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ORIGINAL

Adherence to preprints' publication in Dentistry by Brazilian researchers

Adherencia de los investigadores brasileños a la publicación de preprints en Odontología

Jaisson Cenci[1] ✉, Daiane Silva Santos Da Cruz[2] ✉, Pedro Dentice Da Silva Leite[2] ✉, Maximiliano Sérgio Cenci[3] ✉, Anelise Fernandes Montagner[1] ✉

[1]Graduation program in Dentistry, Faculty of Dentistry. Federal University of Pelotas (UFPel). Pelotas, Brazil.
[2]Faculty of Dentistry. Federal University of Pelotas (UFPel). Pelotas, Brazil.
[3]Department of Dentistry, Radboud University Medical Center. Radboud Institute for Health Sciences. Nijmegen, The Netherlands.

ABSTRACT

Aim: the objective of this study was to evaluate the adherence to the preprint publication format by a sample of Brazilian researchers.

Methods: searches were carried out, in September 2021, on the MedArxiv, OSF, and SciELO preprints platforms, looking for publications in preprint format by all Brazilian researchers of graduate programs in dentistry (n=211) who were productivity fellows in 2021 (PQ). Searches were performed by typing the authors' full names and the possible variations, as indicated by each author's curriculum, openly available on the *Lattes* website platform. The Friedman test, with the Durbin-Conover post-hoc ($\alpha=0,05$) was applied in order to compare the three platforms. Spearman's correlation test ($\alpha=0,05$) was performed to assess the possible correlations between the number of preprints and age, career stage, and the researcher's scholarship level variables.

Results: from the 211 researchers searched, 22 (10,4 %) published 1 (one) preprint on at least one platform. A total of 39 published preprints were found at MedArxiv (n=19, 48,7 %), SciELO preprints (n=18, 46,2 %), and OSF platforms (n=2, 5,1 %). There was no difference between the adherence to MedArxiv and SciELO preprints (p = 0,731). However, the OSF platform presented the lowest adherence, statistically differing from MedArxiv (p=0,008) and SciELO preprints platforms (p=0,003). In addition, no correlation was found between the publication of preprints and the researcher's age (p=0,128), career stage (p=0,248), or the researcher's scholarship level (p=0,661).

Conclusion: it was possible to observe a low adherence to the preprints' publications by Brazilian researchers' productivity fellows of graduate programs in dentistry.

Keywords: Preprint Publication; Open Science; Metaresearch; Access to Information; Science.

ABSTRACT

Objetivo: el objetivo de este estudio fue evaluar la adhesión al formato de publicación preprint por una muestra de investigadores brasileños.

Método: se realizaron búsquedas, en septiembre de 2021, en las plataformas de preprints MedArxiv, OSF y SciELO, buscando publicaciones en formato preprint de todos los investigadores brasileños de programas de posgrado en odontología (n=211) que fueran becarios de productividad en 2021 (PQ). Las búsquedas se realizaron tecleando los nombres completos de los autores y las posibles variaciones, según lo indicado por el currículum de cada autor, disponible abiertamente en la plataforma web Lattes. Se aplicó la prueba de Friedman, con el post-hoc de Durbin-Conover ($\alpha=0,05$) para comparar las tres plataformas. Se realizó la prueba de correlación de Spearman ($\alpha=0,05$) para evaluar las posibles correlaciones entre el número de

preprints y las variables edad, etapa profesional y nivel de beca del investigador.
Resultados: de los 211 investigadores buscados, 22 (10,4 %) publicaron 1 (un) preprint en al menos una plataforma. Se encontraron 39 preprints publicados en las plataformas MedArxiv (n=19, 48,7 %), SciELO (n=18, 46,2 %) y OSF (n=2, 5,1 %). No hubo diferencias entre la adhesión a MedArxiv y SciELO preprints (p = 0,731). Sin embargo, la plataforma OSF presentó la adhesión más baja, diferenciándose estadísticamente de las plataformas MedArxiv (p=0,008) y SciELO preprints (p=0,003). Además, no se encontró correlación entre la publicación de preprints y la edad del investigador (p=0,128), la etapa profesional (p=0,248) o el nivel de beca del investigador (p=0,661).
Conclusiones: fue posible observar una baja adherencia a las publicaciones de preprints por parte de los becarios de productividad de investigadores brasileños de programas de postgrado en odontología.

