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PROFILE OF THE PHYSIOTHERAPIST RESEARCHER AND PROFESSOR IN THE STATE OF BAHIA: A DOCUMENTAL ANALYSIS

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ABSTRACT | Introduction: Outlining the profile of the physiotherapist researcher and professor in the State of Bahia can help to identify gaps to be filled for the development of science in this area. **Objective:** To describe the profile of the physiotherapist professor with a PhD in the State of Bahia and to analyze the connection among the researchers by sub-area of knowledge. **Methodology:** Scientometric documental study with data obtained from the Lattes curricula of the professor staff of higher education institutions in the State of Bahia. Data were tested using the Mann Whitney test and the Collaboration Network analysis system. The level of significance was 5%. **Results:** Twenty-four physiotherapists were identified and analyzed, most of whom were female (75.0%), with three years or less of PhD (58.3%), little training abroad (20.8%), low insertion in master's and doctoral programs (20.8%), with a median of 1.5 articles per year/professor and h-index of 3.6 citations/year/professor. The vocation for research involves more the neurofunctional sub area (25.0%). Not one (0.0%) physiotherapist doctor of the sample is benefited with a scholarship of productivity in research and 62.5% work in public institutions. The number of different orientations was associated with the titration time ($p < 0.050$), but not with the h-index ($p = 0.272$). It was noted that the collaboration network is still incipient. **Conclusion:** Physiotherapists researchers and professors in the State of Bahia are young doctors, with productivity in research in development and little insertion in local, national and international research networks.

Keywords: Physiotherapy. Scientometrics. Research.

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INTRODUCTION

Knowledge and scientific production are intrinsically related to professional improvement and technological advancement[1]. This axiom is especially true for health. The need of quality and safety for the use of different health technologies requires clinical practice to be based on the best scientific evidence. This requires high productivity in research. Physiotherapy is among the health sciences with the highest research productivity in the last decades[2]. This fact reflects the maturation of the profession, the improvement and expansion of research in the various sub areas of professional activity[3]. It has been pointed out that generation and dissemination of knowledge are important factors for the academic training of qualified professionals in health[4].

Generation of evidence requires the inclusion of qualified PhD researchers in the undergraduate courses in Physiotherapy. Doctors are independent researchers that can generate new perspectives for the professional performance and rigorous evaluation of the applied procedures[5]. The doctors are mainly responsible for the development of the research. They having been trained during their PhD process, in research groups and can mentor new masters and PhDs. However, there are still few physiotherapist doctors in Brazil, especially in the Northeast region, which affects the progress of the profession[3].

According to the criteria adopted by the Ministry of Education (MEC in Brazil), all professor of higher education level must have their curricula registered and updated on the Lattes platform for systematic evaluation follow-up of both undergraduate and postgraduate courses[6]. The Lattes platform integrates curriculum of researchers, research groups and institutional data into a single information system[7]. This unique system is under the coordination of the National Council for Scientific and Technological Development (CNPq in Brazil), which is responsible for the transparency of information on Brazilian science for the entire national and international scientific community.

In order to encourage scientific progress and production, CNPq offers, among other forms of funding, scholarships of various modalities for undergraduate and postgraduate courses[7]. Among these modalities, the research productivity grants (PQ in Brazil), which is offered to the more experienced researchers, considered of excellence, is highlighted by criteria determined by each research area stratified by CNPq[6]. PQ productivity grants are intended for the scientific development of different areas of knowledge.

According to data acquired from the Lattes curricula of Brazilian researchers, the Southeast region absorbs 81.8% of the PQ productivity grants distributed to physiotherapists, with the lowest index being in the Northeast region[8,9]. The profile of scholarship holders in this category is predominantly female, with a doctorate degree from national public institutions whose main destination is private universities[7]. The average production of post-doctoral publications is 4.2 articles per year, which confirms the superior productive capacity in research of this group of professionals[5].

