ANALYSIS OF THE PROFILE OF BRAZILIAN FELLOWSHIP RESEARCHERS PRODUCTIVITY IN PHYSIOTHERAPY: OBSERVATIONAL STUDY

ANÁLISE DO PERFIL DE PRODUTIVIDADE DE PESQUISADORES BOLSISTAS BRASILEIROS EM FISIOTERAPIA: ESTUDO OBSERVACIONAL

ANÁLISIS DEL PERFIL DE LA PRODUCTIVIDAD DE LOS INVESTIGADORES BECARIOS BRASILEÑOS EN FISIOTERAPIA: ESTUDIO OBSERVACIONAL

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Abstract

In order to inform the scientific community about the profile of productivity researchers, several studies have been caried out. Considering the advancement of the Physical Therapy field in Brazil, it is necessary to examine the profile of productivity in this field. This is an observational, descriptive study. Initially, a list of all productivity researchers in the Physical Therapy area was obtained from National Council for Scientific and Technological Development. Free access was made to the information contained in the Lattes Curriculum. We identified 62 productivity researchers in Physical Therapy, with 75.8% located in the Southeast region and a slight predominance of women (54.8%). We note that 58% of the fellows are distributed in four universities. Regarding human resource training, researchers in the category 2 stand out for having the highest number of graduates. Among the specialties recognized by Brazilian Federal Council of Physical Therapy and Occupational Therapy, Trauma-Orthopedic, Respiratory and Neurofunctional PT stood out. Therefore, we observe that there is still heterogeneity in relation to the distribution of fellowships, with a predominance of female fellowship holders, with a great concentration in the Southeast region. We emphasize that the main research funding agencies highlighted by the researchers were Brazilian Federal Agency for Support and Evaluation of Graduate Education, National Council for Scientific and Technological Development and regional foundations.

Keywords: Science; Scientific production; Research productivity; Physical therapy.

Resumo

A fim de informar a comunidade científica sobre o perfil dos pesquisadores em produtividade, vários estudos foram realizados. Considerando o avanço da área de Fisioterapia no Brasil, é necessário examinar o perfil de produtividade nessa área. Este é um estudo observacional e descritivo. Inicialmente, uma lista de todos os pesquisadores em produtividade na área de Fisioterapia foi obtida do Conselho Nacional de Desenvolvimento Científico e Tecnológico. Foi feito acesso livre às informações contidas no Currículo Lattes. Identificamos 62 pesquisadores de produtividade em Fisioterapia, com 75,8% localizados na região Sudeste e uma ligeira predominância de mulheres (54,8%). Observamos que 58% dos bolsistas estão distribuídos em quatro universidades. Em relação à formação de recursos humanos, os pesquisadores da categoria 2 se destacam por terem o maior número de graduados. Entre as especialidades reconhecidas pelo Conselho Federal de Fisioterapia e Terapia Ocupacional do Brasil, destacaram-se Fisioterapia Traumatológica-Ortopédica, Respiratória e Neurofuncional. Portanto, observamos que ainda há heterogeneidade em relação à distribuição das bolsas, com predominância de bolsistas do sexo feminino, com grande concentração na região Sudeste. Ressaltamos que as principais agências de financiamento à pesquisa destacadas pelos pesquisadores foram a Coordenação de Aperfeiçoamento de Pessoal de Nível Superior, o Conselho Nacional de Desenvolvimento Científico e Tecnológico e fundações regionais.

Palavras-chave: Ciência; Produção científica; Produtividade em pesquisa; Fisioterapia.

Resumen

Con el fin de informar a la comunidad científica sobre el perfil de los investigadores en productividad, se han llevado a cabo varios estudios. Teniendo en cuenta el avance del campo de la fisioterapia en Brasil, es necesario examinar el perfil de productividad en este campo. Se trata de un estudio observacional y descriptivo. Inicialmente, se obtuvo una lista de todos los investigadores en productividad en el área de fisioterapia del Consejo Nacional de Desarrollo Científico y Tecnológico. Se facilitó el libre acceso a la información contenida en el Currículum Lattes. Identificamos 62 investigadores en productividad en fisioterapia, de los cuales el 75,8 % se encuentra en la región sudeste y hay un ligero predominio de mujeres (54,8 %). Observamos que el 58 % de los becarios se distribuyen en cuatro universidades. En cuanto a la formación de recursos humanos, los investigadores de la categoría 2 destacan por tener el mayor número de graduados. Entre las especialidades reconocidas por el Consejo Federal Brasileño de Fisioterapia y Terapia Ocupacional, destacan la fisioterapia traumatológica-ortopédica, respiratoria y neurofuncional. Por lo tanto, observamos que sigue existiendo heterogeneidad en relación con la distribución de las becas, con un predominio de mujeres becarias y una gran concentración en la región sudeste. Destacamos que las principales agencias de financiación de la investigación señaladas por los investigadores fueron la Coordinación de Perfeccionamiento del Personal de Nivel Superior, el Consejo Nacional de Desarrollo Científico y Tecnológico y fundaciones regionales.

