

Journal Impact Factor: Is it a valid assessment index for scientific literature?

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Impact factor of published journals is an index based on the frequency with which a journal's articles are cited in scientific publications. Journal Impact Factor, although used as an index of evaluation of scientific publications since the 1960s, has a room for argument regarding its role as a quantitative marker of scientific quality of a journal.¹ It is also being used to evaluate individual scientists and institutions for the purposes of academic evaluation and funding allocation. And more often it is used by the librarians in selecting journals for library collections.² However it has been much debated in the literature in terms of their value for evaluating research quality.^{3,4} Journal impact factor has its own limitations and adequate evaluation is warranted before it can be widely used as a quantitative marker of scientific quality of journal.

The Impact Factor had originally been designed to be an index of estimation of relevance of a scientific journal in respect to its publications and became popular in the scientific community.⁵ However impact factor has been misunderstood and abused by many institutions attributing too much of significance on information that is not entirely scientific or reliable.⁶

By definition the impact factor of a journal is the number of all citations of all the articles in one journal in a given year divided by the original research and review articles published in that journal during the two previous years. It reflects the average number of citations to articles published in the journal. Besides Impact Factors, the Journal Citation Reports also include other bibliometric measures, such as 5-Year Impact Factor, Immediacy Index, Cited Half-life, aggregate Impact Factor and so on.⁷ The 5-year journal Impact factor is the number of all citations of all articles in one journal in a given year divided by the original research and review articles published in that journal during the five previous years. This index is useful in fields where it takes longer than two years to circulate and react to research results. Immediacy index is the number of citations which the articles in a journal receive in a

given year divided by the number of articles published. It indicates how quickly articles in a journal are cited. Cited half-life is the median citation age of all the counted articles of a journal in a given year, starting from the time point where half of the citations were made and indicates how long-lasting the published research in a journal is.⁷

The aggregate Impact Factor for a subject category is calculated by the number of citations to all journals in the category and the number of articles from all journals in the category.

So far the Impact factor is concerned, there are not adequate studies on impact factor's validity as an indicator of quality. Journals' impact factors are determined by technicalities unrelated to the scientific quality of their articles.³ There are a good number of limitations of Impact Factor as a valid index of scientific quality. A number of self-citation is reported at different levels, including author self-citation, journal self-citation, and subject category self-Citation leading to increase the impact factor. An editor of a journal may encourage authors to cite articles from that journal in the papers they submit.⁷ Editorial policies of a journal may increase its impact factor instead of improving the scientific merit of the journal. Impact factors are calculated using citations not only from research articles but also review articles, editorials, letters, meeting abstracts, and case notes. Some of these publications provide the opportunity for manipulation of the ratio used to calculate impact factor. As the review articles are more frequently cited and inflate the impact factor of journals some editors may encourage the publication of increased number of review articles. Some publishers invite exclusively senior scientists to publish citable papers to increase the journal impact factor.

Impact Factor many a time, reflects the popularity of the particular topic of or citation and the availability of particular journal over wide area coverage. Journals with low circulation, in spite of their high scientific merit, are less likely to obtain high impact factors. The research fields also

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influence high impact factors in journals covering large areas of basic research. As a scientific language, English-language journals generally have a higher Impact Factor than journals published in other languages.⁶ Impact Factor has inadequate and uneven international coverage. Very few publications and journals from the less-developed countries are covered adequately.

The calculation of impact factor considers only average citation and as such a journal may have a few highly cited papers that greatly increase its impact factor in spite of the fact that the other papers in that same journal may not be cited at all. Therefore, there is no direct correlation between an individual article's citation frequency or quality and the journal impact factor. It is difficult for subspecialty journals to receive high Impact Factors. It is recommended that comparisons of Impact Factors and Impact Factor rankings should be performed under consideration of specialty areas.³

The impact factor is a useful tool for evaluation of journals, but it must be used discreetly. Despite the criticism, Impact Factor and citations get importance in recruitments, promotions, rewards and other recognitions. Eugene Garfield, who is the initiator of journal impact factor, stated very honestly after forty four years of inception of the idea "At that time it did not occur to me that it would one day become the subject of widespread controversy. Like nuclear energy, the impact factor has become a mixed blessing. I expected that it would be used constructively while I am recognizing that in the

wrong hands it might be abused".⁷ However we believe that impact factor is going to serve our purpose positively until some new and more effective tool is being formulated.

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