

Profile of the Researchers with Productivity Grants in the Brazilian National Research Council (CNPq) of the Physical Education Area

Perfil dos Pesquisadores com Bolsa de Produtividade no Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) da Área da Educação Física

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ABSTRACT

The increase in the number of postgraduate programs has been accompanied by a concomitant increase in the Brazilian scientific output. The aim of this study was to describe the profile of the Brazilian researchers with Productivity Grants in the Brazilian National Research Council (CNPq) in the Physical Education Area. The curriculum of the 74 scholarship researchers in the Lattes Platform was analyzed. The researchers varied in gender, classification in the CNPq (1A to 2), institution, date of graduation, number of papers published; as well as the classification of the journal in the Qualis, book and book chapter publications, supervision of undergraduate scientific initiation, masters and doctorate students, and the patents they had obtained. The study considered publications from 2007 to 2009. The results show that most of the researchers had between 5 and 32 years of doctorate studies, are male (75.7%), classified in category 2 (67.6%), with a large proportion working in the south-east region, particularly in the state of São Paulo. Most publications are in the national periodic Qualis B1, B2 and A2. A large number of books and book chapters were published, and there were an excellent number of supervisions of undergraduate and postgraduate students.

Keywords: scientific publication, research statistics, research in physical education, brazil

RESUMO

O aumento do número de programas de pós-graduação tem sido concomitante a um aumento da produção científica brasileira. Este estudo teve como objetivo compreender o perfil dos pesquisadores brasileiros bolsistas do Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) na área de Educação Física. Para tal foram analisados os currículos dos 74 bolsistas, registrados na Plataforma Lattes. Foram consideradas variáveis como gênero, classificação no CNPq (1A a 2), instituição em que atua, tempo de doutorado, quantidade de artigos publicados, bem como a classificação do Qualis da revista, publicações de livros e capítulos de livros, orientações de iniciação científica, mestrado e doutorado e a obtenção de patentes. Para as variáveis relacionadas a publicações, foi considerado o triênio de 2007 a 2009. Os resultados mostraram que a maior parte dos pesquisadores tem entre 5 e 32 anos de doutorado, é do gênero masculino (75,7%), classificados na categoria 2 (67,6%), atuando prioritariamente na região sudeste e, mais especificadamente, no Estado de São Paulo. A maior parte das publicações ocorreu em periódicos nacionais com os Qualis B1, B2 e A2. Observou-se importante número de publicações de capítulos de livros e livros, bem como um número relevante de orientações de mestrado, doutorado e iniciação científica.

Palavras-chave: produção científica, estatística de pesquisa, pesquisa em educação física, brasil

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The process of differentiation of the social world implies the differentiation of forms of knowledge, identifying in this process new objects and principles of understanding and explanation that give origin to autonomous cultural fields, including the scientific fields (Barata & Goldbaum, 2003). The development of research plays an important role in the generation of new knowledge, new technologies, and the development of critical thinking and reflection in the academic environment (Péret & Lima, 2005).

The scientific output of Brazil has grown consistently: the national scientific production is now the 13th largest in the world, responsible for approximately 2% of total world scientific production, surpassing countries such as Switzerland (1.9%) and Sweden (1.8%), and just below the Netherlands (2.6%), and Russia (2.7%) (King, 2009). One factor responsible for this increase in scientific production in Brazil is the system of postgraduate study, which encourages a large number of articles to be published in order to conceptualize national programs (Volpato & Freitas, 2003).

Physical Education is a relatively new academic field, as it only came to be considered a scientific discipline in the second half of the twentieth century (Betti, 2005). Until 1985, Sports Science was represented by empirical analytical research, measurement, evaluation, and kineanthropometry. Later, Sports Science became understood as Physical Education Science, or Sports Science and/or Human Movement Science. These sciences did not mean the same, but had in common the adoption of Sports Science into the field of Science (Sofiste, 2006).

Physical Education is considered plural, covering a variety of issues that arise from the relationship between man, culture, knowledge and society (Antunes et al., 2005), and it is embedded in the area of health sciences at the Brazilian Council of Technological and Scientific Development (CNPq). CNPq is a Brazilian

agency of the Ministry of Science and Technology for the promotion of science and technological research and research training in Brazil. CNPq is the funding agency that evaluates and funds researchers based on the peer evaluation of the merits of the proponent and of their proposals. CNPq also provides a particular form of funding for researchers, called scientific productivity fellowships. These researchers are currently classified in two main categories for this fellowship: researcher category 1 and researcher category 2, by decreasing order of value and prestige. Category 1 were subdivided into four levels: 1A, 1B, 1C and 1D, being the first level of category 1 attributed only to researchers with notorious scientific productivity (Arruda, Bezerra, Neris, Toro, & Wainer, 2009).