The profile of physiotherapists is unknown in Bahia and its knowledge can help to identify strategies necessary for the development of Physiotherapy science and the support of projects and researchers from the different research promotion agencies. Institutional managers can also identify which investments are needed to improve the research in Bahia undergraduate courses in Physiotherapy, which can project them in science in the area, nationally and internationally. Therefore, the present study has the principal objective of tracing the profile of the physiotherapist researcher professor in the State of Bahia. In addition, it is designed to analyze, through collaborative network systems, the degree of connection between researchers by sub area of knowledge.

MATERIAL AND METHODS

This study is considered to be a documental analysis using Scientometry tools. The studied population was of physiotherapists doctors in the state of Bahia,

based on data obtained directly from the Lattes platform. Physiotherapists of both sexes, with a doctorate degree obtained and referred to in the curriculum until August 2016, working as professor staff in Public or Private Higher Education Institutions, in Physiotherapy courses, in the state of Bahia, were included. Institutions that did not make were included the list of teachers available were excluded and teachers who had not updated their curriculum for at least six months and who, even in the course of Physical Therapy, had graduated in other areas or sub areas of knowledge were excluded.

In order to identify the professionals, the e-MEC database (http://emec.mec.gov.br/) was used first, in which the institutions that have the Physiotherapy course in the State of Bahia were selected. Next, the site of each educational institution was consulted, aiming to obtain the professor list of the Physiotherapy course. In order to select physiotherapist professors with a doctoral degree, individual consultations of all curriculum available were done at the Lattes Platform from CNPq (http://lattes.cnpq.br/). The h-index was obtained from the Researchgate Platform (www.researchgate.net).

The variables extracted and analyzed from the Lattes curricula were: gender, doctoral institution of title obtainment, country/state, year of qualification, area of research, research themes, origin of resources of research projects (financed or own resources), quantity of articles published in scientific journals, h-index, profile of institution in which he/she works as a professor, weekly hourly load, number of research projects under development, insertion in masters and/or doctoral programs, post doctoral internship, resources training (guidelines completed and in progress TCC, master's degree, doctorate and scientific initiation) and collaboration network evidenced by co-authorship.

A database was established in the Microsoft Excel 2013 system with the variables of each researcher. The data were tabulated and analyzed in a descriptive way by median and interquartile range for the quantitative variables, since the distribution was not normal for all variables studied. Categorical variables were outlined in absolute and percentage numbers. To test associations between the selected variables, SPSS software version 21 was used. The Mann Whitney test was used to test the association for the quantitative variables, considering an alpha of 5% and 80% power. Gephi version 0.8.2 software was used to evaluate the collaboration network. Knowledge sub-areas and publications from 2015 to 2016 were extracted from the Lattes curriculum of each researcher to identify whether co-authorships existed among the researchers composing the sample. The "nodes" of the networks were formed to represent the researchers (red color) and the sub areas of performance in research (blue color), while the "edges" represent the connections through co-authorizations between different researchers and sub-areas of knowledge. The size of the "knots" and the thickness of the "edges" are proportionate to the number of articles in partnership in the different sub-themes. The greater the number of articles published in partnership, the greater the thickness of the "edge" and the greater the number of articles in a theme, the greater the size of the "nodes". The sub-themes were classified a posteriori following the rationale of the field of professional performance in: 1. Basic Sciences (Physiology, Exercise Physiology, Morphology, Biomechanics, Methodology and Scientific Research); 2. Expanded Clinic (Collective Health, Epidemiology, Health Promotion, Worker Health, Equilibrium and Functional Electrostimulation); 3. Specialties and Clinical Subspecialties (Pain Clinic, Pediatrics, Geriatrics, Neurofunctional Rehabilitation, Intensive Therapy, Hospital Physiotherapy, Respiratory, Cardiology, Urogynecology and Dermatofunctional Physiotherapy).

