University of Nebraska Medical Center

DigitalCommons@UNMC

Journal Articles: College of Dentistry

College of Dentistry

2019

Preprints in Dental Science: DentRxiv as a Strategy to Bring Dental Research into the Information Age

Jafar Kolahi
Dental Hypotheses

David G. Dunning
University of Nebraska Medical Center, ddunning@unmc.edu

Edward F. Rossomando
University of Connecticut

Elham Bidram
University of Isfahan

Saber Khazaei
Isfahan University of Medical Sciences

Follow this and additional works at: https://digitalcommons.unmc.edu/cod_articles

Part of the Dentistry Commons

Recommended Citation

Preprints in Dental Science: DentRxiv as a Strategy to Bring Dental Research into the Information Age

In recent years, life-threatening diseases are etched in the minds of biomedical researchers: the 2015-2016 Zika outbreak in South and North America, the 2014-2016 Ebola outbreak in West Africa and the 2002-2003 severe acute respiratory syndrome (SARS) outbreak in southern China. These rapidly growing viral epidemics endangered the lives of millions of people. To prevent and control these public health emergencies, rapid and global sharing the new data and experiences of biomedical researchers and health care professionals becomes essential. Yet, scientists faced with a traditional and persistent barrier: the slow process of peer reviews.[1] As an example, 97% of the related articles were published after the end of the SARS outbreak in Hong Kong and Toronto.[2] Based on these events, in April 2015, the World Health Organization (WHO) asserted: "*re-publication information sharing should become the norm during future emergencies, with parallel initiation of submission procedures to journals along longer timeframes*."[3]

Preprint would be a solution to this problem. A preprint is a version of a scientific manuscript posted on an open-access online repository, prior to formal peer review process and publication in academic journals.[4] After publication in preprint server, it becomes a permanent part of the scientific literature, easily accessible and citable with its own unique digital object identifier (DOI). Crossref launched preprint-specific schema to ensure the relationships between preprints and any eventual article are declared in the meta-data.[5]

Preprints have clear copyright and licensing statements, e.g. CC-BY (reusable by all, provided attribution is given), to facilitate reuse of the research outputs. Yet, preprints are not peer-reviewed, edited, or typeset before being posted online. Preprints accelerate the dissemination of research findings and scientific communications.[6] The related servers provide rapid access and evaluation of the controversial and negative scholarly contents that would have a low chance to publish rapidly in formal academic journals.[7]

Importantly, preprints do not typically prevent or impede the process of traditional publication in scholarly journals. The majority of well-known publishers, e.g. Elsevier, Wiley, Sage publishing, Nature publishing group, Oxford journals, Springer, BioMed Central (BMC), BMJ (company), PLOS and Taylor & Francis, have clear preprint policies and do not regard preprints as a previous form of publication. Remarkably, more than 142 leading journals, e.g. eLife encourage direct submissions from bioRxiv (preprint server for biology), while reloading files and re-entering authors information at the journal's website is not required. In contrast, the the JAMA Network does not accept preprints and Oxford University Press has some restrictions for the posted manuscripts into preprint servers.[8]

Of more interest, many research funding organizations including, Wellcome Trust, Helmsley Trust, National Institutes of Health, Howard Hughes Medical Institute, Canadian Institutes of Health Research, Medical Research Council, and European Research Council, encourage the inclusion of preprints in grant applications and end-of-grant reports.[9]

Clearly, preprint is not a new concept. The first preprint server, arXiv, was established by Paul Ginsparg (Quantum physicist at Cornell University) in 1991 and has now published more than 1,300,000 preprints in the fields of physics and mathematics. Another well-known preprint server is bioRxiv, co-founded by John Inglis and Richard Sever (from Cold Spring Harbor Laboratory) in 2013 with over 47,000 published preprints in the field of biology. BioRxiv receives significant financial support from the Chan Zuckerberg Initiative.[10] Over 3 million tweets about arXiv-hosted preprints and 1 million about bioRxiv have been posted to date, suggesting these servers as the most popular in the preprint arena.

Two cases vividly illustrate the power of preprints. The first, "A simple proposal for the publication of journal citation distributions"[11] was published at bioRxiv on July 5, 2016. This preprint, while not published in a peer-reviewed journal, nevertheless realized 1,306 tweets from 1,053 users, with an upper bound of 3,139,447 followers. The second, "qqman: an R package for visualizing GWAS results using Q-Q and manhattan plots", was published at bioRXiv on May 14, 2014.[12] Similarly, even though not published in a peer-reviewed journal, this manuscript received 271 citations according to Dimensions database (https://app.dimensions.ai/discover/publication). Seventy-eight percent of its citations were received during the past two years, illustrating it continues to receive considerable interest from the scientific community.