Palabras Clave: Publicación de Preprints; Ciencia Abierta; Metainvestigación; Acceso a la Información; Ciencia.

INTRODUCCIÓN

The preprint (pre-publication) has emerged in science dissemination as a communication format, although many researchers do not know what it refers to precisely. A preprint is a scientific manuscript initially published on an open-access server, which allows critical appraisal and comments by peers; its content can be changed before being sent to a peer-reviewed journal. It is an original version of a study, often uploaded to a preprint server, which will be submitted for potential publication. Thus, this early version of research papers has not yet been certified by the peer-review process.[1,2,3] Although the format is not recent, preprints are increasingly popular in academia. It has been used to early communicate scientific results more or less immediately for quick and easy access and use for over 30 years.[4,5] As an informal communication channel, preprint can be considered the predecessor of formal publications, and its relationship with journals is firmly established in the essence of scientific research.[6]

The preprint servers aim to compensate for the delay in the publication process and increase interaction within the scientific society, enabling the exchange of comments between peers.[3] Some preprint's repositories are multidisciplinary, such as arXiv, preprints.org, PeerJ, F1000, and OSF Preprints. However, others are specific to an area of knowledge, such as bioArxiv (biological sciences), PsyArXiv (psychology sciences), RePEc (economic sciences), and MedArxiv (medical sciences). In Brazil, the SciELO Preprints repository is a recent platform created in 2020 and is an integral part of the SciELO portal (Scientific Electronic Library Online).[6,7,8]

The publication in preprint format has been reported to present some rewards as it creates benefits for researchers and overall scientific progress. Preprint presents agility in disseminating research findings since the document is available online quickly to the scientific community for reading and citation.[9,10] It aligns closely with open science practice, as access to the manuscript is free and unrestricted, promoting openness and transparency in science.[10,11] It guarantees originality, as a preprint would assure the priority of a finding or research clipping to the author.[3] It decreases research costs, as authors currently pay for submission fees and publication fees of their articles through the Article Processing Charge, besides the charges for the fill-text access of the articles by the readers. Other benefits included more publications and critical improvement, enabling comments by peers, and further adjustments.[12] There is evidence that the prior publication of a study as a preprint increases attention and the number of citations after it has been published in a peer-reviewed journal.[13,14,15] The preprint format accelerates the results' sharing, prioritizes findings and ideas, facilitates career advancement, and improves the culture of communication in the scientific community.[16]

Although, some concerns around the preprint format are highlighted. The publication quality is the first aspect that is questioned since the freedom of publication could cause an overproduction of lower quality documents, as well as the publication of documents with errors that a peer-review process would fix before being disclosed without distinction.[4,9,17] Furthermore, it is questioned whether preprints would be considered legitimate documents to be included in review studies, as they are still considered grey literature by many scientists.[10] Also, preprints promote the loss of originality. For some journals, it would mean the loss of priority for disseminating the findings of those studies published as preprints since repositories would be considered the first vehicles that disseminated those findings.[9]

Reflexions and discussions about preprints within the international scientific community have increased considerably in recent years3. However, this discussion is only starting among dental researchers, and Brazil is the second most productive country in the field, the question of how much the oral health community will benefit from preprint publications is still open. However, considering the importance of oral health and its neglected effects on populations, this discussion has to be done.[17] In Brazil, the research scenario is fairly represented by the "research productivity fellows", which are officially recognized by the National Council

for Scientific and Technological Development (CNPq), which is a foundation linked to the Ministry of Science and Technology (MCT), to support Brazilian research. Given the trend of preprints in academia and the health area, this study aimed to evaluate the adherence to the preprint format by researchers' productivity fellows of graduate programs in dentistry in Brazil.

