

Open publishing of public health research in Africa: an exploratory investigation of the barriers and solutions

A previous survey of African medical journals identified the need to assist journals and public health researchers to make publications more openly accessible. This article reports a subsequent survey to describe knowledge of, barriers to and interest in capacity building for open publishing of public health research in Africa. An online questionnaire collected information from 91 respondents in 16 African countries. The respondents were authors (75%) or reviewers (53%) of research articles, journal editors (40%) or journal publishers (19%), with overlap between them, and experience with both traditional and open access publications. Fewer than half of the respondents appreciated benefits of ready availability, added citations and transparency of open publishing. Some respondents chose incorrect answers. There was interest in open publishing using preprints and open reviews, and a majority would like access to free online courses and mentoring opportunities. This study notes a huge potential for equipping researchers in Africa with the skills to understand and use online publishing and provides guidance for future capacity building via access to online resources and mentoring. This is relevant for any discipline, such as public health, where local solutions based on local research findings are important.

Keywords

open science; public health; research; Africa; preprint; open review



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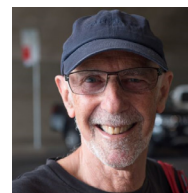
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Introduction

Open science is a good, transparent and credible way to share and drive scientific discoveries at a relatively low cost. Open science is being promoted as the future of conducting science at institutional, governmental and regional levels. The guiding

2 principles of open science include open access, open data and FAIR (findable, accessible, interoperable and reusable) data and citizenship science. Open science also requires the recognition, support and training of researchers, participation of communities, development of infrastructures, policies and regulations and needs broader stakeholder engagement, co-ordination and high-level government support.¹

The aspect of open science on which we focus in this study is open access publishing. In Africa, the 'author pays' formula for researchers from the low-income countries has been cited as a major barrier to accessing the published literature.² Most governments in African countries do not have health research as a funding priority. In other words, neither public health research nor public health research output are their main concerns. Often, there is a gap to be filled in the development of open science policy.³ Meanwhile, local journals may not be capable (in terms of human and financial resources) of adapting to the change from the traditional journal models to open science ones. The last, but not the least, challenging barrier is that most scientists or clinicians from such countries are not either aware of training opportunities or trained in open science including open access publishing.⁴ Both the known barriers to open science and its potential benefits in Africa have been exacerbated with the outbreak of the Covid-19 pandemic.

The ongoing Covid-19 pandemic highlighted the benefits of open access publications while exposing the challenges to achieving accuracy and validity of the scientific information. It is worth noting that inadequate funding and limited research capacity did not prevent African scientists from producing their limited but invaluable contributions to the global Covid-19 research. Of major concern among the African Covid-19 manuscripts was that one in five publications did not have African authors while approximately 66% of the authors on manuscripts with research from African populations were not African nationals. This demonstrates an urgent need to boost research production by African researchers and to support the publication of their research findings.⁵ Thus, facilitating the advancement of scientific research and raising the next generation of scientists in Africa depends (or will depend) largely on open science.⁶

'facilitating the advancement of scientific research ... in Africa depends ... largely on open science'

To respond to the urgent need to support open science in Africa, a consortium of PublicHealth.Africa and LIBSENSE⁷ was formed with an advisory group comprising experts in open science, medical editing and publishing. An initial exploration by the consortium on open access publication of public health research and practices in Africa demonstrated the need to assist journals and researchers.⁸ Based on these results, the group considered the need to offer an education or support programme to boost open publishing of public health research in Africa for researchers, reviewers and journal editors. This study was designed as a needs survey to identify knowledge of and barriers to open access research publication and the expressed need for a programme to boost capacity for open publishing of public health research in Africa.

Methods

With the help of the advisory group, the authors developed a data collection instrument (study questionnaire) to help glean data from authors, reviewers and journal editors in public health. The majority of the questions were closed, with suggested responses offered. Questions included the demography and publishing experience of the respondents, as well as closed questions asking their opinions and about various aspects of open publishing. For these latter questions, various options were presented for the respondents to select, with the proviso 'Note: The following statements are not necessarily true'. Invitations to register for those who wished to take part in the survey were sent to African medical journals listed in African Journals Online (AJOL), editors of journals who are African members of the World Association of Medical Editors, participants in the LIBSENSE members' discussion forum, members of the West African Institute of Public Health

'the authors developed a data collection instrument ... to help glean data from authors, reviewers and journal editors in public health'

3 (WAIPH) and of the African Centre for Global Health and Social Transformation (ACHEST). Furthermore, the authors sent emails to potentially eligible study participants in their respective professional networks. Those who responded by registering were sent a link to a questionnaire created on the LimeSurvey platform in both English and French languages (available in the data accessibility statement at the end of the article). This two-step process indicated acceptance of the invitation. Reminders were not sent.

