Physical Education

Impact of the COVID-19 pandemic on the scientific production of a graduate program in Movement Sciences

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Abstract - Aim To investigate the impact of the COVID-19 pandemic on the scientific production of the graduate program in Movement Sciences of the Federal University of Mato Grosso do Sul. **Methods:** The scientific production of the program was assessed in terms of quantity (number of studies) and quality (Qualis/CAPES rank score and Web of Science® Journal Citation Reports). Chi-squared crosstab tests were used to compare the data according to year of publication of the studies, sex of the researchers, Qualis/CAPES rank score, and Journal Citation Reports. Significance was set at 5%. **Results:** The number of studies decreased by 30.2% during the COVID-19 pandemic ($P = 0.011$). Publications were similar according to researchers' sex ($P = 0.666$). The Qualis/CAPES rank score of the studies was not affected by the COVID-19 pandemic ($P = 0.227$). Differently, the impact factor was affected ($P = 0.039$). The median Journal Citation Report of the scientific production of the researchers decreases from 4.091 in 2020 to 3.346 in 2022. **Conclusion:** The COVID-19 pandemic affected the number of studies published by researcher of the graduate program in Movement Sciences of the Federal University of Mato Grosso do Sul. While the Qualis/CAPES rank score of the studies remained unchanged, the median Journal Citation Reports declined. Although this study highlighted the reality of a specific program in Movement Sciences, the findings may be similar across other programs. This should alert funding agencies to the impact of the COVID-19 pandemic on scientific production within Movement Sciences programs.

Keywords: COVID-19, bibliometrics, journal impact factor, epidemiology, research.

Introduction

Movement Sciences represent a field of knowledge recently created in Brazil. Studies addressing this thematic began only in the 1970s, where physical education professionals focused on the analysis on sporting phenomena and physical activity practices[1]. Considering that Brazil's main research agencies were established in the 1950s, it becomes evident how relatively young the field of Movement Sciences is in the country.

The Coordination for the Improvement of Higher Education Personnel (Portuguese abbreviation for CAPES) is the Federal agency responsible for evaluating graduate programs in Brazil[2]. CAPES divides the fields of knowledge in different areas, aiming to share resources and stimulate public policies. The field of Movement Sciences was initially associated with physical education professionals but now also involves physical therapists, occupational therapists and speech therapists[3].

Movement Sciences presented a substantial growth between the years 1998 and 2014. During that period, there was an explosion of new courses, with a 325% increase in the number of graduate programs in the area 21 of CAPES. The scientific production of Brazilian researchers also increased, occupying the 13th position in the world ranking[4].

Currently, Movement Sciences involves diverse programs in the field of physical education, physical therapy, occupational therapy, and speech therapy. About half of the courses have PhD students, and mostly are located in the south and southeast regions of Brazil[5]. Among all the graduate programs involving physical education, physical therapy, occupational therapy, and speech therapy, only 8.2% are located in the Midwest region of Brazil[5]. This fact states for the need of new courses in the region, seeking to enable a better professional formation, expand human research capacity, and potentiate scientific production[6].

In 2017, researchers of the Federal University of Mato Grosso do Sul submitted a proposal to CAPES of a new graduate program in Movement Sciences. At that time, there was no graduate program in this area in the state of Mato Grosso do Sul. CAPES analysed the proposal and approved the creation of the program.

A challenge appeared two years after the creation of the graduate program in Movement Sciences of the Federal University of Mato Grosso do Sul. By the end of 2019, the world was affected by an unknown condition responsible for causing pulmonary problems, hospitalization, and death[7,8]. Such condition, presented initially in the province of Wuhan, China, required lockdown and quarantine as a way to safeguard one's health[9,10].

The Movement Sciences field was affected by the outbreak of the COVID-19 pandemic. In 2020, the practice of group exercises was avoided in Brazil due to risks of contamination by the new coronavirus. This remained until 2021, when vaccination started in effective in the country[11].

