



HAM-Index Instead of H-Index for Authors' Impact

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Dear Editor,

The most important index for evaluating and ranking the research activities of authors, scientists, and researchers is the H-index, which is defined in Scopus, Web of Science (WOS), Google Scholar, ResearchGate, and other databases (1). The H-index can be calculated manually or using an automatic calculator. The Scopus and WOS databases provide automated calculators. Since 2011, Google has also provided an automatically calculated H-index within the profile (1, 2). The H-index is a numerical index that attempts to show the productivity and scientific influence of scientists both quantitatively and qualitatively. It is used to rank and select winners in national or international festivals. Just as articles and journals are scored and credited based on certain indexes, the H-index has been considered for researchers to determine the scientific level of their published articles; however, the index has some flaws (2, 3).

In this letter, we introduce a new index called the HAM-index as a complement and an alternative to the H-index to address its shortcomings. In 2005, a physicist named Jorge Hirsch at the University of California proposed a method to evaluate researchers' scientometrics, which became known as the H-index, with "H" taken from the last name of Hirsch (4). The primary purpose of proposing this method was to show how each researcher was effective in their scientific field, and this evaluation was done through the number of citations to their published articles. Accordingly, the H-index of each researcher is based on the number of their articles (H), each of which has been referenced at

least H times. For instance, if the H-index of a researcher is 28, it means that they have at least 28 articles, each of which has been referred to at least 28 times in other published articles. However, this method also has deficits; for example, this index does not represent the impact of the research and is only a scientometric index in terms of the quantity and quality of the articles using citations to the researcher's articles (5-7).

Therefore, nowadays, with the greater importance of the impact of applied research at both the academic and general community levels, a new index should be considered to better present the impact of research, which the authors will discuss in this article. Despite the use of the H-index at the international level, the authors point out another important component that is not considered in the H-index. In other words, despite considering the quantity and quality of a researcher's articles, the H-index does not represent the research impact of an author. We believe that to accurately evaluate and rank researchers, authors, and scientists, the impact of research should also be considered. For this reason, we introduce a more comprehensive index called the HAM-index, which objectively represents the quantity, quality, and impact of an author's research and can replace the H-index.

In fact, in this new index, the authors try to consider all the effective and important factors for the evaluation of a researcher. HAM in Persian means together, which indicates the three components of quantity, quality, and impact. It also means mix, which again refers to the last three components. Additionally, HAM is the keyword of three of the proposers of authors' evaluation indexes:

Quantity and quality by Hirsch, and now impact by two authors of this article, which stands for HAM-index (Hirsch, Alinaghi, and Mehraeen).

Because in the hierarchy of medical evidence, systematic reviews (SR) are at the tip of the pyramid and provide the highest scientific evidence, used to prepare guidelines, and are also one of the foundations of evidence-based medicine (EBM), the number of SR articles that cited a researcher's articles can be used to assess the impact of an author's research. In other words, considering that SR articles are an objective indicator and are located at the tip of the pyramid, they are a suitable option for calculating the impact of research. Clinicians usually rely on SR to make medical decisions at the patient's bedside, so it is also known as a decision-making tool.

For this purpose, the HAM-index of each researcher is defined based on the sum of the H-index with the number of SR articles that cited a researcher's articles (of course, used in the SR table in the results section of the main text). For instance, if the H-index of a researcher is 3 and the articles of this researcher are used in one SR article, the HAM-index of this researcher will be 4 (3 + 1), and if 3 articles of this researcher are used in three separate SR articles, the HAM-index of this researcher will be 6 (3 + 3). Therefore, HAM-index = H-index (minus citations included in SR) + Impact-index (the number of SR that cited a researcher's articles).

It means that, the impact index is defined as "n" articles that are cited in "n" SR articles. Following the above example, if 5 articles by the author receive citations in one systematic review, the impact index becomes one, and the HAM-index is calculated as 3 (H-index) + 1 (impact index), totaling 4. Conversely, if one article by that author receives citations in 5 systematic reviews, the impact of that article remains one, and the HAM-index is again 3 (H-index) + 1 (impact index), equaling 4. In this formula, self-citation in the SRs of the researcher is not included, to prevent authors from writing SRs with the aim of self-citation and artificially inflating the HAM-index.

Today, extra-academic impacts have gained special importance in research, and one of the most important and objective measures can be the articles cited in the results tables of SRs. By including this criterion in the HAM-index, a comprehensive evaluation of scientists'

extra-academic impacts can be achieved. In general, to calculate the HAM-index, it is necessary to consider the quantity, quality, and impact, which can present a more complete summary of the short-term, medium-term, and long-term effects of scientists' work. Therefore, it is recommended to incorporate the HAM-index into databases, especially Scopus, Web of Science, and Google Scholar.

Footnotes

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