METHODS

This cross-sectional study was reported according to the STROBE guideline.[18] The research question studied was: What is the adherence rate of Brazilian researchers' productivity fellows of graduate programs in dentistry to the preprints format? It evaluated the percentage of researchers that published at least 1 (one) preprint on the online preprint repositories: MedArxiv (https://www.medrxiv.org), Open Science Framework – OSF Preprints – (https://osf.io/preprints/), and SciELO Preprints (https://preprints.scielo.org/index.php/scielo) platforms.

Sample and eligibility criteria

The sample was selected by convenience, evaluating the list of all Brazilian researchers' productivity fellows in Dentistry, according to the CNPq (National Council for Scientific and Technological Development) website (https://www.gov.br/cnpq/pt-br), accessed on Aug 26, 2021. The entire sample was exposed, as the preprint platforms are freely available to everyone. Thus, it included all the Brazilian dental researchers' productivity fellows. Receiving a productivity grant in Brazil is a sign of peer recognition for researchers with highlighted scientific production. In addition to providing financial support, productivity fellow holders influence several crucial processes for Brazilian science, such as the evaluation of graduate programs, the composition of the editorial board of scientific journals, and the formulation of public policies in science in the country.[19]

Search

Six trained reviewers (DSSDC, EVVC, MCDA, PDSL, RCC, and RPN) performed an online search at preprint repositories (MedArxv, OSF, and SciELO preprints platforms), in duplicate, between 14 to Sept 30, 2021. The search was performed by typing the full name of included researcher in the search box on each platform's website and then checked by another author. New searches were carried out if the researcher was not found, considering the variations in the way the researcher is cited in the literature, according to the information provided by the researcher in their curriculum. This data was collected from the curriculum Lattes of the included researcher, which are openly available at the website https://lattes.cnpq.br/.

Data Extraction

A standardized data extraction table was used to collect the data. First, the form of the collection was discussed to ensure consistency in the data interpretation. Then, after this training, data extraction was performed by the same reviewers who performed the searches, independently, filling into a pre-defined Microsoft Excel table (Microsoft Corporation). The items collected were: publication of preprint (yes / no); preprint platform that the manuscript was published (MedArxv / OSF / SciELO); researcher's age; years of Ph.D. graduation (basis on the information provided by the researcher at the curriculum Lattes); level of PQ researcher scholarship based on the data available openly on the CNPq website (SR-senior, 1A, 1B, 1C, 1D and 2, being SR the highest level and 2 the lowest level).

Data analysis

For the comparison among the preprint platforms, the data distribution of each group was first evaluated using the Shapiro-Wilk test, which showed a p-value < 0,01, demonstrating that the data were non-parametric. Then, the Friedman test, with the Durbin-Conover post-hoc (α=0,05), was applied to compare the publication adherence to the three platforms. Finally, in order to assess any possible correlation between the publication of preprints by the researchers and the variables (researcher age, career stage, and level of the researcher's scholarship), the normality of the data relating to the total number of preprints published by each researcher was initially evaluated (summing the three platforms studied) through the Shapiro-Wilk test, resulting in a p-value < 0,001, assuming that the data were non-parametric. Also, Spearman's correlation test (α=0,05) was performed to assess the possible correlations between researchers' age, years of Ph.D. graduation, career stage, and the propensity to publish preprints. The software used to perform the analyses was SPSS (SPSS®, IBM - International Business Machines Corporation, New York, USA), considering a significance level of α=0,05.

RESULTS

The sample resulted in a total of 211 Brazilian dental researchers' productivity fellows of graduate programs included, being 133 male and 78 females. In total, 22 (10,4 %) of the included researchers published at least 1 (one) preprint on at least 1 (one) platform.

