

## Nursing research in Spain: bibliometrics of references of research papers in the decade 1985–1994

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**Nursing research in Spain: bibliometrics of references of research papers in the decade 1985–1994**

**Background.** Spain is one of the few European countries to have recently totally incorporated the study of nursing into the university sector. Bibliometric studies may be of a great help for the consolidation of nursing research.

**Aim of the study.** The aim of this paper is to describe bibliographic references in Spanish nursing research papers and their evolution over a decade.

**Method.** The method consists of a retrospective bibliometric study of a sample (cluster sampling) of 622 research papers (original papers and review papers), which were contained in the Spanish nursing journals *Enfermería Científica*, *Revista ROL de Enfermería*, *Enfermería Clínica* and *Enfermería Integral*, and published from 1985 to 1994. The journal *Nursing Research* was selected for qualitative comparative purposes. A series of classic bibliometric indexes were used.

**Results.** The mean of references per paper is  $10.64 \pm 10.42$ ; this increased over time ( $P < 0.001$ ). Review papers have more references ( $P < 0.001$ ). Price index (percentage of references published during the last 5 years) is 44% and the Insularity (percentage of references published in same country as the article) is 55%. References to journals predominate (58.6%), with a growing tendency for references to Spanish nursing journals, although they are still scarce (18.1% of the references to journals). Spanish is the language of most of the references (60.3%), the second language being English (36.1%).

**Conclusions.** Bibliographic references in Spanish nursing research papers are scarce and not very specific: this happens both in regard to *Nursing Research* and to

publications in other national and international science areas. However, there is an increasing tendency of references (including references to nursing journals) in the period analysed. The age of the references places Spanish nursing in an intermediate position between the 'hard' sciences and the humanities; and, according to the type of documentation used, we find it halfway between experimental and natural sciences, and technologies and social sciences. There has been a slight increase in references in English in recent years.

**Keywords:** bibliometrics, Spanish nursing research, analysis of references, bibliographic references

## Introduction

One of the most popular ways to assess the state of a certain scientific discipline is using bibliometrics (Bradford 1934, Baiget 1986, López 1996), defined as the application of statistical and mathematical methods to describe the process of written communication and the nature and development of scientific disciplines (Pritchard 1969). The evaluation process of any activity requires the use of indicators and, because science is multidimensional, it cannot be evaluated with a simple indicator (Sancho 1990). According to Romera (1992), two large groups of works are distinguished: descriptive, on the one hand, and analysis of citations and references on the other. The former are focused on productivity, collaboration, and analysis of topics; therefore, they can contribute to factors such as a knowledge of the social structure of the scientific community, maturity of a discipline and main areas of interest, as well as the quantification of their output. The latter aim to describe the consumption of scientific information and to detect the works, authors and journals with a greater impact in the scientific community (among other characteristics), which helps towards tracking the intellectual and scientific development of the new subdisciplines which are being born (Moravcsik 1989).

As the use of bibliometric indicators does not make any sense without a context (López & Terrada 1992a), it is necessary to make brief reference to the discipline object of our interest: Nursing.

According to Fawcett (1994), research in nursing is based on four concepts: subject, environment, health and nursing assistance, and can be placed at the core of experimental, social and human sciences (Sánchez-Prieto 1997). Thus, the discipline can be approached from a series of perspectives, and is increasingly seen as a specific mix of areas of knowledge such as: biology, medicine, anthropology, and psychology, among others. Applying these sciences to nursing

and achieving a proper dynamics for its practice require a well-developed body of research studies (Smith 1981).

In Spain, as well as in many other European countries, research activity in nursing has been hindered because of its practical status in society and health institutions up to the 1970s. The discipline of nursing as an area of knowledge was not considered until nursing studies were included in the university curriculum in 1977. From then on, university studies have been the only way of entering the career in its various forms: care, management, education and research. This makes Spanish nursing representative of European university nursing. However, this integration has not been carried out fully, but just as a technical discipline and with an important academic limitation for the development of research: the Bachelor's degree does not exist in nursing in Spain, and there is no such thing as a nursing PhD in our universities. Therefore, initiatives – as to research – are still scarce, and many of them are not very consistent (Arcas 1994). Despite these limitations, research articles in scientific journals have increased greatly in Spain in the last decade (Pardo & Mallebrera 1993, Foro científico 1997). Also, there has been a proliferation of meetings, congresses, conferences and papers, with an increasing attention on the characteristics of nursing research (Moody *et al.* 1988, Kilby *et al.* 1991, Richart *et al.* 1994, Torra 1996).