Palabras clave: Ciencia; Producción científica; Productividad de la investigación; Fisioterapia.

1 Introduction

A significant growth in Brazilian and worldwide research area has been registered, especially in the last decade, in which the number of publications has nearly doubled in Brazil, going from 40.811 articles indexed in Scopus in 2008 to 74.195 in 2018, according to data from the Ministry of Science, Technology, Innovations and Communications, which is equivalent to about 2.63% of the world production (Brasil, 2019a). According to a report produced by Clarivate Analytics for the Brazilian Federal Agency for Support and Evaluation of Graduate Education (CAPES), Brazil currently holds the 13th position in the world ranking of producers of scientific articles (Cross; Thomson; Sibclair, 2018).

In order to enhance the scientific production of Brazilian researchers, the National Council for Scientific and Technological Development (CNPq) created, in the 1970s, a program for Research Productivity Grants (PR) (Santos; Cândido; Kuppens, 2010). Researchers holding the title of doctor and demonstrating outstanding productivity in their fields of activity in relation to their peers, who meet necessary requirements established by the respective Advisory Committees (AC) can apply for this type of fellowship (Sturmer *et al*., 2013). It is worth mentioning that, in addition to the financial assistance received, productivity researchers (PRs; PQ in Portuguese) have a greater facility to be awarded with other research promotion notices (Sacco *et al*., 2016).

Currently, PR fellowships are divided and ranked in three categories, namely: PR-1 (subdivided into levels 1A, 1B, 1C and 1D), PR-2 and Senior (PR-SR), the most recent category, of a lifetime nature and granted directly the CNPq Deliberative Council to researchers who have remained in categories 1A or 1B for at least 15 years (Sacco *et al*., 2016). The performance of the researcher candidate for the PR fellowship is analyzed, mainly, regarding the doctorate time. For the category 2, candidates must have completed their doctorate three years ago or more, while for the category 1, a minimum of eight years is required, in addition to analyzing the number of publications in ISI Web of Science and SciELO/Scopus journals and guidance from master's and doctorate (Brasil, 2019).

In order to inform the scientific community and funding agencies about the profile of PR fellowship holders, several studies have been carried out, namely in the areas of Collective Health, Psychology, Chemistry, Dentistry, Pharmacology, Biomedical Sciences, Medicine, Nephrology/Urology, Hematology/Oncology, Cardiology, and Physical Therapy (Barata; Goldbaum, 2003; Kamdem *et al*., 2016, 2019; Martelli-Junior *et al*., 2010; Oliveira *et al*., 2011a, 2011b, 2014; Sacco *et al*., 2016; Santos; Cândido; Kuppens, 2010; Scarpelli *et al*., 2008;

Sturmer *et al.*, 2013). The identification of these profiles is important for the elaboration of polices aimed at scientific and technological development, in addition to mapping each area individually.

We highlight, among the mentioned areas, Physical Therapy, a profession regulated in Brazil for 50 years, with a notable growth, rising from an accumulated number of researchers in 1998 to 573 in 2008 (Coury; Vilella, 2009). Currently, that number is 3795, which is equivalent to an expressive increase of 562.3% in 12 years (Brasil, 2020). A survey previously carried out to identify the profile of the PRs in the field of Physical Therapy was published in 2003, identifying 55 active physiotherapists with fellowships, 61.8% of whom were women. Regarding the categories, 74.5% fell into the PR-2 category and 81.8% were concentrated in the Southeast region (Sturmer *et al*., 2013).

It is known that, in order to become a PR fellow, the researcher needs to be linked to an evaluation area recognized by CAPES. However, it is not public knowledge to which area these researchers are linked, whether there is a predominance of area or not, as well as whether these areas of college education correspond to the same ones performed in undergraduate courses. In addition to these requirements, another gap in the literature concerns the specialties performed by PRQ fellows according to Brazilian Federal Council of Physical Therapy and Occupational Therapy (COFFITO) and whether there is a relationship with the areas of concentration and research interest areas at CAPES.