The lockdown and quarantine, on one hand, were important to reduce the number of hospitalization and deaths caused by the COVID-19 pandemic[12,13]. The physical distancing, on the other hand, affected the scientific productivity of researchers by making the recruitment and the assessment of subjects a challenge[14].

Until now, few studies have explored the impact of the COVID-19 pandemic on the scientific production of Brazilian graduate programs[15,16]. While these studies indicate a reduction in the number of publications during that period, none have specifically examined newly established programs, such as the graduate program in Movement Sciences of the Federal University of Mato Grosso do Sul.

The aim of this study was to investigate the impact of the COVID-19 pandemic on the scientific production of the graduate program in Movement Sciences of the Federal University of Mato Grosso do Sul. The authors expected to find a decline in the quantity and quality of studies published during the COVID-19 pandemic.

Methods

This is a bibliometric study involving the scientific production of researchers of the graduate program in Movement Sciences of the Federal University of Mato Grosso do Sul. This study complies with the Guideline for Reporting Bibliometric Review of the Biomedical Literature (BIBLIO). The authors submitted the study protocol to the analyses of the institutional Ethics Committee. The Committee stated that there are no ethical obstacles related to this study (protocol n. #5.454.817, CAAE: 58753422.1.0000.0021).

Participants

To be included, participants had to be faculty advisors of the graduate program in Movement Sciences of the Federal University of Mato Grosso do Sul, from both sexes, and who had their scientific production updated on Lattes Platform®, PubMed®, Scopus®, and SciELO® databases. Exclusion criteria comprised cases of researchers included recently in the program, those who did not mentor any graduate student between 2018 and 2022, and those who had not updated their Lattes Platform® curriculum until December 2022.

Procedures

The search began on the Lattes Platform®, a public repository of Brazilian researchers' curricula. Then, the bibliometric data was retrieved from PubMed®, Scopus®, and SciELO®, chosen for been important mainstream scholarly database. The search period was defined as January 2018 to December 2022, allowing for the tracking of researchers' scientific production both before and during the COVID-19 pandemic. Three independent researchers conducted the search. Upon completing the process, they convened to consolidate manuscripts that fell within the selected timeframe. Duplicate studies were excluded.

The following features were chosen for analysis: manuscript type, journal indexing, affiliation, researcher's sex, and subject area. Studies in press or published ahead of print were included. Preprint literature was not included due to the lack of peer review process and quality control. The quality of the manuscripts was measured with the Qualis/CAPES rank score system and with the Web of Science® Journal Citation Reports. These parameters were adopted because Brazilian researchers commonly use them as a quality index when choosing the journals to submit their papers[18].

The Qualis rank score is the official system that classify scientific production of Brazilian graduate programs. It is maintained by CAPES. The grades occur in different scores, where A1 is the highest and C the lowest score. Impact factors are used to measure the importance of a journal by calculating the number of times selected articles are cited within the last few years. The higher the impact factor, the more highly ranked the journal is. To obtain the Qualis ranking and the impact factor of the journals, we accessed the Sucupira Platform® and the Web of Science® Clarivate Analytics report for the Journal Citation Reports. The most up-to-date classification of the index were used to compare the evolution of the publication of the researchers.

Statistical analyses

For the statistical analysis, the data were described in terms of the number of events, percentages, and median scores. The data pertained specifically to the scientific

production published between 2018 and 2022. The quality of the studies was assessed using the Qualis/CAPES ranking system and the Web of Science® Journal Citation Reports. Given the characteristics of the data, which included numerical, discrete, and nominal variables, non-parametric tests were deemed more appropriate. Thus, Chi-squared tests were used to compare the data across variables such as the year of publication, researchers' sex, professional field, Qualis/CAPES ranking, and Web of Science® Journal Citation Reports. Significance was set at 5%.

Results

The graduate program in Movement Sciences of the Federal University of Mato Grosso do Sul has 18 faculties, seven women (38.9%). Three advisers were excluded, one for been recently accepted in the program and two for not mentoring any graduate student between 2018 and 2022. Of the included advisers, seven were physical education professionals (46.7%), seven were physical therapists (46.7%) and one was a physician (6.6%).