In this sense, and from the bibliometric point of view, the analysis of references acquires a special relevance (Garfield 1978), as it is of great value to find out the characteristic features of scientific interest in the community (Sancho 1990). Although analysis of references is one of the most developed aspects of bibliometrics (López & Terrada 1992b), it is not very common in Spain in relation to nursing in comparison with nursing literature in the international domain, such as the works by Kilby *et al.* (1991), Garfield (1984), Schloman and Byrne (1992). Also, in most cases we deal with 'primary' works, where few aspects are determined (Richart *et al.* 1994, Gálvez & Salido 1999) and where even

the analysis of references is used to assess the quality (Soler *et al.* 1995). Some of the results reflected in relevant studies (Richart *et al.* 1994, Torra 1996) indicate that the average number of bibliographic references in articles published in Spanish nursing journals between 1991 and 1993 is close to 11 per article. Nevertheless, there exists a great disparity between journals in different areas (Del Burgo & Gervás 1992, González *et al.* 1997). Regarding the kind of literature used, books or journals, there is no agreement as to the best information sources (Aleixandre *et al.* 1995, Torra 1996), whereas there is a predominance of the Spanish language in bibliographic references.

In this paper, we have developed an analysis of references in research articles published between 1985 and 1994 in the four nursing journals with highest scientific productivity and regular periodicity in Spain; moreover, we have developed an approach to the main determining factors of the use of bibliography. The interval considered is long enough as to be able to detect important and more precise changes than in previous works. The differences with *Nursing Research*, as the most established journal in advanced nursing research and one with a high impact factor (Cabrero & Richart 1991), have been assessed qualitatively. The aim of this work is to improve the identification of the main areas of knowledge in which Spanish nursing research is being developed. At the same time, it identifies some very interesting suggestions for the evaluation and planning of information units that support research.

## Method

### Description of the type of study and criteria of inclusion

We have carried out a retrospective bibliometric study of all the research papers that have been published during 1985–1994 in the journals *Enfermería Clínica*, *Enfermería Científica*, *Revista ROL de Enfermería* and *Enfermería Integral*. These four journals have been chosen because they are the greatest producers of research articles within the decade studied, but also because they are nursing scientific journals of a national, diverse and periodical character. A timespan of 4 years was required in order to ensure that they are journals embedded in the nursing research domain.

We have considered as *research papers* those fulfilling Huth's (1992) criteria, that is, articles that are based on principles of critical reasoning and which faithfully communicate the methods, findings and interpretation. In consequence, not only original articles but also bibliographic reviews have been included (Icart & Caja 1994, Icart & Canela 1994).

### Reference population and sample

The reference population was constituted by the research articles included in 283 issues (all of which were published in the decade 1985–1994). These were taken from the Spanish nursing journals previously mentioned. About 216 issues were selected by cluster sampling, and distributed proportionally among the journals studied. These issues contained 622 research papers which were analysed. The sample size (Silva 1997) was chosen by having into account a reliance level of 99% ( $\alpha=0.01$ ),  $P=0.5$  (proportion of original papers per issue estimated according to the previous pilot-test) and  $E_0=0.02$  (margin for error of the estimation according to the same information).

Therefore, the issues constituted sample units, and all the research papers – from each selected issue were units of analysis.

### Variables

An analysis of bibliographic references was carried out, excluding the so-called 'grey literature' as defined by Moreno-Torres (1986). Thus five variables were identified: total number of references; number of references published during the last 5 years; number of bibliographic references to books, making a distinction between 'books published in Spain' and 'books published in other countries'; number of references to journals, analysed in four categories: 'Spanish journals', 'foreign journals', 'Spanish nursing journals' and 'foreign nursing journals'; language of the bibliographic references.