The retrieved data were descriptively analysed based on the objectives of the study. Descriptive statistics were reported as numbers and percentages.

Results

In all, the 91 respondents came from 16 African countries, nine from North Africa, 59 from West Africa (48 of these from Nigeria), two from Central Africa, ten from East Africa and seven from Southern Africa. Four gave their country as 'elsewhere'. Table 1 shows that amongst the respondents there was an almost even spread between early, mid and advanced career stage, with a small preponderance portraying themselves as teachers rather than researchers or editors/publishers. Seventy-five per cent (75%) of the respondents had acted as authors in the past three years, while 53% had been a reviewer and 40% a journal editor or associate editor. Due to more than half of the respondents coming from Nigeria, which experiences some differences in open access conditions from many other African countries, we have included a separate column of the results for Nigeria within the following tables.

Characteristics of respondents		All countries	Nigeria	Other African countries
		n = 91 n (%)	n = 48 n (%)	n = 43 n (%)
How would you describe your career stage?	Early career	24 (26)	15 (31)	09 (21)
	Mid-career	34 (37)	16 (33)	18 (42)
	Advanced career	30 (33)	16 (33)	14 (33)
	Retired	03 (03)	01 (02)	02 (05)
Which of these describes your occupation?	Teacher	37 (41)	14 (29)	23 (53)
	Researcher	30 (33)	17 (35)	13 (30)
	Editor/publisher	22 (24)	08 (17)	14 (33)
	Not specified	02 (02)	0 (0)	02 (05)
In the past three years or currently, do you have experience as	Author of a research article	68 (75)	36 (75)	32 (74)
	Reviewer of a research article	48 (53)	25 (52)	23 (53)
	Journal editor or associate editor	36 (40)	18 (37)	18 (42)
	Journal publisher	17 (19)	07(15)	10 (23)

Table 1. Characteristics of the respondents

There was considerable overlap between these categories, for example in the study group as a whole, of the 68 who had experience as an author, 35 also had experience as a reviewer and 29 as an editor.

Fewer than half of the respondents had experience with open access publications in the previous three years, although 41% had been an author needing to pay an article processing charge (APC), 44% had been a reviewer and 29% an editor of an open access article (Table 2). There were no systematic differences between Nigerian and other respondents in their experience with APCs.

A majority, 56%, of the respondents might publish their manuscripts as a preprint and 31% to review as open review, while 19% would prefer the traditional publication process (Table 3).

Fewer than half of the respondents appreciated the benefits of ready availability, added visibility and citations and transparency of the open publishing model, while only 7% thought that research funding agencies had open publishing as a requirement (Table 4).

Types of experiences with an open access publication*		All countries	Nigeria	Other countries
		n = 91 n (%)	n = 48 n (%)	n = 43 n (%)
In the past three years have you been involved in the publication of an open access article in any of these ways?	Author and paid an article processing charge (APC)	37 (41)	17 (35)	20 (47)
	Author and received an APC waiver	20 (22)	10 (21)	10 (23)
	Author in a journal which does not charge APCs	22 (24)	07 (15)	15 (35)
	Reviewer of an open access article	40 (44)	22 (46)	18 (42)
	Editor of an open access article	26 (29)	11 (23)	15 (35)

Table 2. Types of experiences with open access publications in the past three years

*A single respondent could have had more than one experience with an open access publication in the past three years

Response to statements on preprints and open reviews	All countries	Nigeria	Other countries
	n = 91 n (%)	n = 48 n (%)	n = 43 n (%)
I would be happy to publish my research in this way	51 (56)	28 (58)	23 (53)
I would be happy to review manuscripts posted in this way	28 (31)	10 (21)	18 (42)
Made positive comments as free texts	28 (31)	13 (27)	15 (35)
I would prefer to use the traditional publication process	17 (19)	07 (15)	10 (23)
I would not agree to review manuscripts posted in this way	08 (9)	08 (17)	0 (0)

Table 3. Intention or plan to publish or review manuscripts as preprints and open reviews