A total of 39 published preprints were found, being 19 preprints published at the MedArxiv platform (48,7

%), 18 published at the SciELO preprints platform (46,2 %), and 2 preprints published at the OSF platform (5,1 %) (Figure 1). There was a statistical difference in the adherence of publication among the preprints' platforms (p=0,005): no difference was found between the adherence to MedArxiv and SciELO preprints (p = 0,731), while the OSF platform presented the lower publication adherence, statistically differing from both MedArxiv (p=0,008) and SciELO preprints platforms (p=0,003).
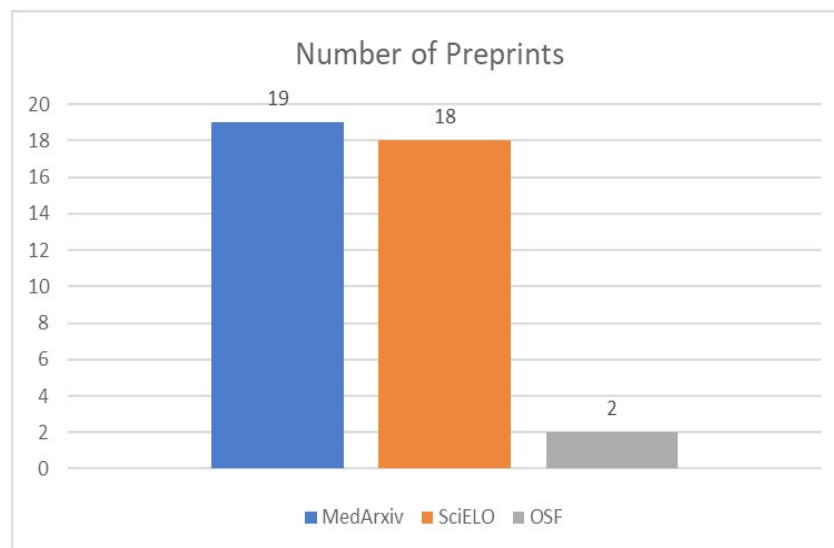

Figure 1. The number of preprints published in each platform

No correlation was found between the publication of preprints and the researcher's age (p=0,128), career stage (p=0,248), and the researcher's scholarship level (p=0,661).

DISCUSSION

Publishing preprints is a common practice in several areas of knowledge, such as physics and computer science;[15,20] however, it does not seem a common practice in other areas, such as dentistry.[21,22] This study showed a low adherence to the preprint publications by Brazilian researchers' productivity fellows of graduate programs in dentistry, which raises a concern for dental science.

Several organizations, such as ASAPbio,[5] have been encouraging greater use of the format in the biological and life sciences, even with a certain reluctance from researchers in these areas, in part by the fear of being copied since preprints are not universally considered a priority marker, and in part, because some journals explicitly or implicitly refuse to accept previously released manuscripts as preprints.[15] However, a recent study reported that 86 % of the evaluated journals allow the submission of papers previously released as preprints, indicating an evolution in this sense, which may encourage more researchers to share their studies' findings in preprint format prior to submission to a peer-reviewed scientific journal.[20]

Preprints are commonly cited as a practice that favors open science.[23,15] A study analyzing the differences between the preprint and final versions of published papers indicated that about 70 % of the preprints were published in scientific journals, with the final version showing little difference compared to the early preprint version.[24] This fact would favours openness in science. Even if the peer-reviewed paper was not fully open, researchers and society, in general, could access the full-text version free of charge, in preprint format, with little or no significant difference. Another factor that seems to aid in the dissemination and growth of this practice is the fact that the previous publication of the study as a preprint increases the attention, as well as the citations of the article later published in a peer-reviewed scientific journal.[6,13,14,15] Thus, this practice has effectively made the paper well-accessed.[6]

The concerns highlighted that preprints should be used with caution since there is no peer-review process involved in it is under discussion in academia since it is clear that this format is in entire evolution and expansion.[12] Even in the biological sciences, there has been significant growth in the publication of preprints in recent years, mainly driven by the coronavirus pandemic.[12,20,24,25] In Brazil, the topic of preprints seems to be little explored. It still finds few spaces for discussion, which should progressively begin integrating the debate in specific forums and scientific events.