By 26 April 2019, Web of Science included 159 articles with the word of "preprint" in the title. Based on co-citation network analysis, this topic is obviously popular among reputable academic journals, e.g. Science and Nature (Figure 1).
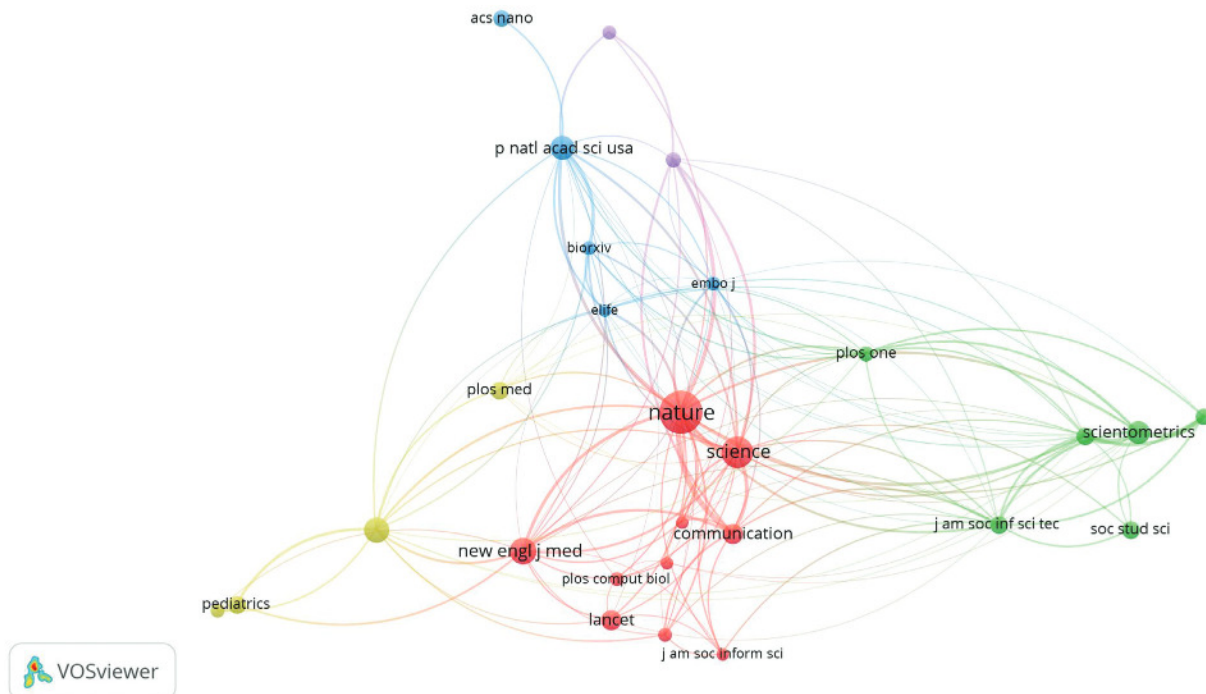
Figure 1: Co-citation network analysis of articles had the word "preprint" in the title. The network involves 27 nodes and 5 clusters shown with different colors.

However, the idea of a new medical preprint server receives a diverse response from the stakeholders-scientists, publishers, and funders.[13-16] It is widely believed that preprints can launch progress in medical science by accelerating the dissemination of scholarly activity and reducing non-reporting and waste in research. While peer review serves as the vital, historical cornerstone of scientific publication, the process can slow communication to the scientific community and public at large. Delays in the publication could result in researchers having incomplete understanding of other relevant current research, and how their own research fits into the maturing context of scientific advancements in their fields.

In contrast, some researchers criticize the idea of research preprints and believe, with understandable concern, that the public dissemination of clinical research findings without quality control and peer review may cause detriment to public health via exposing patients to early, unconfirmed claims or overenthusiastic and overstated conclusions. These concerns could be somewhat mitigated by clearly labeling (with watermarks) the preprint as NOT PEER REVIEWED. In any case, preprints should be transparent. Funding sources, author competing interests and proper approvals or exemptions from ethics boards should be declared. Preprints reporting results of clinical trials should include references to the trial's registration in a WHO-approved database. Authors of preprints should follow the widely accepted EQUATOR Network guidelines (www.equator-network.org).

