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POINT OF VIEW

h-index: A Metric of Merit or a Mirage in Academia?

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Abstract

The *h-index*, introduced in 2005, has become a dominant metric in evaluating medical researchers and journals. Celebrated for balancing productivity and citation impact, it remains widely used in tenure, funding, and publication decisions. However, its limitations including disciplinary bias, disadvantages for early-career scholars, gender inequities, and insensitivity to societal impact which raise concerns about fairness and innovation. While offering utility, the *h-index* risks oversimplifying scholarly value into a numbers game. Alternatives such as *g-index, m-quotient, field normalization, and altmetrics*, along with holistic frameworks like DORA, provide more nuanced assessments. Redefining impact beyond citations is essential for advancing equitable medical academia.

Keywords: h-index, citations, research, publications, authors, journals

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Introduction

In the high-stakes world of medical academia, where careers often hinge on 'impact,' the *h-index* serves as a key determinant of academic recognition. The *h-index* stands as a formidable gatekeeper. It was introduced in 2005 by physicist Jorge Hirsch, this metric, where an author has h papers each cited at least h times [1], offers a tantalizingly simple gauge of scholarly worth. Yet, is it a fair arbiter of merit or a deceptive trap that entrenches inequality, stifles innovation, and distorts the soul of medical research?

The Allure of the *h-index*

Hirsch's brainchild was a response to flawed metrics like total citations, skewed by a few blockbuster papers, or publication counts, which reward quantity over quality [1]. The *h-index* elegantly balances both: a researcher with an *h-index* of 30 has 30 papers, each cited at least 30 times, signalling consistent impact. For medical academics, this is a godsend. Hiring committees, grant panels, and tenure boards lean on it to compare researchers across subspecialties, from cardiology to epidemiology [2].

For many young researchers, the *h-Index* offers the promise of recognition that transcends borders and local hierarchies. It levels, at least in appearance, the playing field between an academic at a major Ivy League institution and one working in a regional hospital in India. A number is universally interpretable, and in globalized science, it provides a common language. Similarly, for senior scientists, a high *h-index* acts as a kind of professional currency, as it may signal prestige, authority, and legitimacy.

Journals, too, wield the *h-index* to quantify their clout. Defined as the largest *h* where *h* articles have at least *h citations*. It outperforms the Impact Factor (IF), which is tethered to a narrow two-year window and vulnerable to gaming via self-citations [3,4]. Titans like *The New England Journal of Medicine* (NEJM) boast *h-indices* above 200, cementing their role in shaping clinical practice [3]. For authors, a journal's *h-index* guides submission choices, promising visibility and career leverage.

A Dominance of Numbers?

It remains debated whether the *h-index* functions as a useful benchmark or an oversimplified metric. Beneath its polished surface lies a metric that amplifies bias and rewards conformity. Early-career researchers often recently completing residencies, balancing clinical loads with grant applications face a steep climb. Their *h-indices* lag not for lack of quality but because citations accrue slowly [5]. This also disproportionately harms women and underrepresented minorities, who battle systemic barriers like unequal funding and mentorship, and widening gap [6].

In medicine's collaborative mega-trials, the metric equates a principal investigator's toil with a co-author's cursory nod, inflating scores for the well-connected [7]. A researcher listed as the 25th author on a multicentre trial may receive the same citation credit as the first author who carried the intellectual burden. Thus, the *h-index* rewards networking and institutional affiliation as much as true scientific creativity. Over time, this can distort career trajectories, with some thriving on collecting it.

Disciplinary disparities deepen the critique. Biomedical fields, driven by rapid citation cycles, produce lofty *h-indices*, while areas like medical ethics or public health, where impact unfolds over decades, languish [2]. A cardiologist might hit *h*=50 by mid-career, while an orthopaedist stalls at *h*=15, despite comparable rigor. This entrenches prestige hierarchies, sidelining interdisciplinary work that bridges lab to bedside or daring research that defies convention.

The human consequences of this numbers game are sobering. Researchers report feeling pressured to prioritize citation-friendly topics over patient-relevant questions. Instead of exploring novel hypotheses that might reshape practice, many retreat to the safety of publishing in well-trodden areas. The *h-index*, in this light, becomes less a neutral tool and more a cultural force shaping the very direction of science [8]. Figure 1 summarizes the strengths and weaknesses of the *h-index*.

