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UNRESOLVED ISSUES

Open access for operational research publications from low- and middle-income countries: who pays?

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Open-access journal publications aim to ensure that new knowledge is widely disseminated and made freely accessible in a timely manner so that it can be used to improve people's health, particularly those in low- and middle-income countries. In this paper, we briefly explain the differences between closed- and open-access journals, including the evolving idea of the 'open-access spectrum'. We highlight the potential benefits of supporting open access for operational research, and discuss the conundrum and ways forward as regards who pays for open access.

'THE FIELD OF KNOWLEDGE IS THE COMMON PROPERTY OF ALL MANKIND'

-Thomas Jefferson, 1807

One of Mahatma Gandhi's earliest publications, *Hind Swaraj*, published in Gujarathi in 1909, is recognised as the intellectual blueprint of India's freedom movement.¹ The book was banned by the British Raj on its publication in India due to fears that it might influence India's subservience to the colonial power. It was translated into English a year later, with a copyright legend reading 'No Rights Reserved'.

It was precisely this global access to, and dissemination of, the aspirational ideas contained in this book that helped leaders such as Nelson Mandela and Martin Luther King to similarly seek freedom, self-reliance and racial equity for people in other parts of the globe.

We have been involved for many years in conducting operational research and capacity building in low- and middle-income countries (LMICs).²⁻⁵ We hold a strong conviction that new knowledge generated through operational research should be widely and freely disseminated in a timely manner, so that it can be used to improve people's health, especially those in LMICs.⁶ Unlike traditional closed-access journals, open-access electronic journal publications aim to promote such dissemination – anyone who has access to the internet can freely read, copy, print, download or link to such publications. However, there are varying degrees of 'openness' in scientific publishing, and there are financial barriers that prevent adequate access for people living in LMICs.

In this paper, we briefly explain the differences be-

tween closed- and open-access journals, including the evolving idea of the 'open-access spectrum', and then highlight the potential benefits of supporting open access for operational research, before discussing the conundrum of who pays for open access.

What are closed- and open-access journals?

Before public access to the World Wide Web became widespread in the late 1990s and early 2000s, the predominant form of publishing was through traditional closed-access journals in print form. Access to articles was available only through subscriptions, site licences or individual article fees, which were often expensive. While most closed journals now offer digital versions of the articles, most still require readers to pay.

Open-access journals contain articles that are digital, online and free-of-charge for the reader.⁷ From an end-user's perspective, open access is meant to remove cost barriers for the readers and any licensing restrictions. The aim of a truly open-access paper is well summarised by the Public Library of Sciences (PLOS) definition: 'unrestricted, immediate access and unrestricted reuse' – often termed 'gold' open access.⁸

However, producing open-access literature is not free, as costs are incurred for managing manuscript preparation, including peer-review, copy editing, typesetting, indexing and maintaining server space (termed processing costs). In contrast to closed journals, these costs have to be paid upfront either by the authors or a sponsor (employer or funder) on acceptance of an article for publication.

Many formerly closed-access journals now function as 'hybrids', offering open access for articles for which an upfront payment has been made. At the same time, they offer a spectrum between open- and closed-access based on embargos and copyrights, even without upfront payment. For example, an article may become freely accessible after an embargo of 6 or 12 months (delayed open access). For such articles, a purchase fee is required to access the article during the embargo period. In addition, there are issues about copyright (whether held by author or publisher), author posting rights (on blogs, social network sites), and whether articles can be deposited on trusted or institutional third-party repositories ('green' open access). Judging the meaning of what is claimed to be open access should thus be based on the question 'How open is it?'.⁹

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Benefits of supporting open-access publications for operational research

Open access provides a number of potential benefits to a wide range of groups,¹⁰ highlighted in the Table. A number of points merit further mention. First, it allows access to new and timely knowledge for health workers and policy makers living in LMICs.¹¹ Paradoxically, these countries, which bear close to 90% of the world's infectious disease and 80% of the non-communicable disease burden, and which are thus in dire need of new knowledge, have the poorest access due to article purchase costs. Most closed-access journals only allow access to abstracts, which are not sufficiently detailed for readers to judge the quality of evidence or contextual relevance. Abstracts may at times even be misleading compared to the full text article.^{11,12}

Second, open access to operational research knowledge is vital to bridge implementation gaps.⁵ For example, research investment by the European Commission (EC) amounted to 55.8 billion euros in its 2007–2013 Framework Programme.¹³ This was dedicated to 'upstream' development of basic science and technology, including clinical trials. For such huge investments to translate into benefits for communities, 'downstream' absorption and application of the knowledge generated within health systems is essential. Access to this knowledge through open access is required to realise the benefits of the original research.