In recent years, several studies have examined the profile and the scientific production of Brazilian researchers of CNPq in various fields of knowledge (Barata & Goldbaum, 2003; Cavalcante, Barbosa, Bonan, Pires, & Martelli-Júnior, 2008; Santos, Lima, Martelli, & Martelli-Júnior, 2009).

The aim of this study was to determine the profile of Brazilian researchers in Physical Education according to their scholarship rank.

METHOD

The study included all investigators in the field of Physical Education registered as recipients of CNPq productivity scholarships ($n = 74$), according to a list provided by the federal agency in May 2010. The list of researchers in Physical Education from CNPq (PQ), whose scholarships were active during the triennium 2007-2009 were used. From the publicly available curriculum Lattes in Lattes Platform (<http://buscatextual.cnpq.br/buscatextual/busca>) a database with information on each researcher was developed. This information included gender, degree type (graduate and/or baccalaureate), the distribution of researchers by CNPq database categories (1A, 1B, 1C, 1D

and 2), geographical and institutional distribution, affiliated institution, time of completion of doctoral degree, scientific production (articles in scientific journals), book and book chapter publication, formation of human resources (mentoring of undergraduates, masters and doctorate students), and patent applications. For the scientific and bibliographic performance and human resource training, the study considered the entire output from triennium 2007 to 2009. Papers accepted but not yet published and papers published in journals not indexed were excluded from the study.

The articles were classified according to the standardization adopted by Coordination of Improvement of Higher Education Personnel (CAPES) (A1, A2, B1, B2, B3, B4, B5 and C), available in the periodical Qualis (<http://qualis.capes.gov.br/webqualis/>). The study listed the journals that published the greatest numbers of papers written by the researchers. All curriculums Lattes were recorded on the same day, avoiding upgrades during the period that the data was being analyzed. The database development and statistical analysis used was SPSS® 18.0 (Statistical Package for Social Sciences for Windows, Inc., USA). The ANOVA test was used for the comparison of these variables. Dichotomous or nominal variables were compared by a chi-square test.

RESULTS

The research fellows of CNPq in Physical Education comprised 74 individuals. There was a predominance of male fellows, 56 researchers (75.7%), compared to only 18 female researchers (24.3%). Table 1, shows that, regardless of gender, there was a predominance of fellows in category 2, which denotes researchers with at least three years of conclusion of the doctorate at the implementation of the scholarship. There were no female researchers in categories 1A and 1B. In all categories, there were higher numbers of male researchers.

Regarding their undergraduate course, out

Table 1

Distribution of researcher scholarship holders in the Physical education area with gender and category by CNPq (n = 74).

Scholarship category	Male		Female		Total	
	n	(%)	n	(%)	N	(%)
1A	5	8,9	0	0,0	5	6,8
1B	3	5,4	0	0,0	3	4,1
1C	6	10,7	1	5,6	7	9,5
1D	6	10,7	3	16,7	9	12,2
2	36	64,3	14	77,8	50	67,6
Senior	0	0,0	0	0,0	0	0,0
Total	56	75,7	18	24,32	74	100

of the 74 researchers, 26 (35.1%) are licensed in Physical Education, one (1.4%) reported a baccalaureate in Physical Education, 37 (50%) reported graduation in Physical Education, not specifying whether it was licentiate or baccalaureate, and 10 (13.5%) are graduates of other courses. Among the graduates of other courses, three are graduates of medicine, and one of engineering, one of journalism, one of physics, one of physiotherapy, one of social science, one of letters/English, and one of pharmacy/biochemistry. The completion time of doctorate ranged from 5 to 32 years (median: 13 years).

Table 2 shows that the researchers are distributed in nine states of the federation, and that São Paulo has the largest number (43.2%). It also shows that the southern-eastern states (São Paulo, Minas Gerais and Rio de Janeiro) and Rio Grande do Sul host most of the research fellows in Physical Education (76%). The analysis of the ratio of number of scholarships in the area of Physical Education of CNPq per capita shows a national average of 0.39 fellows per million people. After analysis of each state, it is observed that the Federal District, with 1.92 scholarships per million people, is well above average. Also above average are the states of Santa Catarina (0.82), Rio Grande do Sul (0.73), São Paulo (0.77), Rio de Janeiro (0.50) and Minas Gerais (0.40).