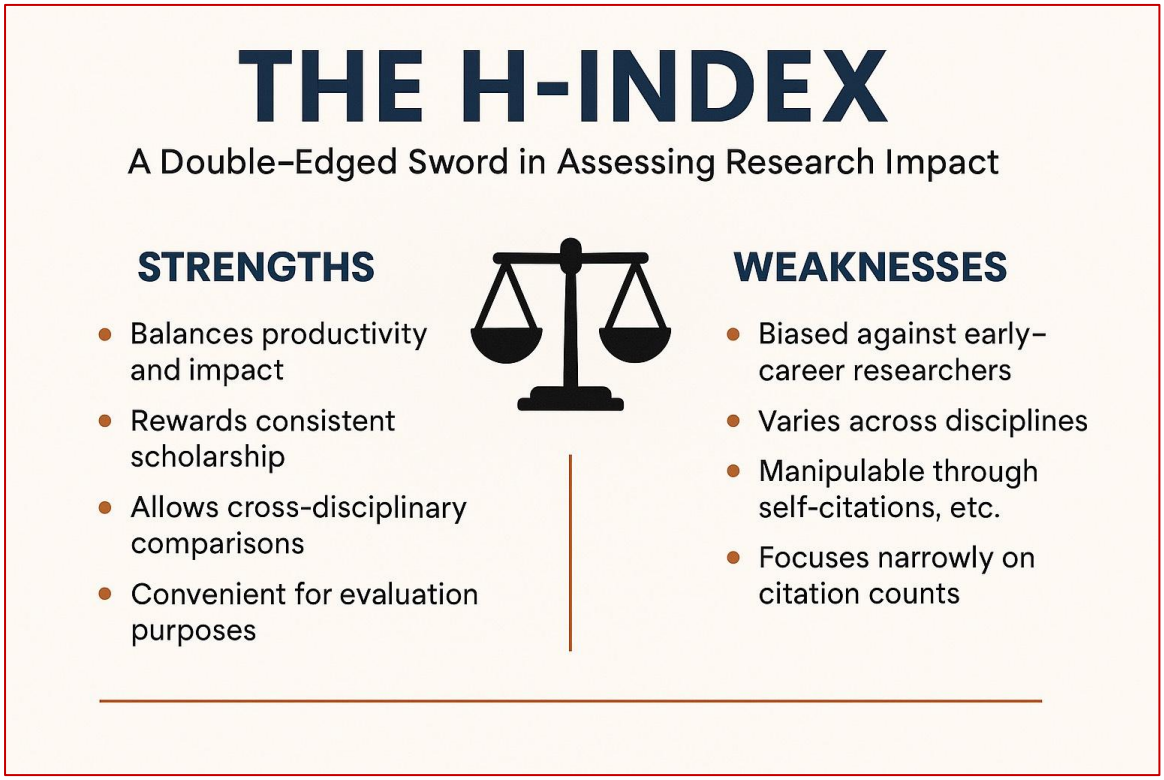

Figure 1. The strengths and weaknesses of *h-index*

Journals Under Scrutiny

Journals also face similar distortions. Older journals with vast archives naturally a mass higher *h-indices*, dwarfing newer venues in fields like precision medicine or AI diagnostics [4]. Citation cartels and predatory publishing further muddy the waters; while less manipulable than IF, the *h-index* is not immune to self-citation schemes [7,9]. Moreover, it ignores non-traditional outputs critical to medicine: datasets, software, or policy briefs that save lives but do not rack up citations [5].

Consider, for instance, the case of COVID-19 research. A preprint on a novel treatment strategy might influence global health policy within weeks, yet traditional citation metrics would take years to reflect that significance. The *h-index* cannot account for the immediacy of such societal impact. In a world where digital communication accelerates knowledge transfer, relying solely on a lagging indicator risk misjudging both people and publications [10].

Reimagining Evaluation

What if we reconsidered its dominance? Variants like the *g-index*, which emphasizes highly cited papers, or the *m-quotient*, adjusting for career length, address some flaws [2]. *Field-normalized indices* and the *ha-index*, averaging citations in a journal's *h-core*, offer fairer benchmarks [3]. *Altmetrics*, which track social media mentions, policy citations, and downloads, bring an additional dimension. While imperfect, these newer tools attempt to capture the multifaceted ways in which science matters [10,11].

The San Francisco Declaration on Research Assessment (DORA) and Leiden Manifesto principles champions holistic evaluations, blending metrics with peer review, teaching, and societal impact [6]. Imagine valuing a researcher's mentorship or policy influence as much as their citation tally. A professor who spends hours nurturing young investigators or developing local healthcare solutions may have an *h-index* of 15 but a transformative effect on their community. By broadening our lens, we acknowledge contributions that lie beyond the narratives.

