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## Characterization of the productivity of scholar researchers of cnpq of nursing: a cross-sectional study

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### ABSTRACT

This cross-sectional study aims to investigate the profile of CNPq research productivity scholarships in nursing. The sample was composed by 141 researchers and the research instrument consisted of a specific form including variables related to the socio-demographic and the curricular characterization of the researchers. The data were organized using SPSS and were presented through descriptive statistics. Chi-square test and ANOVA were also used. The significance level used in the statistical tests was 5%. It was found that the majority (97.16%) were female and are included at level 2 (61.70%), demonstrating the association between gender and level of the researchers ( $p = 0.00$ ). We conclude that there is predominance of females operating at level 2, with the majority of researchers located in the Southeast part of Brazil, having had doctoral training in Brazil and post-doctoral experience abroad.

**Keywords:** Research. Researchers. Support for Research as Topic.

## **INTRODUCTION**

Over the past few years, scientific production in Brazil has grown satisfactorily, culminating in scientific benefits for the various areas involved. According to data published in the Directory of Research Groups of the National Council for Scientific and Technological Development (CNPq), in 2008 there were 104,018 researchers registered in Brazil, part of 22,797 research groups, operating in 422 institutions of higher education. These data show a large increase in the number of researchers, research groups and institutions when compared to previous years<sup>(1)</sup>.

The promotion agencies concentrate, by fostering research, on public universities and post-graduate programs, encouraging teachers to engage in the practice of research<sup>(2)</sup>. The contribution and commitment of each researcher is recognized in the form of titles. One such title is that of the Research Productivity Scholarship (FP) offered by CNPq. This input to the research effort valorizes the researcher, distinguishing that person in the academic field, and brings to bear evaluation criteria that were developed by the Advisory Board of Nursing (CA-EF), giving the right to three years of funding for each scholar<sup>(3)</sup>.

The PQ candidates are evaluated both quantitatively and qualitatively, as well as through ad hoc opinions on levels 1A, 1B, 1C, 1D and 2. This process verifies the quality, innovation and contribution of the projects which are being evaluated, the lines of research of the researchers, the regularity of scientific production and human resource training, links with new researchers, and also the level of participation in terms of scientific management and publishing in journals<sup>(3)</sup>.

Given the above, and given the lack of studies associated with this topic, this research was carried out in order to investigate the profile of the CNPq research productivity scholars with regard to nursing.

## **METHODOLOGY**

A quantitative transversal descriptive study was conducted from February to May 2010, after consultation of the list of productivity scholars in the area of nursing which was available on the website of the CNPq<sup>(1)</sup>. From the delimited area, a population of 141 researchers in categories 1A, 1B, 1C, 1D and 2 was identified. Thus, in terms of inclusion criteria for researchers, it was established that they had to be active with a scholarship in February 2010 and had free access to the Curriculum Lattes. We chose to access the Curriculum Lattes since this is one of the elements used in the assessment of requests for productivity grants, and therefore an appropriate source for the characterization of the profile of researchers<sup>(2)</sup>.

The research instrument consisted of a specific form comprising the following variables: gender, status of researcher, region of Brazil in which the productivity scholar operates, titling, country in which the researcher obtained such a title, link to postgraduate programs, scientific production including articles published in journals, abstracts, extended abstracts and full papers in proceedings, books and book chapters, orientation activities of scientific initiation, masters and doctoral qualifications.

With the information, we created a database in SPSS (Statistical Package for Social Sciences) version 17.0. For data analysis purposes, we obtained absolute frequencies and percentages (descriptive statistics). In the bivariate tables, we used the chi-square test to identify possible associations between class and gender of the researchers and between the class of the researchers and their degree. In addition, ANOVA was used to identify differences between the classes of researchers regarding the types of publication: published articles, books, book chapters, abstracts, full papers and extended abstracts in the proceedings (inferential statistics). The significance level used in the statistical tests was 5% ( $p < 0.05$ ).

The study was submitted for the consideration of the Ethics Committee in Research - Zip Code of the State University of Paraíba, under the Certificate of Presentation for Ethical Appreciation - CPEA: 0401.1.133.000-08 being dispensed in terms of the use of the Term of Consent - Informed Consent, in which case the research was conducted based on information of the Curriculum Lattes of the researchers - secondary data.

## RESULTS

Among the 141 productive researchers analyzed, the majority (97.2%) were female and belonged to Class 2 as FP (61.7%). Significant association was observed from a statistical point of view between gender and the class of the researchers ( $p = 0.00$ ).