Taking previous studies into consideration (Icart *et al.* 1991, Cabrero & Richart 1992, Torra 1996), we described the following as independent variables: year of publication; journal of origin of the articles studied; type of research papers (original or review); number of authors; working institution of the first-named authors; and main theme of the articles. The latter, as other authors have already noted (Icart *et al.* 1991, Kilby *et al.* 1991, Richart 1996), is the variable which is most difficult to classify, because many thematic areas overlap in it. Therefore, the classification of themes was based on nursing curricular subjects. When overlapping occurs, the age groups were given precedence over the other themes; while regarding studies about adults, the key theme of the title or objective was taken into account. In this way, 12 topic categories were created, which appear in Table 1.

The following indexes were generated from those variables: collaborative index (number of authors per paper); price

**Table 1** Quantitative distribution of references according to the topics

Topics	Number of papers	Average	SD
Maternal–infant and child health	77	9.49	10.1
Medical–surgical (clinical)	148	9.71	9.3
Mental health–psychology–psychiatry	46	11.80	8.1
Nursing process	9	8.9	9.1
Nursing conceptual or theoretical models	8	17.12	14.7
Geriatrics–gerontology	19	12.05	18.7
Public health–primary care–occupational safety and health	182	11.5	11.3
Pharmacology	18	8.5	7.7
Dietetics–nutrition	27	17.29	12.4
Management (nursing services or health services)	27	9.92	7.9
Teaching–research–bibliometrics	36	6.16	4.5
Professional ethics–legislation	25	10.12	9.1
Total	622	10.64	10.4

SD = Standard deviation.

index (percentage of references published during the last 5 years); insularity (percentage of references published in the same country as the article); proportion of references to journals in relation to total of references to texts; proportion of references to nursing journals in relation to the total of references to journals in general, and finally, proportion of references to Spanish nursing journals and the total of references to nursing journals.

### Analysis of information

A basic descriptive analysis of the variables of study was developed. The global results and their distribution are presented according to journals and their development over time. Means were compared using ANOVAs, Pearson's correlation and nonparametric tests (Mann–Whitney test and Kruskal–Wallis *H*) were used for non-normal data.

Finally, all issues of the journal *Nursing Research* in the years 1993 and 1994 were analysed with the purpose of contrasting qualitatively the most important results.

## Results

### Quantitative distribution of references

The mean number of references per scientific paper is 10.64 ( $\pm$ SD 10.42); the minimum value is 0 references (58 articles) and the maximum is 86 (one article). The Median is in eight references.

#### Factors associated to the use of bibliographic references

Results are displayed in Table 2 according to the type of article (original or review). Mann–Whitney test two groups: 87.29; degrees of freedom (d.f.): 1;  $P < 0.001$ .

The results of this variable according to the various Spanish journals can be seen in Table 2 (Kruskal–Wallis *H*: 23.74; d.f.: 3;  $P < 0.001$ ).

The relationship between the total of references and the institution of origin of the authors turned out to be significant (Kruskal–Wallis *H*: 11.32; d.f.: 3;  $P < 0.025$ ). The University is the institution generating a highest number of both research papers (245) and average of references (11.47). It is followed by the hospital (224 papers, average of 9.34 references) and primary care (100 papers, average of 9.10 references). Other institutions generate 53 papers and an average of 15.6 references.

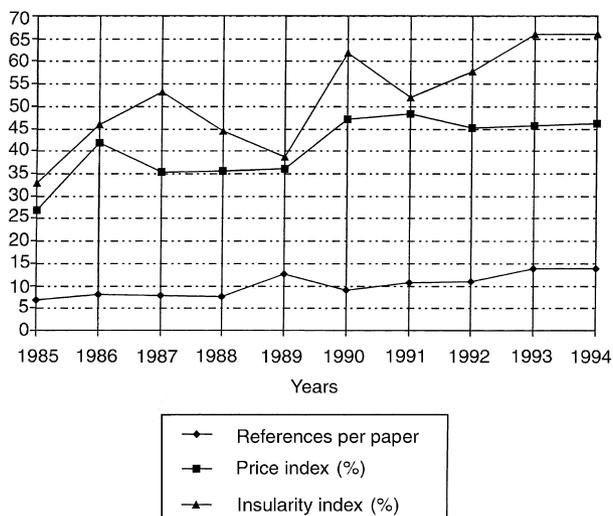
Table 1 shows the distribution of the number of references according to the themes of the articles (Kruskal–Wallis *H*: 32.21; d.f.: 11;  $P < 0.001$ ).