Third, open access is a resource that is essential for helping achieve the targets of the United Nations health-related Millennium Development Goals (MDGs 4–6) for maternal and child health, the acquired immune-deficiency syndrome (AIDS), tuberculosis (TB) and malaria.¹⁴ Policy makers and health workers on the ground need access to the findings of implementation science and operational research to design and monitor their programmes to meet those goals.

Finally, open access bridges inequities in the global scientific conversation.¹⁵ As Gro Harlem Brundtland, former Director General of the World Health Organization (WHO), stated: 'Health problems are no longer local, national or regional, they are global'.⁷ If scientists from LMICs are hampered in accessing the latest knowledge on human immunodeficiency virus/AIDS treatment or new diagnostics for TB, they will be hampered in conversations with their colleagues from other parts of the world. There has been an encouraging growth in research productivity (as indicated by publications) by African scientists in 19 countries, which grew by an average of 26% between 2004 and 2009.^{16,17} A 26-country survey of health systems research, most of which was operational research, found that decisions about health policy were based on evidence in about two thirds of these countries.^{16,18} Widespread dissemination of evidence through open access is essential to sustain this encouraging momentum.

Financial challenges and ways forward for disseminating operational research

Maximising the opportunity for researchers and readers in LMICs to benefit from operational research depends on the answer to the crucial question of who

pays for open access. Publishing companies, donors, funding agencies and individual researchers all have a role to play in tackling this challenge. We propose ways to address three of the main financial challenges related to research dissemination.

Challenge 1: High costs for accessing closed journals

The prohibitive cost of purchasing articles is a major barrier for readers. Policy makers and health workers in LMICs cannot afford the costs of US\$35–40 per article, even if they are highly relevant to their programmes. In addition, the annual institutional and individual subscription rates for a closed-access journal such as the *Lancet* are US\$1714 and US\$293, respectively.¹⁹ These costs are simply unaffordable for most institutions, let alone individuals, in LMICs.

The withdrawal of several large publishers from allowing free access to their 2500 journals for health workers in low-income countries through the Health Inter Network for Access to Research Initiative (HINARI) is worthy of mention.^{20,21} This was a deal negotiated by the WHO with publishers in 2001 to allow free access to about 7000 journals for 4800 institutions in 105 low-income countries. In 2009, this arrangement was withdrawn by several publishers, thereby further reducing access to valuable research.

Solutions

There are several possible solutions. First, the publishing industry generates enormous financial profits for a small number of multinational publishing corporations, which benefit from publicly funded research in a market that is worth over US\$5 billion.^{7,22} For example in 2009, Elsevier made a profit margin of 35% (US\$693 million) on a turnover of US\$1985 million, while Wolters Kluwer and Springer made profits of respectively US\$234 million and US\$ 275 million.²⁰ We suggest that these corporations could afford subscription waivers or offer free online access for individual operational research articles from LMICs.

Second, one of the fundamental problems with HINARI was that it was controlled by the commercial interests of the publishing industry. Publishers gave access to poorer countries, as they generally had small incomes from these countries, and the marginal cost of giving electronic access to institutions in low-income countries was very low.²⁰ Emerging countries, including India, Pakistan, Indonesia and China (who badly need open access), were excluded by most publishers, as these countries represented important parts of many publishers' business plans. The other practical problem with HINARI was that as it was limited to institutions, programme managers and individual health workers operating outside universities could not benefit. What is needed is to expand HINARI to create a 'HINARI +' initiative that would allow access not only for institutions but also for individuals. To avoid past failures, control of HINARI + should not solely depend on the good will of the publishing industry, which is primarily driven by commercial interests.

Third, a more radical option of avoiding the closed-access reader costs is to ensure mandatory open access for publicly funded research. The under-

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KEY WORDS

operational research; publications; journals; knowledge; SORT IT

TABLE Potential benefits for various groups in supporting open access for operational research publications from low- and middle-income countries

Groups ⁷	Potential benefits of open access publications
Authors and researchers	Promotes dissemination, visibility and potential impact through worldwide audience Allows free distribution of publications to health workers in remote areas Allows cost-free and permission-free access to literature needed for research Allows easy, full retrieval and use of data by search engines
Patients, communities and health workers	Access to knowledge can enhance patient and community empowerment and advocacy Access of knowledge by health workers will indirectly benefit patients and communities Use of research knowledge to improve access to new tools, diagnostics and models of care will benefit all
Vulnerable and excluded groups	Allows vulnerable and excluded groups with whom NGOs work to access new information Enhances wider awareness of the conditions of such groups by the general public
Programme managers and policy makers	Provides access to new developments that can be useful for improving disease-related programmes and health systems in general
NGOs	Subscription fees paid to journals can be redirected to implementation activities
Universities and academic institutions	Increases visibility of faculty research work Reduces journal subscription expenditure Allows free use by students and teachers Enhances dissemination and the potential for research impact
Institutional and public libraries	Reduces budgets for subscriptions Allows access to up-to-date literature Allows free use for teaching purposes
Funding agencies	Increases return on investment in research by making new knowledge widely available and retrievable Increased dissemination would facilitate absorption of knowledge and eventual impact Provides individual donors and tax payers access to the results of publicly funded research
Journals and publishers	Increases access, visibility and retrievability of articles, thereby rendering them more useful Increased citations, knowledge transfer and journal impact

