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SHORT COMMUNICATION

Medical publishing: a flawed model in dire need of reform

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Summary Recently, in the midst of the Covid-19 pandemic, high-profile retractions of some papers published in prestigious medical journals have highlighted the necessity for structural reform to the current model of medical publishing. We discuss what ails the current system and what can be done to remedy it.

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The controversy around a recent paper on Hydroxychloroquine, published-and subsequently retracted-in *The Lancet*, has refocused attention on medical journals and their publishing practices.¹ This brings to mind the controversy around the 1973 Rosenhan 'Thud experiment'.

In 1973, *Science* published David Rosenhan's 'pseudo-patients' study (*On Being Sane in Insane Places*). Rosenhan's paper stated that 8 sane people (of which Rosenhan himself was one) presented themselves at psychiatric hospitals in the USA, pretending to hear voices saying 'hollow', 'empty' and 'thud'. They were all admitted, and though all ceased to exhibit any symptoms thereafter, 7 of the 8 were diagnosed with schizophrenia.² Rosenhan's experiment caused

an uproar and served to strengthen Thomas Szasz's anti-psychiatry movement. However, recent investigations by the journalist Susannah Cahalan (published in her book *The Great Pretender*) have uncovered serious flaws in the conduct of this research and raised fundamental questions about its veracity, and the unquestioning attitude with which the study was accepted and defended by medical journals.³

Mainstream media publications-for example, *Time* or *National Geographic*-employ paid journalists and editors to commission, write, edit and publish articles. This is expensive, and a major reason why many newspapers and magazines have folded. Now, consider medical publishing. As *The Guardian* newspaper's medical writer Stephen Buranyi notes, medical journals receive their contributions from authors free of cost. Peer-review is also undertaken *pro bono* by volunteer medical experts. Moreover, the *actual* costs of medical research and peer-review are paid for by tax-

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payers, who fund researchers' (salaried) time and resources (research grants). The publishers then sell the finished product (journals, online access and pay-per-view articles) to the consumer (universities, institutions and individuals). Medical publishing, therefore, is an industry where producing and processing the raw material are done for free by volunteers and the retailer profits by selling the fruits of others' labours.⁴

The scientific publishing industry, in its current avatar, is the brainchild of the press mogul, Robert Maxwell. He nurtured the nascent medical publishing industry in the post-WW2 years, mutating it from a genteel profession into a profitable enterprise. Stephen Buranyi also notes that three major publishers (Elsevier, Springer and Wiley-Blackwell) now control almost 50% of the scientific publishing market worldwide.⁴

The scientific publishing industry exerts a firm control over researchers. The use of *Impact Factor* (an estimate of how many times a paper published in a particular journal has been cited in other journals) to rank journals has conferred cachet on 'High impact factor' journals (for example, *Nature*, *Lancet*, *JAMA*), with researchers vying to publish in these journals.⁴

The race to publish 'significant' results has costs.

Daniele Fanelli's paper (*How many scientists fabricate and falsify research?*) noted that approximately 2% of scientists own up to "having fabricated, falsified or modified data or results at least once". Dr Fanelli also noted around 30% of scientists admitted to "changing the design, methodology or results of a study in response to pressures from a funding source".⁵

In 2005, John Ioannidis published a seminal paper titled 'Why most published research findings are false'. In this paper, Ioannidis demonstrated that up to 80 percent of non-randomized studies, 25 percent of randomized trials, and as much as 10 percent of large-scale randomized trials suffer from significant flaws.⁶ As Ioannidis diplomatically put it "A third of the most-cited clinical research seems to have replication problems". He opined that publication bias favoured the rapid and prominent publication of 'positive' findings over 'negative' studies and cautioned that "evidence from recent trials, no matter how impressive, should be interpreted with caution, when only one trial is available in order to limit premature claims for efficacy".⁷

Are there any solutions to this burgeoning problem, then?

One answer possibly lies in *Open Access* publishing, where researchers pay upfront to have their studies published in online open-access journals. Open access journals then do not have to depend on subscription fees and pharmaceutical advertising to survive. The published research is not hidden behind a 'paywall' and is easily accessible by interested parties worldwide, thereby allowing greater transparency and scrutiny of the research. However, only about 25% of all published papers are currently open access, which is a travesty.⁴

Another solution lies in using sophisticated statistical screening tools to vet studies prior to publication. Dr John Carlisle (Consultant Anaesthetist, Devon) was instrumental in unmasking research fraud propagated on an epic scale by Yoshitaka Fujii, resulting in the retraction of 183 publications. Dr Carlisle pioneered what has come to be known as the *Carlisle Method*: by testing the randomness of varia-

bles such as age, sex, weight, height etc. in a study, Dr Carlisle argues that one can determine whether the distribution of these variables is down to random chance (in a 'clean' study), or 'invented'. Two major journals (*Anaesthesia* and *NEJM*) use the Carlisle method to screen RCTs submitted for publication, and other journals may follow.⁸

The gathering momentum for registering all clinical trials (*clinicaltrials.gov*) and the push for scientists to release their raw data will inexorably lead to greater transparency.

While peer-review is considered the gold standard for medical journals of repute, there are obviously flaws in the system. Dr. Richard Smith, former editor of the *British Medical Journal (BMJ)*, is of the opinion that peer review is "slow, expensive, ineffective, something of a lottery, prone to bias and abuse, and hopeless at spotting errors and fraud".⁹ As scientific studies become increasingly complex, it is humanly not possible for reviewers to be able to review all aspects of a paper. Just as the use of plagiarism detection software is now commonplace, perhaps a novel solution may lie in the development of artificial intelligence (AI)-based software that can assist expert reviewers in undertaking sophisticated, multidimensional peer review. While this may sound sacrilegious to traditionalists who regard the peer review process as sacrosanct and inviolate, one could argue that this bastion too needs to be stormed.

In his book, *The Trouble with Medical Journals*, Dr. Richard Smith also goes on to suggest that the majority of doctors in clinical practice have neither the time nor the inclination to trawl through reams of abstrusely worded medical journals, and that publishers should strive to present research in a succinct, easily digestible format.⁹ Those wishing to deep-dive into a particular research paper can then access the full-text on the journal's website. Indeed, the *BMJ* has been an early adopter of this approach, with some success.

A clamour for change is necessary to force the medical publishing industry to set its house in order and evolve. The status quo is simply unacceptable.

Most people say that it is the intellect that makes a great scientist. They are wrong: it is character: Albert Einstein

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