Considering the growth of the area, it is necessary to examine the profile of the PRs in Physical Therapy, their demographic distribution, specific areas of activity registered with COFFITO and research interest areas registered with CAPES. Thus, the objective of this study was to analyze the profile of PRs in the Physical Therapy area according to CNPq.

2 Methods

This is an observational, cross- sectional, descriptive study, approved by Human Research Ethics Committee of the Federal University of Sergipe (UFS), under the number CAAE 23168619.1.0000.5546.

A total of 62 fellowships in Physical Therapy, according to information provided by CNPq, in force in 2020, being excluded only those not graduated in Physical Therapy. Initially, the information contained in the Fellowship's Lattes Curriculum was extracted and transferred to a database. After the identification of the Physiotherapy productivity fellowships, graduates

in Physical Therapy, a semi-structured electronic form, prepared by the authors of the present study using the Google Forms™ platform, was sent by e-mail to each PR fellow.

The form was elaborated in different sessions that involved the following topics: time of fellowship, productivity grants and number of renewals; institution to which the researcher is linked; amount of guidance performed; research interest area developed, leadership of research groups; funding institutions from which support was received; CAPES evaluation area related to postgraduate studies; for undergraduate work, we asked about subjects taught and involvement in extension projects, work in sectors related to management, as well as whether the researchers work in any specialty area recognized by COFFITO; involvement with institutional management and position held.

Population data were obtained from the website of the Brazilian Institute of Geography and Statistics (IBGE) – Instituto Brasileiro de Geografia e Estatística in Portuguese – and information regarding the specialty of each researcher was requested directly from COFFITO, via e-mail, after listing information of the research participants.

After the construction of the database, using an electronic spreadsheet (Excel 2016™), a descriptive statistical analysis of the data obtained was performed.

3 Results

We identified 62 PRs in Physical Therapy with active fellowships, in August 2020, as made available by CNPq. There was a predominance of female fellowship holders (54.8%) in all categories, except for PR-1D. Regarding the categories, the one with the highest number of fellows was PR-2, with 64.5% of them. Detailed information is shown in Table 1.

Table 1 - Distribution of CNPq productivity grants by sex and their respective percentages (%)[1].

Fellowship modality	Male		Female		Total	
	N	%	N	%	N	%
PR-1A	1	1.6	2	3.3	3	4.9
PR-1B	2	3.3	6	9.6	8	12.9
PR -1C	0	0	3	4.8	3	4.8
PR -1D	7	11.3	1	1.6	8	12.9
PR -2	18	29	22	35.5	40	64.5
Total	28	45.2	34	54.8	62	100

Source: Authors own elaboration (2021).

[1] CNPq: National Council for Scientific and Technological Development; PR: Productivity Researcher; N: absolute frequency.

Regarding the surveys of fellowship holders by demographic region, the Southeast region has 75.8% of PR fellowships in Physical Therapy, the remaining 22.6% are distributed among the South (12.9%), Northeast (8.1%) and Central-West (3.2%). The North region is the only one that does not have PR fellows in Physical Therapy. It is also worth mentioning that 79% of the fellowship holders are in the public sector, divided into the State and Federal sectors (14.5% and 64.5%, respectively).

Southeast region has the largest number of fellows in all categories, followed by South region, with emphasis on the categories PR-1C and PR-2. Northeast region presents fellowship holders only in the categories PR-1C and PR-2. In the Central-West region, we identified fellowship in the categories PR-1D and PR-2. The percentages of each category by region are described in Table 2.

Table 2 - Distribution of CNPq productivity grants by region and respective percentage (%)[2].

Modality	Southeast	South	Northeast	Central-West
PR-1A	100	0	0	0
PR-1B	100	0	0	0
PR-1C	66.7	0	33.3	0
PR-1D	50	37.5	0	12.5
PR-2	75	12.5	10	2.5

Source: Authors own elaboration (2021).