The relationship with the number of authors did not turned out to be significant (Kruskal–Wallis *H*: 12.54; d.f.: 10;  $P = 0.25$ ).

The change over time of the number of references is shown in Figure 1. There is a clear rise of references in recent years (Pearson's correlation: 0.195;  $P < 0.001$ ).

References	Original	Review	<i>Enfermería</i>				<i>Revista ROL de Enfermería</i>
			<i>Científica</i>	<i>Clínica</i>	<i>Integral</i>		
Number of papers	571	51	278	62	89	193	
Mean references/paper	9.17	26.96	10.47	13.46	7.30	11.48	
Standard deviation	7.95	18.23	9.9	8.8	6.1	12.5	
Minimum value	0	10	0	0	0	0	
Maximum value	68	86	79	40	33	86	
Percentile 25	4	14	5	8	4	4	
Percentile 75	12	33	13	16	10	15	
Median	7	22	8	10	6	9	
Mode	0	19	0	10	0	0	

**Table 2** Quantitative distribution of references according to the type of paper and to the studied journals



**Figure 1** Time evolution of the bibliometric indicators. Source: *Revista ROL de Enfermería, Enfermería Científica, Enfermería Clínica, Enfermería Integral*.

### Price index

In our study we found that 2937 references corresponded to publications of 5 years or under, which represents a price index of 44%. The distribution of price index according to journals is: *Enfermería Científica*, 43.7%; *Revista ROL de Enfermería*, 43.5%; *Enfermería Clínica*, 50.1%, and *Enfermería Integral*, 42.6%. The comparison of these proportions does not offer significant differences (ANOVA:  $F=1.355$  and  $P=0.256$ ). The trend of price index is shown in Figure 1 (Pearson's correlation: 0.043;  $P=0.305$ ).

### Insularity

We found 2979 references to foreign publications (mostly journals), which constitute a 45.03% of the whole, and therefore, the percentage of references of the same country is 55%. The insularity index found according to the different journals studied (nonsignificant relationship statistically speaking – ANOVA:  $F=0.257$  and  $P=0.856$ ) was: *Revista ROL de Enfermería*, 61.7%; *Enfermería Clínica*, 57.3%; *Enfermería Científica*, 52.3%, and *Enfermería Integral*, 56%. The change over time of the insularity index is shown in Figure 1 (Pearson's correlation: 0.134;  $P=0.001$ ).

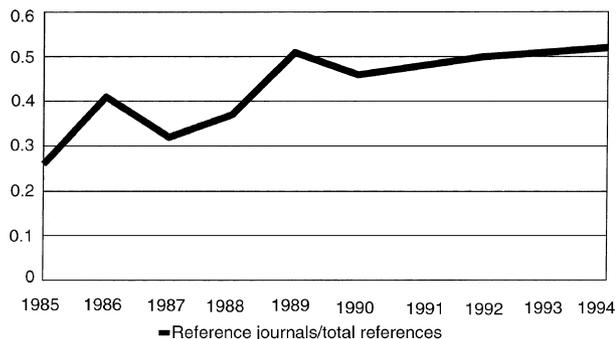
### Journal type and languages of the references

Regarding the type of publications, we appreciate a higher percentage of references to journals in general (58.6%)

