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EDITORIAL

25 years of Brazilian physical therapy postgraduate education: Where we are and where we need to go.

Over the past decades, Brazil has experienced significant growth in research activities in all fields and has become an important source of scientific knowledge.¹ This growth is very likely related to the increased number of postgraduation programs including those in Physical Therapy. The establishment of the first postgraduation program at the Universidade Federal de São Carlos (UFSCar) in 1996,² the creation of the Brazilian Physical Therapy Journal, and the foundation of Associação Brasileira de Pesquisa e Pós-graduação em Fisioterapia (ABRAPPG-Ft) in 2005 are historical landmarks that contributed to the scientific development of the Brazilian physical therapy profession.³ Twenty-five years after the first Physical Therapy post-graduation course, an analysis of the current state of postgraduate education, as well as the identification of challenges, is important to continue to develop human resources and to increase Brazilian scientific production and its international impact. The aim of this editorial is to present the current status of the scientific production; the human resources involved in research including principal investigators, master and doctoral students; the network established between programs; the geographical distribution across the country; and the number of financial investments to Physical Therapy postgraduate programs. Moreover, we will also discuss the current challenges and suggest an open debate for the future of Physical Therapy postgraduate education in Brazil.

Where we are: the current state of postgraduate education in physical therapy

The rise in the number of postgraduate courses over the last 25 years has contributed to the training of human resources and, accordingly, the number of professors and programs, as well as the volume of scientific output. In 1998, there were

57 registered master and PhD supervisors in Brazil, today the number has increased to 494. Data from the Brazilian National Research Council - CNPq (<http://estatico.cnpq.br/painelLattes/>) show that 1952 masters and PhD from Physical Therapy and Occupational Therapy postgraduation programs were conferred between 2004 and 2017. The total physical therapy annual scientific production in 2004 was 262 articles in peer-reviewed journals and 441 publications in conference proceedings. In 2018, 1435 articles and 1297 publications in conference proceedings were published (Fig. 1A). Another important factor that may have contributed to the increase in scientific production is the growing collaboration network established between Brazilian physical therapy researchers. Fig. 1B illustrates the collaboration network characterized by the number of connections between researchers from different postgraduation programs in Brazil at two periods in time, from 2004 to 2008 and from 2017 to 2020.

Currently, 28 universities offer 29 master's programs, 14 PhD programs, and one master's coursework program in physical therapy. From these universities, 24 (85.7%) are public and 4 (14.3%) private institutions distributed across the country as follows: two (7.1%) in the North; three (10.7%) in the Midwest region; five (17.8%) in the Northeast region; five (17.8%) in the South, and 13 (46.5%) in the Southeast (Fig. 2). The current total number of registered professors in the graduate programs is 494, including 288 women (58.4%) and 205 men (41.6%).

Where we need to go: future directions

It is clear that scientific productivity from physical therapy postgraduation programs increased substantially over the last 25 years, and it is therefore now appropriate to identify what we need to do as we move forward. It is time to

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Appendix 1

Suggestions to overcome challenges and improve Physical Therapy postgraduation programs.

Challenges	What should be done
<p>1) Inequality in the distribution of Physical Therapy postgraduation programs across the country: Physical Therapy postgraduate programs represent approximately 3% of the total number of entry-level Physical Therapy registered courses in Brazil. Most Physical Therapy postgraduation programs are located in regions with a high gross regional product (GRP) such as the Southeast (13 universities; 46.5%) and South regions (5 universities; 17.8%).</p>	<p>It is crucial to decrease this inequality by increasing the number of Physical Therapy postgraduation programs in regions with low GRP. New postgraduation programs should be implemented in low GRP regions or Universities and programs should consider extending their activities by providing benefits to students from those regions or expanding the access with distance learning methods.</p>
<p>2) Scholarships for Honors programs during the entry-level course: This is a common practice in public but not in private universities. For instance, students from families of lower socioeconomic level and those attending undergraduate courses in public universities are more prone to pursue an academic career.</p>	<p>Universities should develop and encourage their students to participate in honors programs during the Physical Therapy entry-level courses.</p>
<p>3) Efforts to avoid the “brain drain” The “brain drain” entails the transfer of human knowledge, experience, skill, and expertise from one area, region, country, or geographic location to another. Some reasons for not returning include lack of research funding; poor facilities; limited career structures; poor intellectual stimulation; threats of violence; and lack of good education for children in their home country.</p>	<p>Researchers should have well-defined job opportunities, training opportunities, support with writing grant applications, and mechanisms to develop a network of supportive colleagues. Universities should consider avoiding the brain drain by working in partnership with local businesses, industries, and government agencies to identify employment opportunities. Universities can support innovation and entrepreneurship (e.g., startups). Students should be encouraged to pursue and embrace opportunities and explore new ideas.</p>
<p>4) The need to increase funding to Physical Therapy postgraduation programs and scholarships to students. Brazil experiences considerable fluctuations in research funding, depending on the government. Funding and scholarships directed to Physical Therapy postgraduation programs represented 0.33% (2001 – 2015) of the total investments intended for all programs in Brazil. The scholarships amount represented 0.24% of the total. Current, master’s and PhD students receive on average US \$280 and \$420 a month, respectively.</p>	<p>Publishing in high impact factor journals to increase citation can help physical therapy researchers be more competitive. Brazilian researchers should also look outside the country for funding in foreign agencies or companies. Internationalization can contribute to attracting funding from abroad. Factors determining the funding outcome might also be political. Thus, researchers need to take national or local research priorities into account.</p>
<p>5) Increase international mobility and science-boosting effects The increase in the number of scientific papers has not been accompanied by an equivalent increase in the impact of publications.</p>	<p>Brazilian researchers are encouraged to increase their international collaboration. Mobility allows scientists to build research networks and scientific collaborations produce papers that are more highly cited.</p>
<p>6) Increase research dissemination Researchers tend nonetheless to value and focus upon just a few traditional outputs (i.e., journal articles, books, and conference presentations) and some of them might have difficulties translating the results and communicating to the lay public.</p>	<p>Postgraduation programs are encouraged to develop strategies that go beyond traditional academic publishing to facilitate wider dissemination and public engagement with science. Researchers should present their studies using infographics and videos and make them available on social media. Interactive resources that allow two-way communication (Facebook, Twitter, online forums, instant messaging application, etc.) could contribute to research dissemination and bridge the gap between research, clinicians, policymakers, and the public.</p>
<p>7) Universities should provide on-campus mental-health support for students and professors Mental health problems such as anxiety and depression are common problems experienced by professors and students in postgraduation programs. Some students also relate to suffering bullying or experiencing harassment and discrimination. Several factors might contribute to mental health issues among students and professors (e.g., career success measured by the number of publications, citations, funding and impact, financial insecurities, precarious early-career job opportunities, student’s supervisor judgement).</p>	<p>Universities should be prepared to offer access to qualified mental health practitioners, group support sessions, counselling team, and workshops on how students and professors can better manage their mental health.</p>

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