When analyzing the institutions which the researchers are linked to, it was observed that these are distributed in 17 Brazilian universities, four of which account for 58% of the PR fellowship holders: USP (17.7%), UFSCAR (16.1%), UNINOVE (12.9%) and UFMG (11.3%), all in the Southeast region. The rest of the percentage is distributed as follows to the other universities: UNESP (8.1%), UEL (4.8%), UFSCPA (4.8%), UNICID (4.8%), UFPE (3.3%), UFRN (3.3%), UNIFESP (3.3%), UFS (1.6%), UFVJM (1.6%), UNB (1.6%), UNESC (1,6%) UNIEVANGELICA (1.6%) and UNOPAR (1.6%). Thus, it is emphasizing that the state of São Paulo holds 62.9% of the total fellowships analyzed. Regarding the length of stay in the linked institutions, we identified an average of 16.3 years (± 10.2). More details can be found in Table 3.

[2] CNPq: National Council for Scientific and Technological Development; PR: Productivity Researcher; N: absolute frequency.

Table 3 - Classification of institutions according to the number of PQ fellows in Physiology[3].

Institutions	Position	Ranking Folha de SP	World University Rankings	Nº of Fellowship	% de fellows	UF	Administrative category
USP	1st	1st	1st	11	17.7	SP	Federal
UFSCAR	2nd	12th	37th	10	16.1	SP	Federal
UNINOVE	3rd	67th	*	8	12.9	SP	Private
UFMG	4th	4th	3rd	7	11.3	MG	Federal
UNESP	5th	6th	13th	5	8.1	SP	State
UEL	6th	23th	43th	3	4.8	PR	State
UFSCPA	6th	61th	22th	3	4.8	RS	Federal
UNICID	6th	98th	*	3	4.8	SP	Private
UFPE	7th	10th	32th	2	3.3	PE	Federal
UFRN	7th	22th	34th	2	3.3	RN	Federal
UNIFESP	7th	16th	6th	2	3.3	SP	Federal
UFS	8th	37th	7th	1	1.6	SE	Federal
UFVJM	8th	103th	*	1	1.6	MG	Federal
UNB	8th	9th	9th	1	1.6	DF	Federal
UNESC	8th	110th	*	1	1.6	SC	State
UNIEVANGELICA	8th	*	*	1	1.6	GO	Private
UNOPAR	8th	99th	*	1	1.6	PR	Private

Source: Authors own elaboration (2021).

Currently, the number of PRs in Physical Therapy corresponds to 0.3 per million inhabitants, considering that there are 62 fellows and, according to IBGE, Brazil had 211,955,344 inhabitants in 2022. According to data obtained from the Regional Councils of Physical Therapy and Occupational Therapy (CREFITOs), there are 188,763 physiotherapists registered with their respective regional councils, based on responses received from 13 Regional Councils.

When analyzing the Lattes Curriculum of all researchers, 48 of them obtained doctoral degrees in public institutions, with an average doctoral time of 17.6 years (max: 30 years, min:

[3] Ranking of universities prepared by Folha de São Paulo (2019). World University Rankings prepared by Times Higher Education data filtered by country (2021). *not found in Ranking. USP: University of São Paulo; UFSCAR: Federal University of São Carlos; UNINOVE: University Ninth of July; UFMG: Federal University of Minas Gerais; UNESP: State University of Paulista; UEL: State University of Londrina; UFSCPA: Federal University of Health Sciences of Porto Alegre; UNICID: University City of São Paulo; UFPE: Federal University of Pernambuco; UFRN: Federal University of Rio Grande do Norte; UNIFESP: Federal University of São Paulo; UFS: Federal University of Segipe; UFVJM: Federal University of Vales do Jequitinhonha e Mucuri; UNB: University of Brasilia; UNESC: Federal University of Santa Catarina; UNIEVANGELICA: Evangelical University of Goiás; UNOPAR: University of Northern Paraná.

7 years). Of the 19 doctoral specializations, two comprised 46.7%, being Physical Therapy and Physiology with 27.4% and 19.3% of the fellowship holders, respectively. Among the 62 fellows, 44 (71%) of them hold postdoctoral degrees, 26 (42%) of them completed it at international institutions, based on the information extracted from the Lattes.

Regarding the number of renewals for PR fellowships, according to information collected through a questionnaire sent via e-mail, the time spent on fellowships varied across categories, with a maximum of 18 years and a minimum of one year. As for fellowship renewals, one of the researchers reported eight renewals, another seven researchers mentioned having their fellowship renewed at least once and another six researchers had been awarded the productivity fellowship for the first time.