For practical guidance, Table 1 offers informal benchmarks tailored to medicine. Authors with *h-index* <10 are emerging; 20–40 signals mid-career strength; >60 marks global pioneers. Journals below 40 are niche; above 200, elite flagships like The Lancet. Yet, these are guides, not gospel; contextualize within subspecialties and databases, as Google Scholar inflates scores versus Scopus and Web of Science [9].

Table 1. Informal *h-index* Benchmarks for Medical Authors and Journals

Category	Authors (h-index)	Journals (h-index/h5-index)	Interpretation
Very Low	<10	<20	Emerging talents; new journals
Low	10-20	20-40	Junior faculty; regional outlets
Medium	20-40	40-100	Mid-career leaders; respected journals
High	40-100	100-200	Senior experts; top-tier publications
Elite	>100	>200	Global pioneers; flagship journals

A Call for Reform

The *h-index's* dominance in medical academia warrants critical reflection. It seduces with simplicity but blinds us to research's multifaceted brilliance. Are we measuring what matters: lives saved, knowledge advanced, barriers broken, or merely what counts? By embracing inclusive, nuanced assessments, we can liberate scholarship from this metric's grip, fostering a medical ecosystem where ideas, not numbers, define impact.

At the same time, dismantling the domination of the *h-index* does not mean discarding metrics altogether. Numbers will always play some role in evaluation. The challenge lies in rebalancing our priorities: moving from a singular fixation on citations to a richer tapestry of recognition [8]. As medicine grapples with global crises; from pandemics to climate change, the research that changes the world may not always be the most cited. Often, it will be the work done quietly, locally, and collaboratively.

Table 2 summarizes the benefits and drawbacks of the *h-index* and highlights alternative or complementary metrics that provide a more balanced evaluation of research performance. While the *h-index* offers a simple and widely recognized measure combining productivity and impact, it has notable drawbacks such as field dependency, insensitivity to recent or highly cited papers HCPs [12,13], and disadvantages for early-career researchers. Therefore, other indices—like the *g-index, m-index*, and *contemporary h-index*—along with *field-normalized and alternative metrics*, are recommended to provide a more comprehensive and fair assessment of a researcher's scholarly influence.

Table 2. Benefits, Drawbacks and Alternatives of *h-index*

Features	Benefits	Drawbacks	Alternatives
Simplicity	Simple and intuitive single-number measure of productivity and impact	-Oversimplifies research impact -Ignores citation context or author contribution	-i10-index -Total Citations -Average Citations per Paper (CPP)
Balance (Quantity vs. Quality)	Balances publication count and citation impact	Penalizes researchers with few but highly influential papers, or many low-cited ones	-g-index -h_a-index
Comparative Use	Useful for comparing researchers within the same field or seniority	Misleading across disciplines due to differing citation practices	-Field-Weighted Citation Impact (FWCI) -Normalized Citation Impact (NCI)
Stability	-Not overly affected by one highly cited paper (HCP) -Reflects consistent output	-Hard to improve after a point -Insensitive to recent influential work	Contemporary h-index (hc-index)
Data Availability	Easily obtained from Scopus, Web of Science, and Google Scholar	Different databases report inconsistent h-index values	Cross-check using ORCID or multiple sources for reliability
Career Assessment	Widely recognized and used in academic evaluations	Encourages quantity over quality; ignores teamwork and mentoring contributions.	Combine with Altmetrics, Peer review, or Grant success rates for a holistic view
Time Sensitivity	Reflects long-term performance trends	Disadvantageous for early-career researchers with fewer publications	m-index (h-index ÷ years since first publication)

A legacy of transformation, not a tally of citations. Instead of relying solely on the *h-index*, a combined evaluation approach integrating the h-index, m-quotient (to adjust for career length), altmetrics (to capture societal and online impact), and qualitative peer review (to assess mentorship and non-traditional outputs) offers a more holistic measure of a medical researcher's impact [11]. Additionally, the *g-index,* which emphasizes HCPs [12,13], can complement this framework to reward exceptional influence. The measure of a scholar's life should be in the questions asked, the barriers dismantled, and the patients whose lives are bettered because of their work. We believe that the quantitative measures should inform, but not define, the broader narrative of scientific progress.

Moving forward, academic institutions and funding bodies should adopt multi-dimensional assessment frameworks that integrate bibliometric indicators with qualitative evaluations. Policies aligned with the San Francisco Declaration on Research Assessment (DORA) and Leiden Manifesto principles can guide this shift. Implementing field-normalized metrics, mentorship credits, and societal impact indicators would promote fairness and inclusivity. A balanced policy approach can ensure that research assessment captures innovation, collaboration, and real-world influence—beyond citation counts alone.

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Conflict of Interest

None to disclose by the authors

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Ethical approval

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Patient consent

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