since we have only covered nurse-led or multidisciplinary groups whose principal research activity focuses on care. We should not lose sight of the fact that the existence of a research group does not necessarily imply that it is scientifically productive, just as there are nurses who produce research results who are not in research groups. Our focus in this study on the research group as an analysis unit is a limitation in that it does not take the density of individual researchers or those who do not constitute groups over the country into account. On the other hand, Gálvez Toro et al.[37] ascertained that the existence of very productive research nurses in Spain is associated with the formation of research groups and it is undeniable that research of quality currently requires the combined effort of research groups.

Given these results, now more than ever an updated and exhaustive national register of research groups is required. Furthermore, it is inexcusable that the different institutions that accommodate these groups do not always guarantee their standardised visibility, as we have established in this study. However, it is also essential that the many nurses who are producing research results should form and

Table 7 Nursing journal ranking SJR, 2015.

Area	Journal	SJR	*h* index	Quartile
Nursing	*Enfermería Clínica*	0.245	11	Q3
Critical Care Nursing	*Enfermería Intensiva*	0.334	10	Q2
Medicine	*Revista Rol de Enfermería*	0.103	7	Q4
Geriatrics and Gerontology	*Gerokomos*	0.208	7	Q3
Nursing	*Enfermería Nefrológica*	0.190	4	Q4
Obstetrics and Gynecology	*Matronas Profesión*	0.112	3	Q4
Health (Social Sciences)	*Index de Enfermería*	0.142	3	Q4
Nursing	*Enfermería Global*	0.140	2	Q4
Nursing	*Rev. Sociedad Española Enfermería Neurológica*	0.119	1	Q4

come together in research groups, which have been formalised under the format offered by the institutions in which they practice, because this is a fundamental step for their consolidation and visibility. This is a step to which many nurses still do not relate, but which is essential at this time.

The existence of isolated studies and researchers with disperse and intermittent funding, does not favour the collection of large amounts of data with prolonged follow-up periods, which enable solid results consistent with the great challenges that the current health problems pose to researchers.[38] To combat this, the fragmentation of studies and researchers needs to be overcome and care research needs to be ''molecularised''. In this regard, the creation of care research networks has acquired a strategic importance perhaps never before seen in our country. The barriers that Spanish nurse researchers have encountered in this area and the funding agencies' lack of interest are well known.

At the same time, many funding agencies and organisations are promoting multidisciplinary research in groups made up of different disciplines.[39] This can be used as an argument in response to the demand for care research networks. Without questioning the wealth of multidisciplinary research, which is indisputable, this subject is rarely approached taking conditions of symmetry in the leadership of the groups into account. While in other areas of the health services status biases appear to be being overcome with regard to nurse leadership—in the management or rendering of some services for example—in the field of research many stereotypes persist that constrain the configuration of research groups, the composition of ethical committees, and research unit managers. These biases are largely down to the research hospital's hegemony, such as in the case of primary care.[40] There is an ascending gradient of the multi-inter-transdisciplinarity of research, in terms of the integration of methods, theories and concepts, in which nursing and other disciplines still have a long road ahead until they can participate in multidisciplinary teams other than as ''data managers'' or sample gatherers, and enrich the teams with nursing methods, concepts and theoretical approaches. However, there are isolated exceptions.

The success of multidisciplinary teams in research is down to how familiar the team members are with each other, the social cohesion between them, perception of status and styles of leadership.[41] Knowledge integration between disciplines can be very affected by these factors, which even though well known, do not appear to be being addressed, according to recent reviews of the issue.[42,43]

The automated response to the demand for care research networks being that nurses should be included in multidisciplinary research teams is not the solution while the abovementioned asymmetries persist, and it is in turn promoting the fragmentation of research among the more than 80 groups that we have identified in this study. The real situation of nursing research in Spain at this time cannot allow this error by research planners and managers to continue. It is possible that nursing itself is prisoner to the institutional bias against nurse leadership (described as nursogyny by Ramos-Morcillo et al.[44]). This is equivalent to assuming that the population does not need advances and results in care research.