The number of studies published by the researchers increased 82.9% from 2018 to 2020 (from 47 to 86 studies). However, during the years 2020 to 2022, the number of manuscripts declined 30.2% (from 86 to 60 studies). Table 1 details the number of studies published between 2018 and 2022, and specific characteristic of the faculties.

Table 2 details the number of studies published according to Qualis/CAPES rank score system. Chi-squared crosstabs tests showed that the Qualis/CAPES score of the studies was not impacted by the COVID-19 pandemic ($P = 0.227$).

The number of studies published in journals with Web of Science® Journal Citation Report increased 67.8% from 2018 to 2020 (from 28 to 47 studies). During the years 2020 to 2022, however, the number of manuscripts declined 19.1% (from 47 to 38 studies). The median Web of Science® Journal Citation Report of the manuscripts raised from 2.859 in 2018 to 4.091 in 2020, but suffered a decline to 3.346 in 2022 ($P = 0.039$). Table 3 categorize the studies published in journal with Web of Science® Journal Citation Reports.

Figure 1 shows the proportion of studies published in journals with impact factor compared to the number of studies published in journals without impact factor. The proportion of studies published in journals with and without impact factor stayed similar between the years.

Table 2 - Studies published according to Qualis/CAPES scores rank score system.

Qualis Capes Rank	Year of publication					Total	*P*
	2018	2019	2020	2021	2022		
A1	14	18	19	19	15	85	0.227
A2	10	12	13	10	11	56	
B1	8	9	13	19	13	62	
B2	3	11	14	6	4	38	
B3	4	4	2	7	1	18	
B4	3	2	8	3	2	18	
B5	0	3	1	0	0	4	
C	5	7	16	11	14	53	

Note: The Qualis CAPES ranking is stratified from A1, the highest, to C, the lowest level.

Discussion

This study analyzed the impact of the COVID-19 pandemic on the scientific production of a graduate program in Movement Sciences. The results showed an

Table 3 - Studies published in journals with Web of Science® Journal Citation Reports.

Dependent variables	Year of publication					*P*
	2018	2019	2020	2021	2022	
Number of studies published in journals with JCR, n	28	39	47	43	38	0.761
Median score of JCR of the journals	2.859	3.038	4.091	3.943	3.346	0.039

Table 1 - Number of studies published according to year, sex, and researcher's formation.

Dependent variables	Year of publication					Total	*P*
	2018	2019	2020	2021	2022		
Number of studies, n	47	66	86	75	60	334	0.011
Sex							0.666
Male, n	38	42	69	61	44	254	
Female, n	9	24	17	14	16	80	
Researcher's formation							0.671
Physical Education, n	31	32	50	44	31	188	
Physical Therapist, n	14	29	33	27	22	125	
Physician	2	5	3	4	7	21	

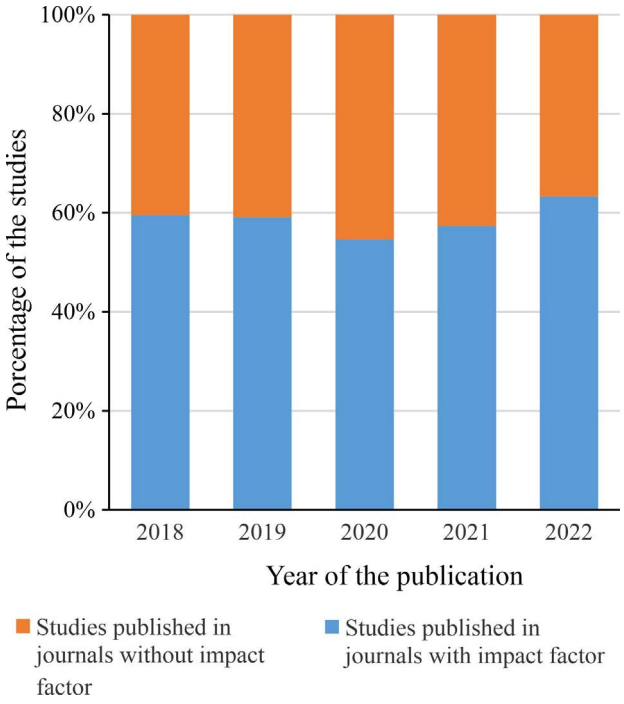

Figure 1 - Proportion of studies published in journals with and without impact factor.