In terms of institutional distribution, the largest numbers of researchers with productivity grants are located at the Universidade de

Table 2

Distribution of researcher scholarship holders in the Physical Education area with the federation state.

State	Researcher	Percentage	Population	Scholarship/million of inhabitants
São Paulo (SP)	32	43.24	41.384.039	0.77
Minas Gerais (MG)	8	10.81	20.033.665	0.40
Rio de Janeiro (RJ)	8	10.81	16.10.429	0.50
Rio Grande do Sul (RS)	8	10.81	10.914.128	0.73
Paraná (PR)	5	6.76	10.686.247	0.47
Santa Catarina (SC)	5	6.76	6.118.743	0.82
Distrito Federal (DF)	5	6.76	2.606.885	1.92
Pará (PA)	2	2.70	7.431.020	0.27
Bahia (BA)	1	1.35	14.637.364	0.07
Brasil	74	100	191.480.630	0.39

Source of population data: IBGE/DPE/COPIS/GEADD, adapted from Martelli-Júnior et al. (2010).

São Paulo (18.9%) and Universidade Federal de São Paulo (13.5%). The larger number of researchers are from the state of São Paulo, as shown in Table 3. Of the institutions with researchers who have productivity grants, 67 (90.5%) are public, and only 7 (9.5%) are private institutions.

From 2007 to 2009, there was an average of approximately 19.5 articles per researcher, out of a total of 1562 articles published. This corresponds to approximately seven articles annually per researcher. Figure 1 shows the

publications according to criteria for the classification of scientific journals adopted by Capes.

Also in relation to the publication of scientific articles by research fellows of CNPq in the area of Physical Education, the study analyzed the journals most used for publication by the grantees. Among these, the most sought journals were Revista Brasileira de Medicina do Esporte, Revista Brasileira de Cineantropometria & Desempenho Humano, Revista da Educação Física/UEM (Impresso), Journal of Strength and Conditioning Research, Motriz:

Table 3

Distribution of the researcher scholarship holders in the Physical Education area with the action Institution.

Institution (abbreviation)	Researchers n (%)
Universidade de São Paulo (USP)	14 (18.9)
Universidade do Estado de São Paulo (UNESP)	10 (13.5)
Universidade Federal do Rio Grande do Sul (UFRGS)	8 (10.8)
Universidade de Campinas (UNICAMP)	4 (5.4)
Universidade Federal do Paraná (UFPR)	3 (4.1)
Universidade Federal do Rio de Janeiro (UFRJ)	3 (4.1)
Universidade Federal de Santa Catarina (UFSC)	3 (4.1)
Universidade Federal de Goiás (UFG)	3 (4.1)
Universidade de Brasília (UNB)	3 (4.1)
Universidade Católica de Brasília (UCB-DF)	2 (2.7)
Universidade Estadual de Londrina (UEL)	2 (2.7)
Universidade Estadual do Rio de Janeiro (UERJ)	2 (2.7)
Universidade Federal do Pará (UFPA)	2 (2.7)
Universidade Federal de São Paulo (UNIFESP)	2 (2.7)
Universidade do Estado de Santa Catarina (UDESC)	1 (1.3)
Universidade Federal da Bahia (UFBA)	1 (1.3)
Universidade Federal de Lavras (UFLA)	1 (1.3)
Universidade Federal de Viçosa (UFV)	1 (1.3)
Universidade do Extremo Sul Catarinense (UNESC)	1 (1.3)
Universidade Cruzeiro do Sul (UNISCUL)	1 (1.3)
Universidade Metodista de Piracicaba (UNIMEP)	1 (1.3)
Total	74 (100)

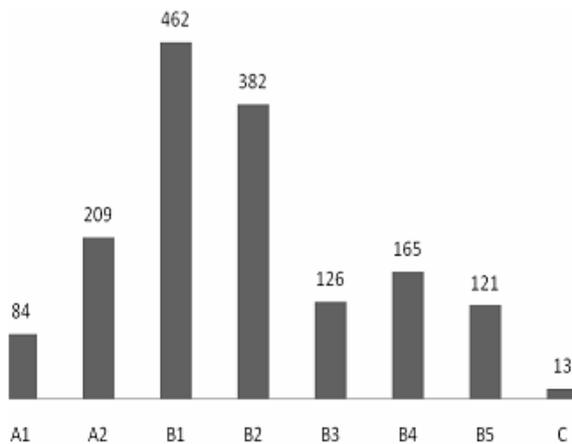


Figure 1. Publications researcher scholarship holders in the Physical Education area with periodic category.