Within this context of emerging preprint outlets as part of the scientific community, in the field of dental science/research we are experiencing considerable and varying time between the submission of a manuscript to a peer-reviewed journal and its publication. Interestingly, the *Journal of Dental Education*, arguably the most prestigious journal on this topic, recently announced a "Published Ahead of Print" page; this page will publish accepted articles, closing the gap between manuscript acceptance and availability to researchers and the public from ~6 months to ~2 months.[17] Existing well-known preprint servers such as arXiv and bioRxiv rarely accept dental preprints. Hence, the establishment of a not-for-profit preprint server for dentistry, dentRxiv, would afford dental research community new venues for rapid distribution and critiquing of research. The server should comply with proposed safeguards and recommendations of COPE regarding preprints.[18] Of more direct interest, a pioneering team at Yale University is in the process of launching medRxiv.[19] We strongly believe that it is now the right time for the dental research community to implement a similar preprint dentRxiv system.

The search of dental journals via PubMed using the query preprint AND jsubsetd[text] revealed no result. Given the emerging ecosystem in academic research which integrates rapid dissemination and availability of results in preprint form, dental journal editors and the broader dental research community should leverage a preprint system bring dental science and research into the information age.

Financial support and sponsorship

Conflicts of interest

Kolahi J., is owner of dentrxiv.org/com

Jafar Kolahi[1], David G. Dunning[2], Edward F. Rossomando[3], Elham Bidram[4], Saber Khazaei[5]

[1]Independent Research Scientist, Associate Editor of *Dental Hypotheses*, Isfahan, Iran, [2]College of Dentistry, Department of Oral Biology, University of Nebraska Medical Center, Lincoln, NE, United States, [3]Department of Craniofacial Sciences, School of Dental Medicine, University of Connecticut, United States. Founder and Director of the Biodontics® Program and the Center for Research and Education in Technology Evaluation (CRETE) at the University of Connecticut School of Dental Medicine, United States, [4]Faculty of Advanced Sciences and Technologies, University of Isfahan, Isfahan, Iran, [5]Department of Endodontics, Isfahan University of Medical Sciences, Isfahan, Iran

Correspondence Address: Jafar Kolahi, No. 24, Faree 15, Pardis, Shahin Shahr, Isfahan 83179-18981; Iran.
e-mail: kolahi_jafar@yahoo.com

References

1. Powell K. Does it take too long to publish research? Nature 2016;530:148-51.
2. Xing W, Hejblum G, Leung GM, Valleron A-J. Anatomy of the epidemiological literature on the 2003 SARS outbreaks in Hong Kong and Toronto: a time-stratified review. PLoS Med 2010;7: e1000272.
3. Modjarrad K, Moorthy VS, Millett P, Gsell P-S., Roth C, Kieny M-P. Developing global norms for sharing data and results during public health emergencies. PLOS Med 2016;13:e1001935.
4. Berg J. Preprint ecosystems. Science 2017;357:1331.
5. Preprints – Crossref. https://www.crossref.org/services/content-registration/preprints/. [Accessed April 26, 2019].
6. Verma IM. Preprint servers facilitate scientific discourse. Proc Natl Acad Sci U S A 2017;114:12630.
7. Bourne PE, Polka JK, Vale RD, Kiley R. Ten simple rules to consider regarding preprint submission. PLoS Comput Biol 2017;13:e1005473.
8. List of academic journals by preprint policy – Wikipedia. https://en.wikipedia.org/wiki/List_of_academic_journals_by_preprint_policy. [Accessed April 19, 2019].
9. Funder policies – ASAPbio. https://asapbio.org/funder-policies. [Accessed April 21, 2019].
10. Callaway E. BioRxiv preprint server gets cash boost from Chan Zuckerberg Initiative. Nature 2017;545:18.
11. Larivière V, Kiermer V, MacCallum CJ, *et al.* A simple proposal for the publication of journal citation distributions. bioRxiv 2016;062109.
12. Turner SD. qqman: an R package for visualizing GWAS results using Q-Q and manhattan plots. bioRxiv 2014;005165.
13. Enserink M. Plan for new medical preprint server receives a mixed response. Science (80-); 2017. doi:10.1126/science.aap9443.
14. Krumholz HM, Ross JS, Otto CM. Will research preprints improve healthcare for patients? BMJ 2018;362:k3628.
15. Maslove DM. Medical preprints – a debate worth having. JAMA 2018;319:443-4.
16. Peiperl L, Editors on behalf of the PM. Preprints in medical research: progress and principles. PLOS Med 2018;15:e1002563.
17. http://www.jdentaled.org/. [Accessed May 20, 2019].
18. Committee on Publication Ethics. COPE discussion document: preprints. https://publicationethics.org/files/u 7140 /COPE_Preprints_Mar18.pdf. [Accessed April 25, 2019].
19. The YODA Project – MedRxiv. https://yoda.yale. edu/medrxiv. [Accessed April 26, 2019].