RESULTS

We found 48 undergraduate institutions in the state of Bahia with a Physiotherapy course and 43 were excluded because they did not have doctors in the teaching staff. Of the five institutions included, 24 physiotherapists with doctoral degrees were identified, the majority being female (75.0%) and none (0.0%) with a productivity grant in research (Table 1). In relation to the institution where the degree was achieved, fifteen (62.5%) did their training in the Northeast, six (25.0%) in the Southeast region and three (12.5%) abroad. Of the three (12.5%) who completed their extensive training abroad, one trained in Spain, one in Portugal and one in Argentina.

The profile of the institution to achieve the PhD degree, was 10 (41.6%) private, and 14 (58.4%) public. Only one (4.2%) undertook a doctorate sandwich in the exterior, having partially trained in Portugal, and one (4.2%) carried out postdoctoral training in Australia. One (4.2%) completed a postdoctoral internship in São Paulo and one (4.2%) is in training in Rio de Janeiro. Postdoctoral internship abroad was funded by CNPq, and the two nationals were funded by the Foundation for Research Support of the State of Bahia (FAPESB in Brazil). Fifteen (62.5%) professors work in public institutions. Of the 24 PhD physiotherapists, five (20.8%) are inserted as permanent teachers in master's and doctoral programs, serving to train new researchers.

Table 1. General researcher professors physiotherapists characteristics of state of Bahia in September 2016.

	N = 24	%
Gender		
Female	18	75.0
Male	6	25.0
Internship of Research productivity		
Benefited	0	0.0
Institution of Title Obtained		
Bahiana School of Medicine and Public Health (Northeast)	7	29.2
Federal University of Bahia (Northeast)	7	29.2
Catholic University of Salvador (Northeast)	1	4.2
Federal University of São Paulo (Southeast)	2	8.3
São Paulo University (Southeast)	2	8.3
Saint House of São Paulo (Southeast)	2	8.3
Murcia University (Spain)	1	4.2
San Martin University (Argentina)	1	4.2
Trás os Montes and Alto Douro University (Portugal)	1	4.2
Professor Performance		
Private	9	37.5
Public	11	45.9
Both	4	16.6
Insertion in Master and Doctoral Programs		
Yes	5	20.8
No	19	79.2

Source: Curriculum Lattes

The median titration time was three and a half years and the number of articles published in scientific journals was 1.5, considering the last 10 years (Table 2). However, when adjusted for the period from 2015 to 2016, corresponding to the last two years adopted by the main metrics of the current evaluative systems, a median of 3.5 articles per year per teacher is observed and a h-index of 3.6 citations per article.

Table 2. Quantitative selected characteristics about profile of research physiotherapists who act as professor in the state of Bahia in September 2016.

Variables	Q1	Median	Q3
Time to obtain title (in years)	1.7	3.5	7.0
Number of publications (last 10 years)	5.7	15.0	26.5
Number of undergraduate orientation in progress	9.7	25.0	40.2
Number of master orientation in progress	0.0	0.0	2.1
Number of PhD orientation in progress	0.0	0.0	0.1
Number of research projects in progress	1.5	3.0	3.0
Number of scientific iniciation orientation concluded	0.0	2.0	9.0
Hourly load	40.0	40.0	55.0
H Index	1.0	3.6	10.0

Q1 – 25% Quartile; Q3 – 75% Quartile. Source: Curriculum Lattes and Researchgate.

The subareas of the knowledge or themes in which these researchers developed their doctoral projects can be visualized in Figure 1. The highest frequency of studies was in the neurofunctional sub area (25.0%). Of the 24 doctors, 19 (86.4%) carry on research on the same topic.