Regarding the distribution of FPs according to the Brazilian region in which they were located, most productive researchers were located in the Southeast (67.4%,  $n = 95$ ), followed by the Northeast (16.3%,  $n=23$ ) and the South (14.2%,  $n=20$ ). Three researchers (2.1%) were located in an educational institution located in the Midwest region of Brazil. There were no productive researchers linked to institutions in the North of the country. The states that comprise the majority of scholarships are: São Paulo (55.3%,  $n=78$ ), Ceará (11.3%,  $n=16$ ), Rio de Janeiro (10.6%,  $n=15$ ) followed Rio Grande do Sul (6.4%,  $n = 9$ ). The states of Bahia, Goiás, Minas Gerais, Mato Grosso, Paraíba, Paraná, Rio Grande do Norte and Santa Catarina account for 16.4% ( $n=23$ ) of the remaining grants.

In relation to academic education, the productive researchers are mostly doctors (71.63%,  $n=101$ ) and post-docs (28.37%,  $n=40$ ), and most doctors (42.55%  $n=60$ ) and post-docs (19.14%,  $n=27$ ) belong to Class 2. There is a statistical relationship between the class of the researcher and their educational qualifications ( $p=0.00$ ).

With regard to the venue of post-graduate training, for 97.2% ( $n=137$ ) of the population, their doctorate was obtained in Brazil, and only 2.8% ( $n=4$ ) of the researchers studied for doctorates abroad. This relationship is reversed when considering the location of post-doctoral training, as of the 40 scholars with this training, 82.5% ( $n=33$ ) obtained their educational qualification abroad, and only 17.5% ( $n=7$ ) undertook postdoctoral studies in Brazil. The results show the association between different categories of researchers and the place of acquisition of a doctorate ( $p=0.00$ ) and of post-doctorate training ( $p=0.00$ ).

As regards the researcher's area of expertise, areas of nursing ( $n=130$ ) and Collective Health ( $n=11$ ) appeared as predominant. Other areas in which the researcher specialised

were Public Health and Education (n=5, respectively); Administration and Philosophy (n=3, respectively), Psychology, Nutrition and Medicine (n=2, respectively); Anthropology; Microbiology, Probability Statistics and Sociology (n=1, respectively). It was found in the Lattes CV of FP that, of the 141 researchers, 95% were involved in the postgraduate courses. Among those who have no relationship (n=6), two were post-docs.

The bibliographical production of the researchers was analyzed in terms of the number of books and book chapters published, scientific papers published in journals, abstracts, full papers and extended abstracts in conference proceedings. It was observed that the largest number of publications was in terms of abstracts published in conference proceedings (mean=15,119, standard deviation - SD=221.85), followed by journal articles (average=139.13, SD=793, 48). Books were a less frequent form of publishing among participants (average= 550, SD=8.07). The tests show that there is a significant statistical difference between the class of researchers and the number of articles published in journals, books produced and complete works published in conference proceedings (Table 1).

**Table 1.** Frequency distribution, absolute average and standard deviation of scientific production of the researchers of FP (n=141), Campina Grande, 2010.

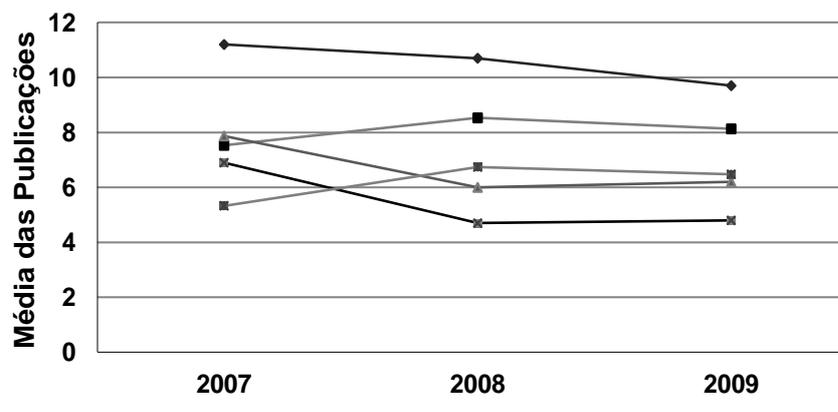
| Scientific Production           | Central measures |        |         | Inferences |      |
|---------------------------------|------------------|--------|---------|------------|------|
|                                 | F                | A      | DP      | F          | p    |
| Articles in Journals            | 9482             | 139.13 | 793.48  | 2.20       | 0.00 |
| Abstracts in Proceedings        | 15119            | 221.85 | 1265.58 | 1.38       | 0.11 |
| Books                           | 550              | 46.16  | 8.071   | 2.85       | 0.00 |
| Book chapters                   | 1863             | 27.33  | 156.19  | 1.14       | 0.29 |
| Completed work in the<br>annals | 2345             | 8.34   | 8.81    | 2.53       | 0.00 |
| Expanded Abstract               | 1600             | 23.48  | 134.81  | 0.90       | 0.62 |

F = frequency; A = Average; DP = standard deviation; F = result of ANOVA test; p = significance of the statistical tests; n = 141

The specific analysis of the production of scientific articles in the last triennium (2007-2009) shows that there was an increase in the average number of publications among productive researchers.