MedArxiv and OSF preprint platforms were searched in this study because they are widely used worldwide.[26] In addition, the non-profit MedArxiv platform is more geared towards clinical and health science researchers. [27] The SciELO preprint platform was recently created in 2020. It is part of the SciELO portal (Scientific Electronic Library Online), an international cooperation program aimed at developing open-access scientific

communication covering all areas of knowledge. In addition to being open and non-profit, it is a Brazilian platform, which explains its inclusion in this study, since the sample of researchers assessed was Brazilian researchers working in Brazil.[7]

The MedArxiv and SciELO Preprints platforms showed no difference since both presented the vast majority of publications in this format by the researchers included who published preprints. This may be because the MedArxiv platform is one of the best-known and most used in the health area[27] and the fact that the SciELO is a Brazilian platform. Otherwise, the OSF platform presented the lowest adherence rate, with only 5 % of preprints published by the researchers included. However, 22 public protocols published on this platform by 10 included researchers were found during the search. This highlights that the OSF platform has a greater appeal for the publication of study protocols than for preprint publications. In addition, this can be taken as an advance since the publication of protocols before the beginning of the development of the study is also linked to an open science practice.[11]

The researchers of graduate programs in dentistry who have research productivity grant were included as a sample because they have a large volume of scientific production, which is a requirement to obtain this grant incentive. Moreover, these researchers are closely linked with science and are considered distinguished researchers in the field.[19] Thus, those researchers can be considered as the recognized representatives of their fields, with an important leading role in terms of mentoring future generations of scientists. Of the 211 assessed researchers, only 10,4 % had at least one preprint published on at least one platform. The publication of preprints showed no correlation with the researcher's age, career stage, and scholarship level. This rate shows a low adherence by the most productive researchers in the dental area to the preprint publications. This finding suggests that the preprint format should be better disseminated and encouraged to Brazilian dental researchers. A previous study that evaluated the adherence to preprint format, by a small sample, also showed that this format, even in an incipient way, is already a reality in the dentistry area, with a low adherence rate of 16,5 %.[22]

Preprints do have limitations, but when used correctly, that is, never as a substitute for a formal publication, it can bring benefits to the researcher, to science, and society, bringing more transparency, collaborating with open science, increasing the speed of dissemination of research findings,[20] in addition to providing greater visibility and citation chance for the paper after it is published.[15] In the same way that the preprint removes the exclusivity of academic journals that charge for publication as for access to the full-text article.

The main criticism of preprints is the lack of peer review. However, spaces are made available on the preprint platforms for comments, critical appraisal, and feedback about the document by peers. This practice would provide not only the possibility of improving the pre-publication itself but also the possibility of the author adjusting possible errors and improving the manuscript before submitting it to a peer-review journal.[20] It is essential to highlight that the researchers who read the preprints publications should have as a common practice to evaluate the preprints made available in their research area, acting responsibly in the critique and review of the findings shared by their colleagues.[24]

The study's limitations are due to the limited number of platforms assessed and researchers included. More studies evaluating the adherence of a broad range of dental researchers, not just productivity fellows, and not only from Brazil but also covering more platforms, should be performed.

CONCLUSION

The findings indicate a low adherence rate of the preprint publications by Brazilian researchers' productivity fellows from graduate programs in dentistry.

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CONFLICT OF INTEREST
None.

AUTHORSHIP CONTRIBUTION
Conceptualization: Jaisson Cenci, Daiane Silva Santos Da Cruz, Pedro Dentice Da Silva Leite, Maximiliano Sérgio Cenci, Anelise Fernandes Montagner.
Research: Jaisson Cenci, Daiane Silva Santos Da Cruz, Pedro Dentice Da Silva Leite, Maximiliano Sérgio Cenci, Anelise Fernandes Montagner.
Writing - proofreading and editing: Jaisson Cenci, Daiane Silva Santos Da Cruz, Pedro Dentice Da Silva Leite, Maximiliano Sérgio Cenci, Anelise Fernandes Montagner.