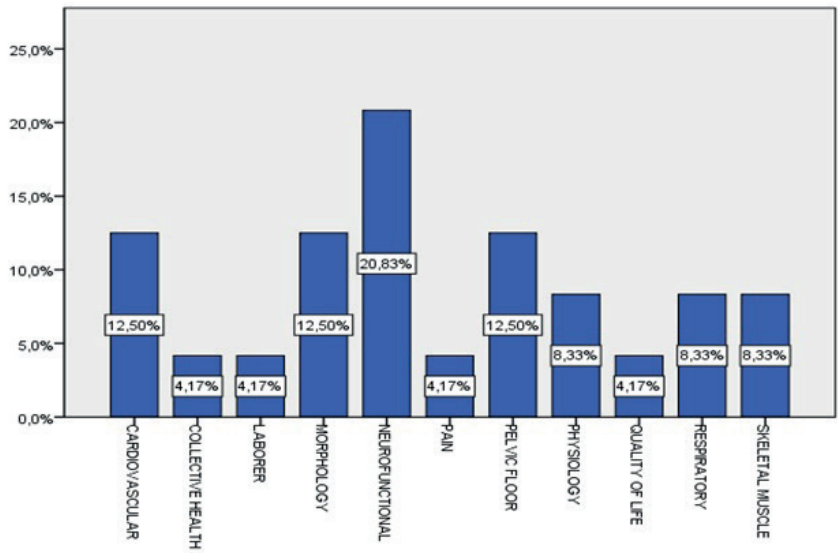

Figure 1. Themes of doctoral research of research professor physiotherapists of State of Bahia in September 2016.

At present, these doctors are participating in eight research groups registered in the national directory of CNPq research groups. Research teams are part of 20 declared projects, 13 (65.0%) with some funding, especially with resources from the state of Bahia Research Foundation (FAPESB in Brazil).

Duration of the obtained doctor's degree was associated with the number of completed Master's and PhD orientations, but not with the hourly load, the h-index, and the number of publications (Table 3).

Table 3. Association between time of the obtained doctor's degree and selected quantitative variables of research professor physiotherapists of state of Bahia in September 2016.

	Time of the obtained PhD title		
	Equal or less than 3.5 years	More than 3.5 years	
	Median (Q1;Q3)	Median(Q1;Q3)	p-valor
Concluded master orientations	0.0 (0.0;0.0)	0.0 (0.0;8.0)	0.033
Concluded PhD orientations	0.0 (0.0;0.0)	0.0 (0.0;1.0)	0.031
Concluded scientific Initiation orientations	0.0 (0.0;3.50)	5.0 (0,0;15.0)	0.035
Hourly load	40.0 (40.0;60.0)	40.0 (23.0;40.0)	0.104
H Index	2.0 (1.0;2.50)	2.0 (1.0;7.0)	0.272
Number of published articles	11.0 (5.0;20.50)	16.0 (6.0;30.0)	0.176

Q1=25% Quartile; Q3=75% Quartile. Mann Whitney test, alpha 5%. Source: Curriculum Lattes and Researchgate.

The publications of these teachers in the last two years were analyzed in order to identify the collaboration networks between them (Figure2). The average degree of connections between doctors was 2.6, which means that the investigators analyzed collaboration with approximately three other researchers. It is observed that there are two consolidated collaborations between two pairs of doctors, represented by the letters J-L and I-C. Three in-development collaborations represented by the letters J-O, A-B and C-R. The other researchers have a weak strength of cooperation evidenced by co-authored publications.

It was observed that two of the 24 doctors did not publish any articles in the last two years, two published without collaboration and have no common sub area with other physiotherapists doctors of the State of Bahia. The most researched sub areas involved the themes of "Pain", "Biomechanics", "Neurology", "Urogynecology", "Epidemiology", "Geriatrics", "Cardiology" and "Respiratory".