increasing number of studies published between 2018 and 2020, followed by a decline in the subsequent years. The Qualis/CAPES score of the journals was not affected. The median Web of Science® Journal Citation Report of the studies, differently, suffered a decline during the COVID-19 pandemic. These factors are important to understand how the COVID-19 pandemic affected the scientific production of graduate programs in Movement Science, as well as to alert CAPES and founding agencies before pressuring researchers and institutions.

The graduate program in Movement Sciences of the Federal University of Mato Grosso do Sul was created in 2017. The growing scientific production between 2018 and 2020 shows a concern of the faculties in publishing their studies. As CAPES prioritize the scientific production on its regular evaluations, the faculties seem to dedicate more time on writing manuscripts instead of exploring the social relevance of the programs and human resource training[19].

Publishing studies in high impact journals is one way of disseminating content. A recent study pointed out that an increase number of publications enhances not only the number of manuscripts of the programs, but also improve citations and the impact of the studies on society[13]. Researchers should focus, therefore, on not only publishing more, but also publishing in better-ranked journals.

Table 1 shows that there is no difference in the number of publications if we consider the sex and the professional area of the researchers. As there are fewer women[20,21] and physicians as adviser in this graduate program, their production were lower, but not statistically significant when compared to men and other professional areas.

The scientific production detailed in Table 2 indicates aspects commonly seen in programs recently approved by CAPES. Mostly of the manuscripts (57.8%) were published in journals categorized as “B” and “C” on the Qualis/CAPES rank system. Although there is no consensus about the use of Qualis/CAPES as an evaluative method in different professional areas[22,23], it is the official rank system of Brazil and should be considered by researchers before submitting their manuscripts.

Despite the growth of the scientific production seen from 2018 to 2020, there was a fall in the number of studies published from 2020 to 2022 (decrease of 30.2%). In Brazil, the COVID-19 lockdown occurred in 2020[24]. The authors believe that the studies published in 2020 were finished and submitted before the COVID-19 pandemic, and that the real impact of the COVID-19 was observed in the years 2021 and 2022.

The impact of the COVID-19 pandemic did not affect the proportion of studies published in each category of Qualis/CAPES, but affected the median scores of the Web of Science® Journal Citation Report. Table 3 shows that the Journal Citation Report of the studies raised from 2.859 in 2018 to 4.091 in 2020, but suffered a decline to 3.346 in 2022. This aspect indicates that Qualis/Capes, alone, may not the proper instrument to assess the quality of the studies. The results indicate that the Web of Sci-

ence® Journal Citation Report should be considered by Brazilian researchers when choosing the journal to submit their manuscripts. The literature, however, still indicates divergences on its use as a quality control[25,26].

It is important to highlight the strengths of the present study. This is a vanguard research performed in a recently approved graduate program. The results should alert CAPES and Brazilian founding agencies to consider the implications of COVID-19 before pressuring researchers, programs and institutions. As limitation, we recognize that this study focused its analyses of the scientific production of the faculties and did not consider other aspects of the programs, such as scholarships, funding resources, number of dissertations and thesis, and grants. Further studies should explore these topics.

Conclusions

The COVID-19 pandemic had a negative impact on the scientific production of the graduate program in Movement Sciences of the Federal University of Mato Grosso do Sul. The impact occurred mainly after 2020, evidenced by the decline in the number of studies and by the lower Web of Science® Journal Citation Report of the journals.

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