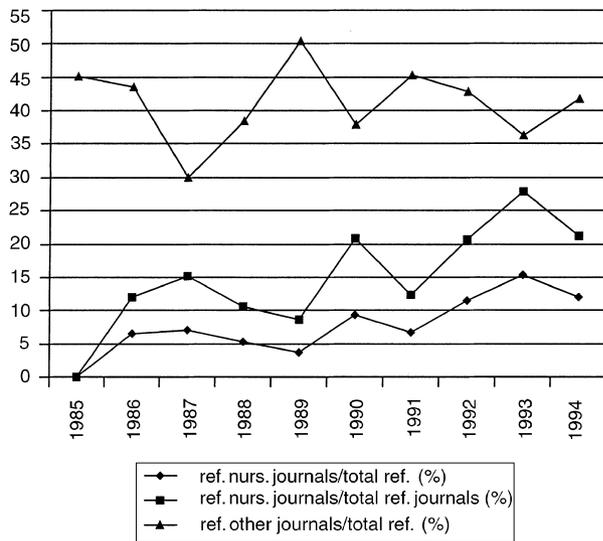
compared with book references (41.4%); within the former, there is a small percentage of references to nursing journals (18.1%). The rest include mostly publications belonging to different medical specialities and to the psychology sector. If we make a distinction between references to Spanish nursing journals and references to foreign nursing journals, we find that the former constitute a 15.1%, whereas the latter represent a 3% of the total references to journals.

The trend of the type of publications mentioned shows, in the first place, a growth of the proportion of references taken from journals (Figure 2); moreover there is, according to the types of publication:

- an increase of references to Spanish books (Pearson's correlation: 0.169,  $P < 0.001$ ).
- a slight increase in the number of references to books published outside Spain, although the difference does not turn out significant (Pearson's correlation: 0.029,  $P=0.46$ ).
- increase of references to Spanish journals (Pearson's correlation: 0.220,  $P < 0.001$ ).
- slight increase of references to journals published outside Spain, although the difference does not turn out to be significant (Pearson's correlation: 0.064,  $P=0.1$ ).
- increase of references to nursing journals (Figure 3), the mean number per article being doubled (Pearson's correlation: 0.206,  $P < 0.001$ ).
- increase of references to other journals (Pearson's correlation: 0.131,  $P=0.001$ ) Figure 3.
- increase of references to foreign nursing journals, although they are still scarce (Pearson's correlation: 0.109,  $P=0.006$ ). Spanish is the most frequent language of the references (60.3%), while English (36.1%) remains second. An increase of references in English per article is noted, although the difference does not turn out significant (Pearson's correlation: 0.059,  $P=0.14$ ). The distribution of the language in the references according to journals ( $P=0.004$ ) is shown in Table 3.



**Figure 2** Time evolution of references to journals. Source: *Revista ROL de Enfermería, Enfermería Científica, Enfermería Clínica, Enfermería Integral*.



**Figure 3** Time evolution of references to nursing and other sectors journals. Source: *Revista ROL de Enfermería, Enfermería Científica, Enfermería Clínica, Enfermería Integral*.

**Table 3** Language of the references according to the studied journals

Languages	Mean numbers of references in each of the languages			
	<i>Revista ROL de Enfermería</i>	<i>Enfermería Científica</i>	<i>Enfermería Clínica</i>	<i>Enfermería Integral</i>
Spanish	6.68	6.42	8.32	5.06
English	4.27	3.97	4.84	2.17
French	0.55	0.21	0.24	0.07
Others	0.08	0.12	0.00	0.03

Another feature of interest of the references is the identification of the cited publication. The references to nursing journals are distributed as follows: *Revista ROL de Enfermería*, 256; *Enfermería Científica*, 132; *Enfermería Clínica*, 15, and other nursing journals (both national and international), 288.

The results obtained for the journal *Nursing Research* in the years 1993–1994 are: number of references per article, 32.3; price index, 31.5; proportion of references to journals in relation to the total of references, 75.6%; proportion of references to nursing journals in relation to the total of references, 20%, and proportion of references to nursing journals over the total of references to journals, 26.4%.

## Discussion

### Number of references per paper

For the years 1992–1993, our study offers a mean number of references per paper of 12.3, similar to the one found by

Richart *et al.* (1994) for this same interval (11). Torra (1996) obtains a mean of 10.5 for the period 1991–1993, also similar to the corresponding to these years (11.7), although we should take into account that the reference population and the classification of some variables in these two works mentioned is somewhat different. Considering the decade 1985–1994, the results (10.6) are equal to those obtained by González *et al.* 1997) for the years 1984–1993 on the nursing publications on Public Health and Community Nursing, and with a reference population different from the one we are dealing with.