NGOs = non-governmental organisations.

lying principle is that it is unacceptable to be publishing taxpayer-funded research in journals that do not provide immediate and free access to those who most urgently need to see the results of these studies. Mandatory open access is now required by the United Kingdom Department for International Development (DFID) research policy,²³ the United States National Institutes of Health²⁴ and the Wellcome Trust.²⁵ Horizon 2020 (H2020), the new Framework Programme for Research (2014–2020) launched by the European Commission, which is among the world's most prolific bodies for academic output, has also followed suit.²⁶ These initiatives require that funding agencies pay for open access, but individual researchers are spared. The researcher is obliged by mandate to publish in open-access journals.

Challenge 2: High author costs for publishing in open-access journals

The most important barrier to dissemination through open-access journals is the upfront fees required for processing articles. While these are legitimate costs that publishers must cover, most authors cannot afford the US\$1000–5000 fees to have their articles published. For open access to exist, these fees need to be covered.²⁷ While some well-resourced journals, such as those belonging to PLOS and BioMed Central (BMC), have a system of waivers or differential pricing based on country income, other open access journals do not.

Solutions

There are several possible solutions. First, annual research budgets from governments or international bilateral/multilateral donors should include a line item to cover publishing fees.

Second, publishing companies could establish a dedicated annual fund to assist researchers from low-income countries to publish their research. Given their profit margins, this would not be particularly onerous.

Third, there should be consideration of pooled funding from donors (including the Global Fund to Fight AIDS, Tuberculosis and Malaria), whereby authors from designated LMICs could have access to online support to pay for their articles once accepted. This support would be granted once pre-defined criteria had been fulfilled.

Fourth, open-access journals could emulate the model of PLOS and consider introducing waivers or subsidies for authors from LMICs with differential pricing, even if it means a marginal increase in fees for the rest of the articles. Further, it does not make sense for an article that has 1000 words to be charged the at the same rate for processing as an original article with a word count of 3500. Differential pricing would seem to be justified.

Challenge 3: Embargo periods and other barriers for hybrid journals

Many journals offer delayed open access after an embargo period. The embargos allow some closed journals to appear to offer open access, but the delay does not serve the best interests of policy makers and programme managers. For example, an article that provides breakthrough implementation knowledge that is useful for reducing maternal or child mortality should not be subjected to time-limited embargos.²⁰ Finally, some journals allow posting of the pre-publication manuscripts on institutional repositories, but these articles often remain outside PubMed and other search engines, and are a second-class option for dissemination.

Solutions

As it is difficult to predict which articles will have immediate value, the goal should be to make all knowledge available without embargos. The other, more creative funding models mentioned should be explored so that the use of embargos is discarded.

CONCLUSION

Policy makers, programme managers and researchers in LMICs need access to operational research findings without cost, and at the same time researchers need to be able to publish without financial barriers. Meeting this challenge in the largely underfunded field of operational research will require the creation of innovative funding and dissemination mechanisms that provide viable financial models for publishing companies and at the same time support individual authors and readers from LMICs. In this way, vital research knowledge will become accessible to those most in need.

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Les articles de journaux en accès libre visent à assurer la dissémination large de nouvelles connaissances et de rendre leur accès libre de façon à pouvoir être utilisées rapidement pour améliorer la santé des populations, surtout dans les pays à revenu faible ou moyen. Dans cet article, nous expliquons brièvement les différences entre les

publications à accès limité et à accès libre, notamment l'idée en gestation de « spectre d'accès libre ». Nous soulignons les bénéfices potentiels du soutien à l'accès libre pour la recherche opérationnelle et ensuite discutons la question de qui paye pour cet accès et la recherche de solutions.

El propósito de las publicaciones en las revistas de acceso libre es lograr una amplia difusión de los nuevos conocimientos mediante el acceso libre y oportuno, de manera que los avances se puedan aplicar a fin de mejorar la salud de las personas, sobre todo en los países de bajos y medianos ingresos. En el presente artículo se explican brevemente las diferencias entre las revistas de acceso libre

y acceso restringido y se analiza además la idea evolutiva del 'espectro del acceso libre'. Se destacan las ventajas que puede ofrecer el respaldo al libre acceso a la investigación operativa y se analiza luego el dilema y las opciones que pueden permitir progresar con respecto a la fuente de financiamiento del libre acceso.

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