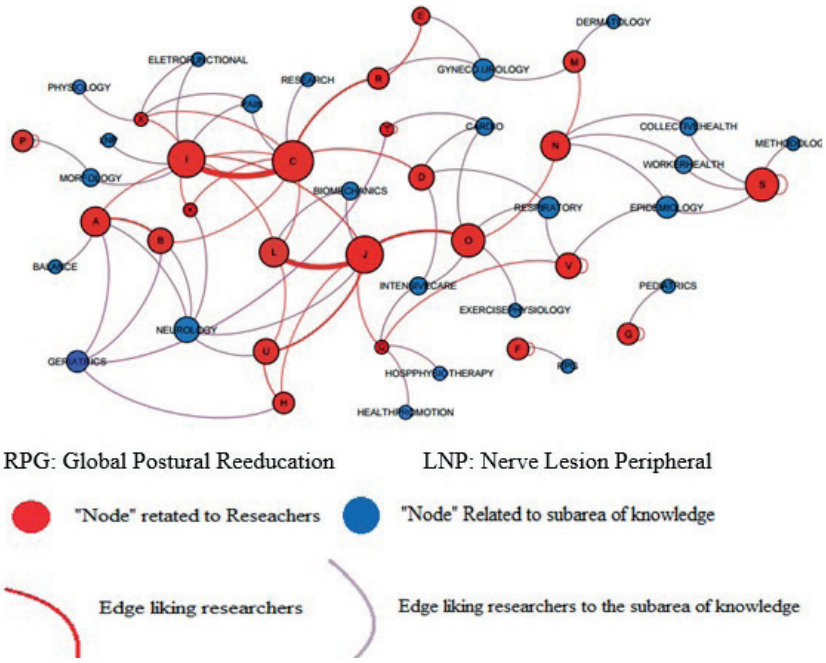

Figure 2. Network of collaboration between researcher professor physiotherapists of State of Bahia in September 2016.

DISCUSSION

The current outline of the profile of the physiotherapist professor with a doctoral degree in the State of Bahia demonstrates indicators and relevant gaps for actions, investments and strategies necessary for the development of Physiotherapy Science in the state, in the country and at the world level. Specific sociocultural characteristics create unique conditions for the health that requires scientific support for the approach. The knowledge generated by qualified scientific research can be significant for the necessary functional kinetic of the world's contemporary populations, which can increase productive capacity and improve people's quality of life.

No physiotherapist doctor in Bahia has a research productivity grant and the entire Northeast region of Brazil uses 5.71% of the PQ grants[8]. Four Northeast scholarships are concentrated in Pernambuco and Rio Grande do Norte States, which have Physiotherapy masters and PhD programs[9]. The specific criteria applied by the area to contemplate physiotherapists with a productivity grant consider that researchers with a defined research line, scientific merit research projects, completed and ongoing guidelines for masters and doctorates, and articles published in indexed journals in the main databases (LILACS, ERIC, ISI, Embase, MEDLINE and Scielo)[7]. Bahia has no master's or doctoral degree in Physiotherapy or Rehabilitation (21 area of CAPES) and the only five physiotherapists enrolled in stricto sensu postgraduate programs are in Medicine I and Medicine II evaluation area of CAPES that have criteria very different, especially in relation to Webqualis. This phenomenon may explain one of the reasons for the non-distribution of these internships in the State. However, criteria that are not adjusted to the peculiar conditions, strengthen regional asymmetries and may hinder the development of research and, consequently, of the profession in the State of Bahia.

Another possible explanation for the lack of productivity grants in research is the titration time, because the present study there was a predominance of doctors with less than 3 and a half years of obtaining a doctor's degree. This is a very small time compared to the Southeast region, where 81.8% of the scholarships are concentrated, in which the predominant range of doctorates is 6 to 15 years[6]. However, the difference between the five teachers included in the masters and doctoral programs and the others is striking. Being enrolled in a stricto sensu postgraduate program is critical to achieving the minimum indicators for obtaining the PQ scholarship. Doctors from Bahia will probably have a long walk inserted in programs in other areas until the state has 12 productive professors in the same institution and with experience in guidelines to propose a master's and doctoral program in Bahia to CAPES. One promising solution to anticipate this process would be to build an interinstitutional program, which is hampered by the different institutional modalities (public and private) where these teachers are distributed and by the veiled competitiveness between institutions.