Figure 1 shows the distribution of the absolute average of scientific articles published in journals, according to the year of publication and the class of the researcher. We observe an average increase in the number of publications between the classes of researchers over the years, meaning that class 2 showed a greater increase in the number of publications than other classes.

**Figure 1.** Distribution of the absolute average of publications in the triennium 2007-2009, according to FP class. Campina Grande, 2010.



With regard to the number of ongoing guidance of scientific initiation (SI), Masters (MS) and doctorates (DT), it is observed that researchers in Class 2 had the highest average and the highest absolute number of orientations in the three levels; and those in the 1D class presented the lowest absolute numbers and also the lowest average in the three levels. Concerning the guidelines completed, there is a similar relationship.

## DISCUSSION

The data reveals that 97.2% of researchers were female, with only four male scholarships of level 2 (2.84%). A similar study dealing with productive researchers in the field of dentistry<sup>(2)</sup>, showed that the male population exceeded the female one in all classes of FP. Another study that included FP in the area of Collective Health, also showed a slight female majority in terms of researchers<sup>(4)</sup>. In the area of nursing, the highest number of women as FP can be explained by the predominance of this gender in the profession. This reflects the professional training of nursing, in addition to the ability of taking care bequeathed to the female, which is reflected in the naturalization of women in this type of service<sup>(5)</sup>. However, the recognition of the importance of men in nursing is real and, over the years, the demand for males in this profession is increasing in educational institutions<sup>(6)</sup>.

The historicity and culture of Brazilian universities seem to explain the unequal distribution of scholarships offered to the different regions of the country, since the production of scientific research is one of the points that propel the development agencies to contemplate providing teachers with scholarships. The creation of the Postgraduate Program was pioneered at the Pontifical Catholic University of Rio de Janeiro (PUC-Rio) in 1965, which brought the research to the scope of the university, encouraging other institutions to adopt this practice<sup>(7)</sup>. This incentive was given to the Northeast starting in the 1970s, and the Federal University of Bahia (UFBA) was the first to embrace this proposal in the region<sup>(8)</sup>.

The Anna Nery School of Nursing, Federal University of Rio de Janeiro (UFRJ), promoted the first postgraduate course in *stricto sensu* (Masters) in nursing in 1972<sup>(9)</sup>. Since then, the Southeast began to invest more in research compared to other Brazilian regions and, as a result, obtained a higher annual growth in terms of Postgraduate Programs. Of the 21 programs *stricto sensu* in the country between 1998 and 2000, 12 were in the Southeast, four in the South, four in the Northeast, one in the Midwest and none in the North<sup>(8)</sup>.

Besides scientific productivity, the research funding is also influenced by the goals that the World Health Organization (WHO) have established for this millennium<sup>(10)</sup>. Funding

becomes very important in this context, because the investment of the development agencies in research provides the necessary conditions for its realization, for it grants aid in the funding of the structure and provides materials that enable the development of projects<sup>(11)</sup>.

Regarding the qualifications of teaching staff, the majority of researchers in nursing have presented the doctorate as the most recent qualification in their careers (71.6%). A study carried out in dentistry found a greater number of researchers among scholars in terms of productivity (58.6%), and the difference between doctors and post-doctoral researchers was 17.2%<sup>(2)</sup>; on the other hand, in nursing, this difference was more intensified (43.26%). All nursing scholars have, at least a doctorate, which is a result that differs from the results obtained by the research into Collective Health, in which four of its scholars do not have such a title, and belong to class 1A<sup>(4)</sup>.

It was observed that among the post-doctor researchers considered in this study, 82.5% achieved this title abroad. It should be noted that the national and international exchange of knowledge produced comes from the contribution of post-graduate courses that contribute to the consolidation of research groups and centers, which gives greater visibility to the profession<sup>(12)</sup>.

When we checked the professional area of each researcher, it was noted that the areas of nursing (76.0%) and Collective Health (8.7%) are predominant among the researchers, which can be justified by the generalist character of the profession and the nature of the postgraduate programs available.