However, the mean number obtained for 1985 (6.82) is clearly less than the one found in the work by Kilby *et al.* (1991) in the domain of international nursing for that same year, which was of 11.2. Something similar happens when considering the interval 93–94, where the mean number of references obtained per article (13.7) is clearly lower than in *Nursing Research* (32.3). The latter observation coincides to that shown by Cartagena *et al.* (1993): 30 references per article in the journal *Nursing Research* of 1990. This journal remains a constant contributor to the diffusion of international scientific production on nursing.

We deduce that, while in the international domain in a period of 10 years (1985–1994), the number of references per paper is increases by three-fold (from 11.2 to 32.3), in the Spanish publications for this same period, it is doubled (from 6.82 to 13.7). This fact, in spite of not being an indicator of quality, should correspond with the greater output and scientific development in nursing (specially North-American), from which a high number of the journals indexed in the databases of most common scientific use some. Let us not forget that in Europe (including Spain), there are few and very limited PhD programs in nursing; that is why research is still not very developed and there are hardly any organizations or entities that fund works developed by professional people not having a PhD.

The comparison with Spanish scientific journals of biomedical domain shows that the references per article in the nursing journals (10.6 for the whole period) are fewer than the ones in that domain – 15 according to López and Terrada (1992b) – and the distribution is more similar: 10% with no references, while 85% have fewer than 25 references and 5% have 45 or more references (in our study, fewer than 2% have 45 or more references, and 9.3% have none). In the case of original articles in the journal *Atención Primaria*, Del Burgo and Gervás (1992) obtained a mean of 16.6, corresponding with the result obtained by Álvarez *et al.* (1996), in this same domain and by analysing a higher number of journals (17 references per article). To establish comparisons among these works seems relevant, as the domain of primary

care has suffered from a series of features similar to the evolution of nursing in the last decade (Jiménez-Villa *et al.* 1993). The differences in relation to these authors could be partly because of the recent inclusion of Spanish nursing in the University sector.

#### *Factors associated to the use of bibliographic references*

Considering the institution of origin of the first-named authors, a higher number of references is confirmed, as in Torra (1996), in favour of the university context, which is followed by the hospital domain and the primary care one. An easier access to bibliographic sources and a better training in research methodology at university can justify this fact.

As for the type of paper, and following Torra (1996), we found that the number of bibliographic references in reviews is higher than that in original articles. This concurs with the characteristics of both types of articles (Icart & Caja 1994, Icart & Canela 1994), as expected.

The relationship between the type of journals studied and the number of references per article has come out in favour of *Enfermería Clínica*, followed by *Revista ROL de Enfermería*, *Enfermería Científica* and lastly *Enfermería Integral*; this distribution happens to be just like that explained by Torra (1996). We believe that this situation could have been determined by the demands of each Editor in regards to the acceptance of the articles to be published, that is, the degree of demands made as for argumentation of the theoretical frame and discussion.

The relationship between number of references and topics of the papers shows that the topics included in the areas dietetics–nutrition and nursing conceptual or theoretical models contain a higher number of references, which might be a result of that those articles are submitted by more expert authors.

The relationship between number of references per article and collaborative index did not turned out significant.

#### **Price index**

From the results obtained (44%) and the data found in the literature (López & Terrada 1992c), nursing achieves an intermediate position between the ‘hard’ sciences and those with a strong component of classic literature.

The results are similar to those found in other studies: in the years 1993–1994 we obtained a price index of 45.9%, and González *et al.* (1996) obtained a 40% for the years 1995–1996 in the nursing domain in primary care. The study by Alexandre *et al.* (1995) on the journal *Atención Primaria* in 1991 reflects a 42%, in contrast to a 48.2% obtained for this year. For the years 1988–1992, smaller

figures are obtained (42.2%) in relation to the ones found by Álvarez *et al.* (1996) in the domain of primary care and in the one of biomedical sciences including nursing (48% for these years), and with the work of González *et al.* 1997), if we take into account the whole decade (48.9% in contrast to 44%).