Among the PR researchers, 41 of 62 (66.1%) answered the questionnaire proposed in this study after three consecutive and interval attempts. It was observed that 37 (90,2%) of them are leaders of research groups, 33 (80.8%) are linked to graduate programs in Area 21 – Physical Education, Physiotherapy, Occupational Therapy and Speech Therapy within the Physiotherapy sub-area as classified by CAPES. Regarding involvement in Extension and Management, we found participation of 78.6% and 64.3%, respectively, among the administrative positions reported, highlighting the department head (12/27) and coordination of the postgraduate program (11/27).

We inquired about the approval of research grants in funding agencies, and we found CAPES (13.7%), CNPq (26.6%) and regional agencies (26.6%) as the main sources of financial support. In addition to these, international support was also reported (12.1%). Given this information, we emphasize the importance of fostering institutions, mainly public, for the development of Brazilian research.

It is known that minimum requirements are necessary for the researcher to become eligible for participation in public calls for applications to compete for the productivity fellowship. Among them, we highlight the training of human resources in the form of guidelines, which varies according to the category desired. We highlight, in Table 4 the amount of guidance in the categories of Master, Doctorate, Postdoctoral and Undergraduate Research (Scientific Initiation) according to information extracted from the Lattes Curriculum of each researcher, grouped by fellowship modality.

Table 4 - Amount of guidance by category of PR fellows in Physical Therapy[4].

Modality	Amount of guidance				Total	
	Master	**Doctorate**	**Postdoctoral**	**SC**	**N**	**%**
PR-1A	65	75	35	186	361	7.9
PR-1B	238	130	60	379	807	17.7
PR-1C	110	40	14	142	306	6.7
PR-1D	227	109	27	214	577	12.6
PR-2	846	416	57	1201	2520	55.1
Total	1486	770	193	2122	4571	100

Source: Authors own elaboration (2021).

We seek, in relation to the researchers' productivity, the number of articles published in journals previously described in Lattes. Physical Therapy researchers who are PRs have published 3.045 articles in journals in the last five years (2015-2020). Across all categories, the average number of publications per researcher was 49.1 articles during this period. We also analyzed the median number of publications by category: PR-1A: 39 (min 32, max 69), PR-1B: 50.5 (min 28, max 113), PR-1C: 34 (min 22, max 63), PR-1D: 60 (min 40, max 71) and PR-2: 43.5 (min 11, max 120).

In the Web of Science database, 5,112 were indexed, with an average of 104 articles per researcher. The median (minimum and maximum) by categories were PR-1A: 132 (min 86, max 152), PR-1B: 123 (min 56, max 258), PR-1C: 53,5 (min 13, max 94), PR-1D: 135 (min 91, max 207) and PR-2: 72 (min 17, max 143). In the SCOPUS, on the other hand, 3,427 articles were indexed, with an average of 87.2 articles per researcher, the median (minimum and maximum) by categories were: PR-1A: 95 (min 92, max 98), PR-1B: 112,5 (min 48, max 151), PR-1C: 73,5 (min 61, max 86), PR-1D: 88,5 (min 65, max 146) and PR-2: 57 (min 13, max 242). More information about each category is shown in Table 5.

[4] PR: Productivity Researcher; SC: Scientific Initiation.

Table 5: Productivity of fellows in Physical Therapy[5].

Modality	Articles published in journals*		Web of Science				SCOPUS		
			Total articles		Citation	Fator H	Total articles		Citation
	Md	Mean ± SD	Md	Mean ± SD			Md	Mean ± SD	
PR-1A	39	46.67±19.65	132	123.3±33.8	1538.3±414.2	23±3.5	95	95±4.2	1175.5±316.1
PR-1B	50.5	57±26.1	123	133±65.7	1200.4±585	19.4±4.5	112.5	100.9±40.5	1271.3±720.2
PR-1C	34	39.7±21.1	53.5	53.5±57.3	568±475.2	16±4.2	73.5	73.5±17.7	686.5±215.7
PR-1D	60	56.9±10.5	135	138.4±37.3	2322.4±1814.5	24.8±6.4	88.5	99.2±32.8	2351.2±2180.7
PR-2	43.5	46.9±24.6	72	72±26.3	792.1±479.6	14.8±3.1	57	67.5±46.5	651.5±576.3

Source: Authors own elaboration (2021).

We asked the researchers whether they had children and about their children's ages. Of the 41 respondents, 35 (87.8%) reported having children, with an average of two children per researcher. Regarding age, 10% of children were between 0 – 5 years old, 34.3% were between 6 – 10 years, 11.4% were between 11-18 years and 44.3% were over 18 years old. Among the 35 respondent researchers, 20 were women (57.1%) and 15 men (42.9%).