Among the various criteria for obtaining a scholarship are regular scientific production (especially the publication of articles in journals with an impact factor) and the human resources formation, particularly masters and doctors. Thus, researchers affiliated with a postgraduate program are more likely to achieve and maintain these criteria.

With respect to publications, it was found that, over the years, there has been a growth in publications on the part of the researchers in this study. Publication in journals began with communications between researchers through letters in the Seventeenth Century and it was only in the Eighteenth Century, that publishing in journals became common

practice among researchers. What was once accessed only by the scientific community became the focus of interest also for the general public. It was found that in five years, the number of electronic journals has doubled, also increasing the number of articles accessed through the Internet<sup>(13)</sup>.

Brazilian production has increasing particularly in the area of health, based on the articles indexed in the Institute for Scientific Information (ISI). The literature shows that in the 1990s, recent doctoral graduates would not publish any work until five years after their defense. This reality has changed mainly due to postgraduate programs, which are rigorously evaluated by committees of the Coordination of Improvement of Higher Education Personnel (CAPES)<sup>(14)</sup>.

The data reveal that 61.7% of the total of productive researchers in nursing belong to class 2. This class was also considered to be the most important in the research conducted in the field of dentistry. Therefore, productive class 2 scholars have also created a greater number of publications in the last three years, and a larger number of completed and ongoing supervisions with regard to scientific initiation, master's degrees and doctorates. One can relate this phenomenon to the assessment of production by the fostering agency, as this class is evaluated every five year period, and the other researchers, each decade<sup>(3)</sup>.

More accurate assessment may also be responsible for the increased productivity of researchers within class 2, which is inversely proportional to Class 1A. The higher the class of the researcher, the greater the accuracy and quality of his or her publications. It also highlights the share of scholarships for each class: there is a maximum quota of 20% of all scholarships in Category 1 for level A, and a minimum quota of 10% for other levels, and also of 50% for category 2. There is currently a progressive attempt to correct this distribution, one which began in 2009<sup>(14)</sup>.

In addition to the the funding agencies' requirements with regard to scientific publishing, researchers should be encouraged to produce and publish scientific papers from a social perspective, rather than just curricular. In Brazil, journals are categorized by QUALIS, using a model created by CAPES to classify scientific periodicals used in disseminating

the intellectual output of post-graduate *stricto-sensu* programs (masters and doctorate) in the country. The classification consists of seven layers: A1, A2, B1, B2, B3, B4, B5 and C. The highest weight (100) is allocated to the stratum A1, and the lowest value (zero) to stratum C. This classification leads the researcher to choose the appropriate journal for publication<sup>(15)</sup>. In this context, even in the face of a discourse that values only the nature of quantitative research, nursing recognizes the importance of subjectivity for the establishment of an appropriate method for humane care, and has developed studies guided by qualitative approaches<sup>(12-16)</sup> that effectively bring quality of care to its clientele. The present study presents the limitations related to statistical analyzes of data. For example, as continuous variables were used, some tests could not be performed such as, for example, the post hoc test, which would show any differences between classes of researchers and the number of publications.

## **CONCLUSION**

It is concluded that, of the total of 141 researchers, there was a predominance of females, of Class 2, located in educational federal institutions in the Southeast, with doctoral training in Brazil and postdoctoral experience abroad, working in the area of nursing and taking part in post-graduate activities. The scientific production has increased in the last three years, especially in class 2, which has also shown a higher number of completed and ongoing supervisions.

From the statistical point of view, it was observed that there is a significant association between the class of researchers and their gender, as well as between class and educational qualification. This shows that gender and educational qualification are somehow related to the class of researcher as are the differences between the class of researcher and the number of books, journal articles and full papers in proceedings. This indicates that, depending on the class, the number of publications will vary significantly.

Nursing is an area that has been developing in academic terms. Despite this fact, the number of productive researchers is still relatively small, especially if compared to the number of scholarships by region throughout the country and by states.

The increase - in number and quality - of postgraduate *stricto-sensu* has been strengthening and enhancing the activities of research groups, the quality of journals and grants for productivity scholarships to researchers who stand out in terms of their peers, valorizing their scientific production according to normative criteria established by the CNPq, and specified by the Advisory Committees.

To sum up, in nursing, as well as in other areas, research is an essential condition for the generation of knowledge, guidance, practices, improvement in care and the quality of life of the clients. Therefore, this activity strengthens the identity of nursing as a profession, highlighting the effectiveness of nursing practices in the context of various dimensions and its social relevance.

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