Main advantages of open publishing	All countries	Nigeria	Other countries
	n = 91 n (%)	n = 48 n (%)	n = 43 n (%)
It ensures ready availability of published materials	43 (47)	22 (46)	21 (49)
It results in more visibility for me and my institution	42 (46)	22 (46)	20 (47)
It allows authors to be cited more	39 (43)	18 (37)	06 (14)
It fosters more impact in the larger society	32 (35)	18 (37)	14 (33)
It promotes interdisciplinary research for a wider audience	23 (25)	12 (25)	11 (26)
It favours collaborative research	16 (18)	08 (17)	08 (19)
It offers more transparency in the publication process	15 (16)	08 (17)	07 (16)
It results in a quicker publication process	09 (10)	05 (10)	04 (9)
It allows accountability for taxpayers' money	06 (07)	01 (02)	05 (12)
It is required by research funding agencies	06 (07)	03 (06)	03 (07)

Table 4. Main advantages of open publishing in the respondents' points of view

Table 5 shows the responses to the question about the major advantages of the traditional funding model. The view that the journals are less likely to be predatory was the most common response (37%), while only 21% agreed that no APC is required.

Advantages of the traditional publishing model	All countries	Nigeria	Other countries
	n = 91 n (%)	n = 48 n (%)	n = 43 n (%)
Less likely to be predatory	34 (37)	15 (31)	19 (44)
Copyright protection for authors is better	20 (22)	12 (25)	08 (19)
No article processing charge (APC) is required	19 (21)	11 (23)	08 (19)
Proportion of high-quality manuscripts is higher	19 (21)	07 (15)	12 (28)
Supported by my institution and/or country	15 (16)	05 (10)	10 (23)
Proportion of poor-quality manuscripts tends to be lower	14 (15)	05 (10)	09 (21)
More thorough evaluation of manuscripts (peer review)	14 (15)	08 (17)	06 (14)
Impact factors are higher	11 (12)	07 (15)	04 (09)

Table 5. Major advantages of the traditional publishing model

5 Fewer than half of the respondents identified either opportunities for or threats to open access publishing in public health in Africa (Table 6). The greatest opportunities were thought to be in supporting African-led research and aligning publications with national or regional health priorities. The largest threats were thought to be for poor peer review and that international agencies may not recommend open access journals.

Open access publishing in public health in Africa		All countries	Nigeria	Other countries
		n = 91	n = 48	n = 43
		n (%)	n (%)	n (%)
Opportunities				
Support the movement 'African-led research in Africa'		38 (42)	14 (29)	24 (56)
Allow alignment of publications with national or regional health priorities instead of focusing on global scientific validity		33 (36)	16 (33)	17 (40)
Give more credit to African institutions in terms of contribution to the global research effort (publications)		30 (33)	15 (31)	15 (35)
Favour speedy academic promotion		28 (31)	11(23)	17 (40)
Encourage regional collaboration for sustainability		24 (26)	11(23)	13 (30)
Threats				
May result in a neglected or poor peer-review		36 (40)	19 (40)	2.58
International research funding agencies may not recommend open access journals in public health in Africa		32 (35)	15 (31)	17 (40)
My promotion prospects may be reduced by publishing in non-traditional journals		12 (13)	04 (08)	08 (19)

Table 6. Opportunities for and threats to open access publishing in public health in Africa

In terms of perceived needs for training and mentoring, Table 7 shows that 73% of the respondents would like access to free online courses of relevance to them, and 68% would be interested in joining a mentoring programme. Forty-three per cent (43%) identified themselves as advanced career researchers who would be interested in mentoring junior researchers.

Interests of respondents in		All countries	Nigeria	Other countries
		n = 91	n = 48	n = 43
		n (%)	n (%)	n (%)
Would you like to have free access to online courses of relevance to your interests?	Yes	66 (73)	38 (79)	26 (60)
	No	02 (02)	0 (0)	02 (05)
	Maybe	05 (06)	03 (06)	02 (05)
Would you be interested in joining a mentorship (mentor-mentee match) programme with access to experienced mentors in your field?	Yes	62 (68)	36 (75)	26 (60)
	No	08 (09)	02 (04)	06 (14)
	Maybe	04 (04)	03 (06)	01 (2)
If you identify yourself as an advanced career researcher, would you be interested in mentoring junior researchers?	Yes	39 (43)	23 (48)	16 (37)
	No	03 (03)	0 (0)	03 (07)
	Maybe	12 (13)	05 (10)	07 (16)

Table 7. Interests of respondents in free online targeted training courses and mentoring programmes

Table 8 shows that while there was interest in accessing online courses in how to review, edit, write and publish, relatively more respondents were interested in learning about research methods and public health.