Still, on the results extracted from the questionnaire sent by e-mail, 29 researchers reported their specialties to COFFITO. Seven specialties were mentioned: Trauma-Orthopedic Physical Therapy (8), Respiratory Physical Therapy (6), Neurofunctional Physical Therapy (5), Cardiovascular Physical Therapy (4), Physical Therapy in Gerontology (3), Physical Therapy in Women's Health (2) and Dermatofunctional Physical Therapy (1).

With regard to the areas of expertise at graduation, 52 areas were mentioned, the main ones being: Physical Therapy (14/52), without further specifications; Cardiovascular Physical Therapy (5/52), Electrophysical Agents (4/52), Physical Therapy applied to Orthopedics (3/52), Physical Therapy in Gerontology (3/52) and Supervised Internship in Orthopedics (3/52). In terms of research areas, 19 were identified, four of

[5] Md: Median; Mean ± standard deviation (SD). *Articles published in the last 5 years, data from the Lattes Curriculum.

which are prevalent among researchers: Cardiorespiratory Physical Therapy (22.6%), Biomechanics (11.3%), Electrophysical Agents (11.3%) and Plasticity (8.1%).

4 Discussion

The data presented in this study indicate an increase in the number of fellowship holders of Productivity in Physical Therapy by CNPq, when compared to a previous study developed by Sturmer *et al*. (2013). Currently, there are 62 researchers distributed across the Southeast, South, Northeast and Central-West regions, compared to 55 fellowship holders in 2013. We point out an advance in this information when compared with Sturmer *et al*. (2013) since the Central-West and North regions did not have physiotherapy productivity fellows, while currently, 2020, the Central-West region has two fellows and the North region remains absent (Sturmer *et al*., 2013).

Such results indicate that, although there is still a heterogeneous distribution in the number of fellowships by region, there is an increase in research outside the Southeast axis, even though it has 75% of the fellowships distributed. When comparing data on the distribution of fellowships by geographic territory with the distribution of undergraduate courses in Physical Therapy, the pattern follows in a very similar way, except for the Northeast region, which occupies the second position. According to data from ENADE 2019 (National Student Performance Exam), the Southeast region presents 42.4% of Physical Therapy courses in Brazil, followed by the Northeast region with 25.8%, South region with 16, Central-West corresponds to 9.3% and the North with 6.5% of total courses (Brasil, 2019b).

Regarding the distribution by sex, although there is still a predominance of females in the total of PR fellowships in Physical Therapy, this is not as expressive as that found in the area of Psychology (63%), for example (Sacco *et al*., 2016), revealing a tendency to balance between the sexes. In 2013, 61.8% of the grants were implemented for women and currently was 54.8%. However, we reinforce that the prevalence of PR women occurs in all categories, except 1D, and that category 1C is composed exclusively of women, which reaffirms the quality of the work performed by female researchers and their ability to remain in evolution process in their careers presenting outstanding productions.

Despite the small superiority in relation to the distribution of fellowships for women when compared to those distributed to men, we observed a reduction when compared to the 2013 data, although, currently more fellowships have been granted in the field overall, the number awarded to women has remained unchanged. The period of seven years since the last study did not change the total amount, since 2013 34 fellowships have been distributed to women, with a total of 62.

According to data from Parent in Science, a movement that emerged in 2016 with the aim of raising the discussion about motherhood and fatherhood within the universe of science in Brazil, only 36% of productivity grants across the country were awarded to women researchers in 2017. This research aimed to investigate the impact of motherhood on academic performance and consequent productivity (Machado *et al*., 2019). According to data obtained, when analyzing the total productivity of researchers who claimed to have children correlated with their age, a reduction in productivity was observed in the first years after motherhood (Machado *et a*l., 2019).

Since such information has not been evaluated by Sturmer *et al.,* (2013), we cannot infer that our data is justified by maternity. However, as productivity indices are considered over the last few years for the implementation of fellowships and knowing, according to Machado *et al*. (2019), that motherhood has a relevant impact on the productivity of women scientists, directly affecting their permanence in high academic positions, this is a fact that can be considered.