Revista de Educação Física (Online), Lecturas Educación Física Y Deportes (Buenos Aires), Revista Brasileira de Educação Física e Esporte (Impresso), Revista Portuguesa de Ciências do Desporto and Revista Brasileira de Ciências do Esporte e Revista Brasileira de Fisioterapia.

Table 4 shows the distribution of mentored students by the category of scholarship. Researchers from category 1B supervised most

students, with a mean of 6.7 per researcher. At the masters level, the highest can be found in category 1D (8.2) and for doctorates the largest number is in category 1C (5.1).

Table 5 shows the publications of books and book chapters as well as the ratio of publications per researcher. Although in absolute terms researchers in category 2 published most book chapters (209 chapters published), the highest number of publications per capita was reached by researchers divided into category 1D with approximately 7.1 book chapters per researcher. The researchers of category 2 have also the largest absolute number of published books (65), see Table 5. However, the largest per capita output of publications of books has been achieved by the researchers of category 1C, writing approximately 2.3 books per researcher. Researchers in category 1B did not publish any books or book chapters in the triennium 2007 to 2009.

Despite the importance of patents applications, there was no evidence of patenting by

Table 4

Supervision of scientific initiation. masters and doctorate students with category by researcher scholarship holder in the Physical Education area.

Scholarship category	Researcher	Scientific Initiation student		Master student		Doctorate student	
		n*	S/R**	n*	S/R**	n*	S/R**
1A	5	11	2.2	17	3.4	20	4.0
1B	3	20	6.7	19	6.3	9	3.0
1C	7	25	3.6	54	7.7	36	5.1
1D	9	39	4.3	74	8.2	37	4.1
2	50	208	4.2	375	7.5	115	2.3
Total	74	303	4.1	539	7.3	217	2.9

*n = supervision number.

**S/R = Supervisions per researcher in some category.

Table 5

Publication types of the researcher scholarship holders in the Physical Education area.

Scholarship category	Researcher	Book Chapters		Books	
		n*	P/P**	n*	P/P**
1A	5	16	3.2	4	0.8
1B	3	0	0.0	0	0.0
1C	7	53	7.6	16	2.3
1D	9	64	7.1	15	1.7
2	50	209	4.2	65	1.3
Total	74	342	4.6	100	1.4

*n = supervision number.

**P/P = Publication types per researcher.

researchers with productivity grants in the area of Physical Education.

DISCUSSION

This study showed that in May 2010, there were 74 research fellows of CNPq in the area of Physical Education, predominantly in states of the south-east region (64.8%). These findings correlate with studies carried out in the chemistry area, which showed that 63.7% of the research scholarships are in the south-east region (Santos, Cândido, & Kuppens, 2010), and in the field of dentistry, for which 85.5% of the research scholarships are in this region (Cavalcante et al., 2008).

Regarding the number of research fellows of CNPq in Physical Education per million inhabitants, the national average is 0.39, with the values varying between 0.07 (Bahia) and 1.92 (Federal District). From this data, it is clear that the grants for the researchers are distributed disproportionately in the different states and regions. Compared to other areas, Physical Education still has few productivity grants. Santos, Cândido, e Kuppens (2010) showed that in chemistry this ratio was 3.15 grants per million inhabitants while in dentistry the national average was 2.1.

It was observed that the majority of researchers work in public institutions (90.5%), with USP, Unesp, UFRGS and UFMG employing most of them. The participation of the research scholarship holder in the training of new researchers differs in the different stages of academic Education, with an average of 4.1 supervisions in the undergraduate section, 7.3 supervisions of Master students and 2.9 supervisions of doctorate students per research fellows of CNPq in Physical Education. These supervisions totaled 303 scientific initiation undergraduates, 539 Master students and 217 doctorate students. Tani (2007) affirms that teaching is one of the main tasks of the postgraduate programs, but the Brazilian postgraduate system in Physical Education faces a serious

deficiency in this respect.