The relationship of the price index with the journals studied has not turned out to be significant, but we believe that this is because of fewer papers being taken from *Enfermería Clínica* (because it is younger than the others). Thus *Enfermería Clínica* stands out as the nursing journal to have a higher price index (50.1%), possibly because it contains a higher number of research papers and references per paper.

It is noteworthy that the age of references for the journal *Nursing Research* (31.5%) is greater than that obtained in all the journals aforementioned. This could perhaps because of the authors of the works in this journal considering (in their references) the publications that constitute the guidelines for investigation (Sancho 1990) about the topics of study, so that they quote the classic literature in this respect. This leads to a consolidation of the direction of the research in time (*Colegios visibles*: Sancho 1990). Otherwise, the result obtained does not thus confirm the hypothesis by Cartagena *et al.* (1993) where they suggest a lesser age for the foreign nursing journals in relation to the Spanish, although we should take into account that these authors analyse, not only *Nursing Research*, but also *Journal of Advanced Nursing*. Finally, it is relevant to say that this index is hardly modified in the decade studied.

#### **Insularity**

The Insularity found for the whole decade is 55%. The greater insularity of scientific literature published by Spanish nursing (32.8 for 1985), in relation to medical literature (López & Terrada, 1992c) can be derived from Table 4, in which the results obtained by Spanish nursing journals are compared with those in other medical journals published in 1982. However, the average of figures obtained for the years 1988–1992 (50.9%) is similar to those found by Álvarez *et al.* (1996) in the domain of primary care (52.6%).

Richart *et al.* (1994) obtained an insularity of 60.8% for the years 1992–1993, similar to that found for these same years (61.8%) and slightly smaller than that obtained by González *et al.* (1996) in the nursing domain for the years 1995–1996 (78.3%). The latter difference might be due, among other reasons, to different reference populations and/or the classification process.

**Table 4** Insularity index in Spanish medical, nursing journals

Journals	Insularity (%)
Studied Spanish nursing journals (1985)	32.80
<i>Revista Clínica Española</i> (1982)	10.24
<i>Medicina Clínica</i> (1982)	9.46
<i>Revista Española de Enfermedades del Aparato Digestivo</i> (1982)	14.13

The data referred to the last three medical journals are taken from López and Terrada (1992c).

The distribution obtained according to journals corresponds (save the difference in data) to that shown by Richart *et al.* (1994). *Revista ROL de Enfermería* constitutes an exception, as it appears in the last place according to these authors. Perhaps these differences are justified by the arbitrariness of the sample selected by such authors (Torra 1994).

The growing tendency for insularity in nursing research publications can be explained by an increase in the scientific production in this domain in our country and by its greater accessibility.

### Type of documentation used

All the studies based on computations of references agree that information is transmitted, in experimental and natural sciences, mainly through journals (80%); books prevail in practical applications and social sciences (50–65%), while journals have a lesser weight (10–35%) (López & Terrada 1992b). The proportion of the average values of the references to journals in the decade studied (58.6%) reaffirms, as in Torra (1996), that the Spanish scientific production in nursing is halfway between the disciplines related to experimental and natural sciences, and technologies and social sciences; this is something we believe to be justified rather by the youth of the discipline in Spain than by its character.

In respect to the percentage of references to journals in the biomedical domain, Alexandre *et al.* (1995) in *Atención Primaria* reflect a greater approximation to experimental sciences (72% of journals in 1991) than if considering nursing journals in isolation.

In the international domain, the results obtained for *Nursing Research* as for references to journals (75.6%) show a value which is more similar to the Spanish biomedical sciences in general, and neighbour to those considered for experimental sciences. It is not surprising, given the older tradition in research of North-American nursing.

The tendency in the decade studied shows an increase in the proportion of references coming from journals, which makes manifest a growing use of live literature. This increase

is partly because of the growth of references to nursing journals.