Although Physical Therapy is recognized in Brazil as a profession predominantly developed by women, this fact does not reflect on data in this study, as previously presented. To better discuss this discrepancy, we explore possible explanations that could justified it. Thus, we pointed out some barriers faced by women scientists that need to be considered when offering fellowships/prizes. Mello-Carpes *et al*. (2019) highlight some factors such as: the need to strengthen the blind review process by public notices, since this fact would exclude gender bias; effective implementation of gender equality polices; consider the period of maternity leave during the evaluation of the curricula, since there is a productivity gap in the curriculum of these scientists; among other topics (Mello-Carpes *et al*., 2019).

We emphasize that, in addition to the aforementioned challenges, according to cultural paradigms, women often still have a double burden with regard to domestic

chores and child rearing, because there is still the thought and attitude that women are responsible for maintaining family order (Madalozzo; Martins; Shiratori, 2010). It is also worth remembering that, often, the activities performed in the academic environment end up being taken to the home environment, thus generating an increase in the demand for work (Zibetti; Pereira, 2010).

In addition to updating the information regarding the profile of researchers in Physical Therapy productivity in activity in the year 2020, we raised some questions regarding the reduction in the number of women fellowship holders in relation to the previous study, including suggesting that greater attention should be given to women after the period of maternity, since her productivity tends to decrease in the first years and, as a result, she may lose the benefit of PR fellow (Machado *et al*., 2019; Mello-Carpes *et al*., 2019). We cite the example of the Women's Research Assistance Program (WRAP), a program that aims to support women scientists from Queensland/Australia in maintaining their careers and, consequently, encourage them to continue producing after the period of maternity leave (Wrap, 2018).

Still on the topic of encouraging women scientists, we highlight in Brazil, the Serrapilheria Institute, which offers in its public notices specific points as a way of encouraging women who have become pregnant during the term of the grant, including maternity fellowship; participation of breastfeeding children and companions in events; extension of the doctorate completion period for candidates who are mothers. As mentioned by the institute itself regarding its values, the focus of this institution is to encourage diversity, based on the assumption that science needs permanent review and that its access must be universal, therefore without restrictions (Instituto Serrapilheira, 2021).

We also highlight the World Award for Women in Science, offered by L'Oréal-UNESCO, which was created in 1998 and has since honored five eminent women scientists from five regions of the world (Fondation L'Oreal, 2021). In Brazil, we have the For Women in Science Award, offered by L'Oréal Brazil in partnership with UNESCO Brazil and the Brazilian Academy of Sciences. In each edition, young researchers from different areas are chosen to be awarded fellowships as a way of encouraging the research developed. This award is seen as an incentive to pursue a career and, consequently, to advance research in Brazil. Specifically for the area of Physical

Therapy, the For Women in Science has awarded six researchers in the last decade, in 2011, 2013, 2014, 2017, 2019 and 2020 (L'Oréal Brasil, 2021).

The distribution of fellows among the public and private sectors is worth highlighting, as data extracted from the Lattes Curriculum of the fellows show that 79% are in the public sector. We point out that when asked about the incentives received through funding agencies, the researchers pointed out CAPES, CNPq and regional Research and Innovation Support Foundations as the main sources of funding. Still based on the answers obtained, 12% of the researchers stated that they had already received incentives from international funding agencies, which once again reflects the high power of research carried out in Brazil, and the strong internationalization on the part of researchers and universities, since the invitations to bid were completed with researchers from around the world.

Although competing for international public notices are linked to some challenges, such as language/communication, publications in very high impact journals and partnerships with international institutions, this has been an alternative to the constant cuts in the national budget for research. Thus, we highlight the importance of maintaining resources to support scientific research and the need for greater investments in this area.

Regarding the institutions which the researchers are linked to, we highlight that four of them – University of São Paulo (USP), Federal University of São Carlos (UFSCAR), UNINOVE and Federal University of Minas Gerais (UFMG) – concentrate about 58% of the active fellowship holders. We combined this information with the data provided by Folha de São Paulo regarding the Ranking of institutions and data from the World University Rankings, prepared by Times Higher Education, as it is a world ranking. We filter the data by country, in order to obtain only the data from Brazilian institutions. We note that USP, the institution with the largest number of Physical Therapy fellows, is also ranked as first in the indexes used, however for the other institutions, the ranking does not follow the same order, a justifiable fact, since such indexes are prepared for classifying Universities in general.