Despite this, Physical Education has one of the highest numbers of supervisions, when compared with other studies, such as dentistry, which has an average of 2.5 supervisions of undergraduates, 3.6 supervisions of Master students and 2.2 supervisions of doctorate students by research scholarship holders (Cavalcante et al., 2008).

The Latin American representation in the database of the Institute of Scientific Information (ISI, Philadelphia, PA, USA) grew by 1.3% (5822 articles) in 1981, by 2.3% (16,046 articles) in 1996 (Weisinger & Bellorín-Font, 1999), and as a result of the increase of postgraduate programs in these countries, it has shown an increasing trend in participation since. In Brazil, for example, in 2004, the Physical Education area offered 17 courses at Master level and eight doctorate programs (Lovisoló, 2007). Currently, the Capes offers 38 postgraduate programs, which are complemented by programs that are related to Physical Education, such as Physiotherapy, Occupational Therapy, Speech Therapy, Nutrition and Collective Health.

In Physical Education, scientific methodology represents an important way of legitimating practices in the field (Betti, 2005). Through analyzing publications of CNPq Physical Education research fellows from 2007 to 2009, an average of 19.5 published articles per researcher was observed. The majority of these articles were published in journals of B1 category, followed by publications in journals having B2, A2, B4, B5, B3, A1, and C category, respectively. This classification of scientific journals was developed by the Coordination of Improvement of Higher Education Personnel (CAPES).

The numbers of the Physical Education scientific production are closely related to the general increase in the Brazilian scientific production and arguably reflect the mechanisms established for the Brazilian agencies of

promotion. Among these, the improvement of the postgraduate programs system of evaluation can be discerned, that for intermediary by CAPES, through the number and quality of published articles to appraise the national programs (Deheinzelin & Caramelli, 2007). Another mechanism that stands out is the scholarship for research productivity that promotes a competition between peers, encouraging the establishment of new researchers through the publication of articles in important periodicals (Martelli-Júnior et al., 2010).

The journal that publishes the largest number of articles is the *Revista Brasileira de Medicina do Esporte*. Out of the ten periodicals that publish the greatest number of articles written by research scholarship holders in Physical Education, seven are national, and out of the three internationals, two are published in Portuguese. The fact that international journals are involved at all indicates that researchers are slowly starting to publish for a more international audience.

Nahas and Garcia (2010) affirm that the worldwide Brazilian participation in the total number of articles in the area of physical activity and health is still small. However, it has grown in recent years, judging by the increasing involvement of our researchers in international events and even as members of the editorial board or reviewer of several international journals. The imbalance of the nationality of publications, in overall terms, would not only occur in this area, because health research in the world was distributed as follows: 90.4% originates from 42 developed countries, with 72.5% being produced in only five countries (USA, UK, Japan, Germany and France), and only 2.5% comes from 31 upper middle income countries (Brazil is one of the leaders in this group) and 7.1% comes from other 138 countries (Guimarães, 2006).

The CNPq Physical Education research fellows published a total of 100 books and 342 book chapters from 2007 to 2009, resulting

in an average of 1.4 books and 4.6 book chapters published per researcher. Researchers in Category 1C and 1D performed above average: 2.3 books and 7.6 book chapters in category 1C, and 1.7 books and 7.1 book chapters for researchers classified in 1D. These values are higher than those presented by Cavalcante et al. (2008) in their study on CNPq research scholarship holders of the dentistry area, who published an average of 0.3 books and 1.9 book chapters over three years.

According to Amadei and Torkomian (2009), a patent is an industrial property title on an invention or a model of utility. The state rewards the inventor with security in the negotiations with potential clients that are interested in applying the researchers invention. In an environment characterized by innovations, which can be found at universities, patenting is a common practice. So far no patents have been registered with CNPq Physical Education researchers.

CONCLUSION

The study of the profiles of CNPq researchers in the area of Physical Education, led to the observation that the majority were males, working particularly in the southeast region, specifically in the state of São Paulo, and in public institutions. Most of the publications of the researchers are in Portuguese periodicals. The results can be used as a starting point for the development of goals and strategies to further enhance the role of the field of Physical Education in the academic world. For this, we believe are necessary investments in post graduate and greater incentive to scientific initiation increasing the amount of scholarships available in the area. We also consider it important to establish international partnerships, spreading more and more results obtained in Brazil, as well as absorbing the research conducted in other countries, constantly feeding the exchange of knowledge.

In addition the study can help improving

the geographical spread of the researcher and to better allocate investments and support in order to stimulate scientific progress even more efficiently.

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