Another noteworthy result is that Spanish nurses' scientific production has grown exponentially at a greater speed than its capacity to gain funding. With the limitations offered by the different metric systems for evaluating production, Spanish nursing appears well positioned in the analyses that have been performed. A further sign of the tenacity displayed by Spanish nurses throughout these years in overcoming the many barriers that they have encountered to be able to research leads us to wonder where nursing scientific production would be now if they had received sufficient support. Various research studies undertaken in our country show the relevance of the support of the health organisation and of nursing managers in the use of nurse research results.[45,46] Therefore, institutional support is another element that cannot be lacking in the strategy to further nurse research. The health services' research units and collaboration between university departments of nursing and the health services can be determining factors in this sense and there are initiatives in other countries that show the path to follow.[47]

However, although bibliometric impact is one of the most valued indictors to assess scientific activity, it is essentially an indicator of the visibility and dissemination of papers, so it is not a good measure of scientific performance. A significant number of scientists and organisations have pronounced on this matter through the San Francisco Declaration on Research Assessment.[48]

Similarly, we must not forget that the true final impact of research is when it reaches citizens, transforms societies

and helps to improve their quality of life.[49] The current evaluation models of production and funding, focussing on bibliometric impact, are possibly affecting the objective of researchers and groups, who are obliged to demonstrate an impact curriculum, rather than research with social impact.[50]

There are still no results from the effect of the ''academic transition'' of Spanish nursing when they broke their glass ceiling in accessing doctorates, but associated doctoral theses and publications are gradually taking off in volume (although the statistics of doctoral theses of the Ministry of Education, Culture and Sport in 2014 and 2015 appear to have no data on ''nursing and patient care'' as a thesis subject area). The results of bibliometric indicators have shown a notable increase in production over the past five years, just when the nursing doctorate programmes have found a definitive place in the Spanish universities. This is an issue that must be analysed in depth in the years to come, since this is a resource for promoting care research and destined to become a lynchpin, as noted by the Institute of Medicine, when they recommended that the number of nursing doctorates should be doubled in the U.S.A., due to the proven care and academic benefits they entail.[51] The sequence ''doctorates equal more research'' (and of more quality?) is more than predictable, since nursing production without this vitally important resource has been remarkable, and therefore it is expected that doctorates will catapult production.

Having reached this stage, it is essential to manage the careers of young researchers appropriately. Spanish nursing has not yet tackled this issue structurally, due to the academic limitations imposed on it. The future of care research lies in constructing a robust, innovative and enthusiastic critical mass. This critical mass must be managed now in the degree course, with an introduction to research and evidence-based practice being compulsory on the curriculum, and undergraduates must be encouraged to participate in departmental research groups. Creating a scientific viewpoint in these stages of professional development is possibly one of the best seeds that can be sown for research to flourish. Subsequently, at postgraduate level, the collaboration of predoctorate nurse researchers should be nurtured and encouraged by offering them appropriate support mechanisms, encouraging them to apply for predoctoral grants to enable them to develop as researchers in suitable conditions. Doctorate students should be offered high quality supervision, mentoring processes and solid training in research skills. They should also be offered a research career to enable them to visualise midterm how their efforts in taking this option will be rewarded.[52] The influence of gender on research careers should not be forgotten in this list of strategies, as shown by the gender biases in publication in nursing journals, despite the fact that it is a predominately female profession.[53,54]

Conclusions

Nursing research in Spain is sensitive to the policies and resources for promoting research, although there is no consolidated and uniform strategy to overcome current barriers. Nurses in Spain have made an effort to research which exceeds the resources and support obtained as scientific production data shows. The impact of the academic development of Spanish nursing on scientific production is still unknown.

Conflict of interests

The authors have no conflict of interests to declare.

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