An association between the number of orientations and the titration time was observed. However, no association was observed with the hourly load, with the H-index and the number of articles published. These findings confirm that the number of orientations, especially of scientific initiation, masters and doctorates is greater for those who have been titled for longer[6]. However, they demonstrate that the dedication to the formation of new human resources for research and the quantity and quality of publications is not related to the titration time. It is possible that several of these doctors have no real interest in developing as researchers and that the short time of obtaining the degree and of insertion in public institutions has not yet allowed to reach the top of the research productivity curve and, for that reason, still can not absorb productivity research grants.

The title was given more in public institutions, as well as institutions of predominant performance were also public ones. This is different from what has been observed in the Southeast, where the public has served more to title, while the private, more to employ physiotherapists doctors[6]. However, it is similar to what occurs in the Amazon region, where the type of institutions both to obtain the title and the performance occurs in the public[10]. Since the Physiotherapy courses in public institutions in the state of Bahia do not exceed 15 years of implantation,

many places in public competitions have appeared in the last decade. In any case, the hypothesis is confirmed that physical therapists have a greater possibility of approval in public examinations and demonstrate the need for more doctors in the state.

Another fact observed was the lack of collaboration among the doctors of the sample, despite researching in the same knowledge sub-area. One of the best means of the development for contemporary sciences has been through the strengthening of collaborative networks[10,11]. Competitiveness in such a restricted universe should be completely eliminated and the few doctors and institutions should join forces to achieve the common goal of the development of the profession in the state.

Low training abroad of these doctoral doctors may also be contributing to the difficulty of publication in journals better classified in Webqualis, which has a lower H-index[7]. It was noted that the two physiotherapists who obtained their degrees abroad did not continue their development as researchers and neither published with foreign researchers of international renown, maintaining a much lower h index than expected for the titration time. The only postdoctoral physiotherapist in Australia stands out from the others in relation to his h index, which shows that this is a fundamental action for the improvement of the Brazilian science internationalization index[3]. It is urgent that physiotherapist doctors in Bahia and their respective institutions invest in sandwich doctorates and postdoctoral internships abroad to help boost the development of the profession in the state.

Institutions of undergraduate and research support are required to do their part, valuing their doctors and creating opportunities for the development of research and, consequently, the profession in the state of Bahia. Well-trained professionals can help reintegrate into the prolific market several people with functional disabilities and contribute to the socio-economic development of the country[9].

The advantages of this study are its low cost and easy access to public databases. As limitations, it is recognized the difficulty of testing hypotheses due to the small size of the sample and the dependence of updating the faculty list in institutional sites. In spite of this, it was possible to identify some factors related to the difficulties of research development in the state of Bahia, which point out ways for practical actions of the physiotherapists themselves, the managers of the educational institutions in the state, and the agencies for the allocation of resources in the area. The development of the profession in the state of Bahia depends on special attention to these gaps and a multisectoral effort.

CONCLUSION

It can be concluded that the physiotherapists with the highest level of qualification of the state of Bahia are young doctors, with low insertion in masters and doctoral programs, productivity in research in progress and little collaboration, mainly at the international level. These findings point to investment needs for the development of research in this area of knowledge in the state of Bahia that will have repercussions on national and international indicators.

AUTHOR CONTRIBUTIONS

Cruz FG designed the experiment, collected the data, constructed the dataset, analyzed the data and wrote the manuscript. Cohim S oversaw the first author work and performed a critical review of the manuscript. Carneiro APQ performed the network data analysis, oversaw the dataset building, wrote the manuscript and performed a critical review of the manuscript. Sá KN designed the experiment, coordinated the research team, oversaw the research phases, wrote the manuscript and made the necessary adjustments in the final draft after the peer review.

COMPETING INTERESTS

No financial, legal or political competing interests with third parties (government, commercial, private foundation, etc.) were disclosed for any aspect of the submitted work (including but not limited to grants, data monitoring board, study design, manuscript preparation, statistical analysis, etc.).

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