### References to nursing journals in respect to the whole of references to journals

The use of specific live literature in the discipline of nursing in respect to that non-specific is slightly low (18.1%), if we take into account that most of papers are generated and formed from the bulk of nuclear contents of a discipline, and are published in the specialized journals. The percentage for the interval 1992–1994 (23.2%) is not different from that reflected by Torra (1996), which is 22.6% for the period 1991–1993; it is somewhat smaller to that found in *Nursing Research* (26.4%). These results could be interpreted by making allusion to the youth of nursing as a discipline and its holistic character, which leads it to get contributions from the other sciences.

All in all, the progressive tendency to include nursing journals as bibliographic support in the Spanish publications of nursing is noteworthy; it is probably associated with the increase of scientific production in this domain.

As for the distinction among references to Spanish nursing journals and foreign ones, we found that the former are five times more frequent; this is not really surprising if we observe the insularity aforementioned, whereas it does stand out if we compare it with the biased relationship between references to Spanish and foreign texts. This difference may be because many books having been catalogued as foreign, because their author or editor's country is so, are in fact translated into Spanish, which facilitates the access to them. On the other hand, articles published in foreign journals are seldom translated into Spanish.

### Most frequently cited Spanish nursing journals

The results agree with those offered by Torra (1996) and Gálvez and Salido (1999): *Revista ROL de Enfermería* is the most frequently quoted followed by *Enfermería Científica* and *Enfermería Clínica*. This order is reasonable enough if we take into account their age, periodicity and development.

### Language

The results obtained agree with those found by Torra (1996), so that Spanish references are higher in number. English references (36.1%) are similar to those published by Richart *et al.* (1994), and somewhat fewer than those reflected by Álvarez *et al.* (1996) for the papers published in the domain of primary care and the period 1988–1992 (44%). If we take

into account that the main databases include mostly journals in English (López & Terrada, 1992b), it is easy to deduce the scarce use of documental resources on the part of Spanish nursing. This situation can be justified by nursing's recent inclusion into the scientific community, and therefore, to research resources, such as the knowledge of English, as Narvaiza (1995) argues. The latter can be one of those factors conditioning the Insularity. Anyway, a tendency towards growth in the use of references in English can be observed, although there has been some stagnation in the last years considered.

According to journals, *Enfermería Clínica* and *Revista ROL de Enfermería* are those containing more references in English. This may be because of their being also those having the highest number of references per paper.

### Limitations of the study

One of the most common limitations in the works of references analysis that can have an effect on the validity of aspect (Silva 1997) of this work, is the frequency with which *cosmetic references* (Kragh 1987) – understood as those which do not have a real importance for the citing work – were used, with the purpose of providing the article with prestige and apparent scholarship.

### Implications of the study for nursing

The information identified in this paper is useful to assess the current state and development of Spanish nursing, as well as its consolidation as a science. Also, this sort of bibliometric studies is a useful tool to find out those aspects needing a deeper study; this way, we will be able to improve the evaluation of the discipline.

On the other hand, we identified the main documentary sources supporting research in Spain: this offers a great help in the documentation process of future research papers. Besides, the bibliometric studies highlight some interesting aspects and indicators on productivity and repercussion; these are very useful for the planning and assessment of information units.

### Conclusions

The bibliographic references of the most representative research publications in Spanish nursing are scarce and not very specific, in respect not only to *Nursing Research*, but also to publications in other national and international scientific domains, although there exists an increasing tendency in the decade studied. We noted – as conditioning

factors of the index of references – the working institution of the first-named authors, as well as the type of research papers, so that works generated in the university context and reviews, respectively, contain a higher number of bibliographic references.

The age of the references places Spanish nursing at an intermediate position between 'hard' sciences and those with a strong component of classic literature. At the same time, the type of documentation used places this discipline halfway between experimental and natural sciences, and technologies and social sciences. In the journal *Nursing Research*, references are older than those within the Spanish context.

The insularity of the references is outstandingly greater than in scientific biomedical literature in general, as well as being more similar to the biomedical context of primary care, and having a tendency to grow.

The most frequently used language in the bibliographic references is Spanish, followed by English. References in the latter have had a slight increase in recent years.

Among the journals studied, *Enfermería Clínica* occupies the best valued positions in relation to number, age and linguistic diversity of the bibliographic references.

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