Areas of interests of the respondents	All countries	Nigeria	Other countries
	n = 91	n = 48	n = 43
	n (%)	n (%)	n (%)
Research methods statistical analysis	49 (54)	23 (48)	26 (60)
Public health	38 (42)	19 (40)	19 (44)
Research methods study design	37 (41)	17 (35)	20 (47)
How to review journal articles	34 (37)	16 (33)	18 (42)

(Contd.)

Areas of interests of the respondents	All countries	Nigeria	Other countries
	n = 91 n (%)	n = 48 n (%)	n = 43 n (%)
Journal editing	33 (36)	16 (33)	17 (40)
Leadership	31 (34)	12 (25)	19 (44)
Writing skills	29 (32)	12 (25)	17 (40)
How to publish your research	28 (31)	12 (25)	16 (37)
Open science and publishing	27 (30)	12 (25)	16 (35)

Table 8. Areas of interests of the respondents wishing to access free targeted online courses

Discussion

There was an overlap in that some of the respondents had authored articles in the past three years while they had also been reviewers and editors of journals. There was reasonable knowledge of the advantages and disadvantages of the open and traditional publishing models, although we might have expected a larger proportion of the respondents to appreciate the benefits of ready availability, added citations and transparency of the open model since these options were chosen by fewer than half of the respondents. This can be attributed to the perceptions the researchers have of open access publications as most of them are unaware of the complexity of the work their librarians need to do to access various consortia deals. Thus, researchers access information materials as a result of the deals without appreciating the challenges of making them available. Another, previous, study has demonstrated that authors are not always aware of policies on open access.⁹ In addition, some respondents chose obviously incorrect answers such as that open access publishing will favour speedy academic promotion (while the opposite might be true) and demonstrated a lack of understanding that open access research publication output may be required by research funding agencies.

The traditional subscription-based publishing models in which individuals or institutions would pay subscription fees to access scientific materials have been in use for decades. On the other hand, open science practices, which include open access, open source, open data, open methodology and open peer review, aim to remove the financial and legal restrictions preventing individuals from accessing research publications and outputs. Open access publication models include gold, green, bronze, hybrid and diamond.¹⁰ Forty-one per cent (41%) of all the respondents had authored open access publications and paid APCs, as compared to 24% who authored open access articles in journals which do not charge them, while 22% received an APC waiver for open access publication in the last three years (Table 2). It is difficult to detect systematic differences between the respondents from Nigeria and elsewhere, although the former appeared less likely than others to publish in a journal that does not charge APCs. Open access journals follow the open science publishing model and allow scholarly communications and outputs to be publicly available online with no cost to the reader. To enable the reader to enjoy open access, the publication costs are shifted elsewhere, typically onto academic institutions and authors.¹¹ Research4Life classifies countries into two categories of which those in category A are given a waiver of APCs by some journals; by this criterion Nigeria is not entitled to a full waiver.¹² Electronic Information for Libraries (EIFL) negotiated an APCs waiver for some countries.¹³ We might thus have expected respondents from Nigeria to differ from other countries for APCs and waivers.

'Open peer review is reported to support high quality reviewing and also helps to reduce the risk of hidden conflicts of interest'

Fifty-six per cent (56%) of all the respondents had an interest in preprint and open review publications (Table 3), but the survey questions did not explore this further. Preprints are article versions which are made publicly available before traditional journal-based peer review. The Covid-19 pandemic has led to an increase in acceptance of preprints as a valid way of rapidly communicating new research.¹⁴ There is great potential in open peer review, which allows for the public sharing of peer-reviewed reports and the author responses in a transparent manner. Open peer review is reported to support high quality reviewing and also helps to reduce the risk of hidden conflicts of interest.¹⁵

7 Seventy-three per cent (73%) of our study participants indicated interest in free access to online courses, relevant to their interests (Table 7). Among them, interest in accessing research methods statistical analysis was 54% and in accessing research methods study design was 41%. The other areas of interest were public health (42%), reviewing journal articles (37%), journal editing (36%), leadership skills (34%), writing skills (32%) and how to publish research (31%) (Table 8). Sixty-eight per cent (68%) of the respondents indicated interest in joining a mentorship programme. Forty-three per cent (43%) of the advanced career researchers indicated willingness to mentor junior researchers (Table 7). Training in good scientific practices has also been reported to have the potential to position African scientists to be more critical and adopt practices which improve the integrity of their work.¹⁶ Thus, free online courses can be used for either unsupervised training or blended with mentoring. This also concurs with previous research findings which suggested the need to assist journals and researchers who publish in them exists, in order to make the work they publish more accessible to audiences who might want to use the results.¹⁷

The most identified main advantages of open publishing were (i) ensures that published materials are readily available (47%), (ii) results in more visibility for me and my institution (46%), (iii) allows authors to be cited more (43%), (iv) fosters more impact in the larger scientific society (35%), (v) promotes interdisciplinary research for a wider audience (25%) (Table 4). This study, however reported about 37% of the respondents considering traditional publishing to be less likely to be predatory (Table 5). Charging authors without providing a service in return is the predatory journals business model,¹⁸ and there is potential for education about identifying predatory publishing more effectively.