It is important to mention that three of these universities are in the state of São Paulo, the state that has one of the main research funding agencies in the country, FAPESP (São Paulo Research Foundation). FAPESP has autonomy guaranteed by law, in addition to having an annual budget corresponding to 1% of the state's total revenue,

which assurances support for research, funding and dissemination of science and technology produced in São Paulo (Brasil, 2023b; Brasil, 2023a).

We reinforce the importance of this study, especially due to the impact that the work developed in the country has on the level of world science. We highlight the impact of Brazilian citations in the area of Health Sciences, since the researchers of the present study are in this category. According to a report produced by Clarivate Analytics: Research in Brazil – Funding Excellence, in 2019, the most productive universities are not always those that have the greatest impact on research, corresponding to the highest number of citations. We emphasize that, according to this report, the four most cited universities in the investigated area were Federal University of Sergipe (UFS, 2.68), Federal University of Santa Catarina (UFSC, 1.98), Federal University of Pelotas (UFPEL, 1.72) and Federal University of Minas Gerais (UFMG, 1.56) (Web Of Science Group, 2019).

One of the contributions of PR researchers is through the training of qualified human resources, namely, orientation of students at the undergraduate level (scientific initiation) and graduate (master and doctoral) courses. We found, based on the information mentioned in the Lattes Curriculum, a significant increase in the amount of guidance from category 2 researchers, when compared to the others. This data deserves mention, since it is maintained in all areas in which Productivity Fellowships are awarded (Reis, 2016).

About the number of physiotherapists in the Brazilian territory, according to Matsumura *et al*. (2018), until September 2016, there were 206,170 physical therapists registered with their respective Regional Councils (Matsumura *et al*., 2018). One of our goals was to update this data, however, due to the lack of answers on the part of some Councils, even after 3 attempts, this goal could not be properly contemplated. According to data obtained by 13 of 17 Regional Councils, until May 2020, there were 188.763 professionals registered on their respective councils. According to data presented by Matsumura *et al*. (2018), from 2005 to 2016, there was a 159.72% increase in the number of registered physical therapists.

With regard to specialties at the Federal Council, only 29 out of 62 researchers reported having one or more specialties. Among those mentioned, we highlight Trauma-Orthopedic, Respiratory and Neurofunctional, areas of great emphasis in Physical

Therapy. However, we emphasize that less than half of the researchers answered the questionnaire sent, thus, we cannot affirm that such data are consistent with reality. We make the same reservation for the data referring to the areas of expertise in the research, according to data collected, the areas of Cardiorespiratory Physical Therapy, Biomechanics, Electrophysical Agents and Plasticity stand out.

Wainer and Vieira (2013), when evaluating the CNPq research productivity grants, raised questions about the issues considered for the implementation of the PR grants. According to them, two aspects would be considered for the decision to implement grants, the first of which would be to reward researchers, and, for that, the amount of research developed by these scientists would be the main criterion evaluated, with researchers with greater career time tend to stand out for the accumulation of citations throughout the career. The second aspect would be to encourage scientists, so when receiving the PR fellowship, the researcher would feel motivated to continue or improve the level of production, since the most recent publications and their impact would be decisive for obtaining or not the fellowship (Wainer; Vieira, 2013).

Data presented by the present study were obtained from CNPq Lattes Platform. Such information is fed by the researchers themselves, ensuring a high degree of reliability of the information. However, since researchers can add information at any time, there is a possibility that, during the data collection period, information was added by the researchers and, consequently, was not captured by our searchers, or even that the information could be incomplete. Another limiting factor was the non-return of the questionnaires sent, after three attempts via electronic contact, thus the information received cannot be attributed as representative of the reality, given that only 66% of the researchers returned to us.

Thus, this study aimed to contribute to the scientific community in what is mainly related to the identification of regional inequalities, concentration of fellowships by institution and discrepancies in the distribution between sexes and, thus, to allow changes in the distribution of these resources, especially in terms of promoting more equitable science, not only about gender, but also across the different regions of the country. We point out projects with the purpose of encouraging women scientists as it is a category that is still in the minority, especially when analyzing the productivity fellows in general, as previously mentioned.

5 Conclusion

Therefore, we observed, based on the data collected, that there is still heterogeneity in relation to the distribution of the fellowships, with a predominance of female fellowship holders, with a great concentration in the Southeast region, especially in the state of São Paulo. We emphasize that the main research funding agencies highlighted by the researchers were CAPES, CNPq and regional agencies. We also highlight the growing progress of the field, especially in terms of the number of publications, training of human resources, and scientific leadership.

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