Although the introduction to the survey identified '... open access publishing of research results in public health', (see the link to the survey in the data accessibility statement at the end of the article) the results are likely to be relevant to other disciplines and not limited to public health. Our respondents considered opportunities for open access publishing in public health in Africa to include support for the movement 'African-led research in Africa' (42%), allowing alignment of publications with national or regional health priorities instead of global scientific validity (36%), giving more credit to African institutions in terms of contribution to the global research effort (33%) and encouraging regional collaboration for sustainability (26%) (Table 6). During the Covid-19 pandemic one in five publications on Covid-19 did not have African authors and approximately 66% of the authors on publications of research which was coming from an African population were not African nationals. This reveals the need to enhance research output by African researchers and support the publication of their work.¹⁹

Threats to open publishing in public health in Africa included that this may result in a neglected or poor peer review (40%), international research funding agencies may not recommend open access journals in public health in Africa (35%) and promotion prospects may be reduced by publishing in non-traditional journals (13%) (Table 6). Those who chose the option about research funding agencies were incorrect, as research funders are behind the move to actually require open access publication of findings resulting from their funding. Plan S requires researchers to publish in open access journal or platforms and make publications available in open access repositories.²⁰

Open access would make scholarly content freely available online to all readers and it is associated with higher citation rates – probably due to wider accessibility.²¹ There have been suggestions that there is a need to create awareness of open access tools and skills in Africa to enable easy adoption of open publishing,²² and that this should distinguish between green, gold and diamond open access. These benefits of open access publishing notwithstanding, it is important to note that open access journals may be associated with authors paying APCs, disadvantaging researchers who are unable to cover such costs. This further exacerbates the already significant research dissemination inequity for researchers in low- and middle-income countries in Africa. Although we were not able to explore the relationship between a country and views about APCs, our previous research did find a relationship between the

'There is a need to increase the number of high-quality African open access journals to allow the publication of African research'

8 charging of APCs and GDP of the country.²³ Western publishers are the majority publishers of subscription journals.²⁴ There is a need to increase the number of high-quality African open access journals to allow the publication of African research.

Study limitations

Due to the method used to identify the people who would receive the survey, we were unable to estimate a response rate and so cannot claim that the answers are representative of a particular population. For example, since the survey sampling frame included journals published under a range of publishing models, responding editors might have inherent biases from their own experiences of open access. We also note the limitation of our small sample size and that over half of the respondents were from one country, Nigeria. We separated the data according to country to minimize the effect of most respondents being from Nigeria. Although there was an even spread of respondents from various stages of career development and between researchers, teachers and editors, the small sample size and lack of a prior hypothesis does not allow us to explore the responses according to the various demographic features of the study sample. We did not explore the wider issues of open science, such as open data or software.

Conclusions

Despite the limitations expressed above, this exploratory study does indicate that there is still a need for education to help correctly identify barriers and solutions to open access publishing in Africa. This is particularly important as Africa is faced with significant health challenges which need public health to improve the health of the population. The high proportion of respondents wishing to have access to online resources and to take part in a mentoring programme provides guidance for future action in these areas.

This study notes a huge potential for equipping researchers in Africa with the skills to understand and use online publishing to make African research findings more readily available. This is relevant for any discipline, such as public health, where local solutions based on local research findings are important. The development of skills in the use of preprint and open review as options can also be part of capacity building. This gives a potential programme direction for the development of a capacity-building initiative in this area.

'there is still a need for education to help correctly identify barriers and solutions to open access publishing in Africa'

Data accessibility statement

The survey questionnaire and spreadsheet with response data are available here: <https://zenodo.org/record/8251046>.

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Abbreviations and Acronyms

A list of the abbreviations and acronyms used in this and other *Insights* articles can be accessed here – click on the URL below and then select the 'full list of industry A&As' link: <http://www.uksg.org/publications#aa>.

Competing interests

The authors have declared no competing interests.

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