Editorial

Impact factor: Measure of quality of research publication

Whenever we conduct a piece of research, every one of us wants it to be retrieved beyond human life, hence we publish it in journal. The authors would like it to be published in a journal which is most valued so that it is read far and wide and cited by others for future research. The librarian chooses the most respected and read journals for the libraries due to limited financial resources so that library is full of quality journals. When clinician scientists appear for selection and promotion the curriculum vitae are evaluated. The credit is given for a published research work in a most valued journal. What is a most valued journal? How to ascertain most valued journal? It is inevitably difficult to quantify qualitative measures such as scientific excellance.[1] The prestige and standing of a journal used to depend on the reputation of editor, editorial board and the society it publishes, size of circulation, timeliness of publication, speed of handling the manuscript and rigor of peer review process. In the present era potential for online search and retrieval of article has added a dimension.

Impact factor (IF) is now being used to measure as an index of quality and prestige and is being increasingly used for ranking and evaluating the journals and judging the academic performance and the quality and importance of an individual research publication.[2] The IF is a product of the Institute of Scientific Information (ISI) of Philidelphia, PA. ISI founded in 1958, is an independent, non-governmental private company. This has a database which lists the contents of scientific journals published world wide. They calculate the number of citation of each paper within the database receives from other papers within the database. A paper which receives more citation is valued more. These data are published as the science citation index (SCI). Similarly the value of individual journal may be seen by reviewing this bibliographic data. It is called journal IF.[3]

The IF for a journal is calculated by dividing the number of citation received in a particular year for the number of articles published in preceding 2 years. This gives a numeric value. To calculate the IF of *Indian Journal of Orthopaedics* in the year 2011, the citations received in the year 2011 for the articles published in year 2009 and 2010 (numerator) will be divided by number of articles published in year 2009 and 2010 (denominator).

$$\text{IF in 2011} = \frac{\text{Citation in 2011 for the articles published in 2009 and 2010}}{\text{Number of articles published in 2009 and 2010}}$$

This IF of a journal is intended to measure how often, on an average, authors cite moderately recent articles from the particular journal.[4] The original papers, notes and review articles are included in the total of denominator while citation of original articles, notes, review articles, editorial, letters and meeting abstracts are included as numerator. The IF appearing in 2012 will reflect IF of 2011 of any journal for articles published in 2009 and 2010. The IF is listed in journal citation report (JCR) published around July-August every year.

Although IF is most common and widely used method to select a most valued journals. It is still far from the ideal. The journal published in English language[5] and having open access policy have higher IF as the articles are likely to be cited more. The basic science journal rank higher than the clinical journals. The review articles are cited more than original articles. The methodological articles are cited more than the articles which provide new data. The journals which publish the review articles are likely to have more citation.[1] The SCI covers not all journals and accuracy of the data in SCI cannot be ascertained. The IF also depends on the speciality. Rapidly developing specialties tend to have a higher IF.[6] The IF ranges from 0 (least cited) to 40(most cited) with median of 0.80 in year 2001.[6]

Although journal IF reflects the journal and not the quality of articles. The journals can manipulate the IFs by publishing more review articles than the original discovery although original articles are adding new knowledge based on methodologically conducted scientific study. The publication of mini reviews, letter to editor and abstracts which attract citations and are not counted as denominator.[1] Minor citation which is just a reference while a major citation where a new study is based on the previous articles gets the same weightage in calculating IF. It reflects the interest of researchers and not the quality or usefulness of the article.[5]

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The articles coming out with a path breaking conclusion may not be cited in 2 years and may take more number of years to be cited. Even a retracted article or articles negatively cite will get the same weightage. It is a general observation that American articles are cited more than that from Europe and seldom from Asia and Africa. IF does not differentiate in self citation and citation by others, minor or major citation. The higher IF does not mean that article is widely read. Some journal which has a high IF, not widely read globally publishes an article which is relevant to those geographical area where this journal is not accessible and knowledge could neither be used by clinicians e.g., if an articles on Tuberculosis of spine is published in less circulated journal from a country where TB spine is not common and will be of no use to those clinicians who are working in developing countries where TB spine is endemic and the journal in which it is published is not available. IF is not a reflection of readability of the journal (article). The IF is not a true representative of the papers in the journal as one might imagine. If the data is analyzed then 10-15% cited articles account for over 50% of all citations and 50% or less articles accounts for over 90% citations.[3] A relatively small number of articles account for 90% citation with in a journal leading to a high IF.[3] Any research which takes more than few years to be completed and once gets published will not add to citation index of referred articles and IF of the journal.

Although IF is not an ideal method to measure the quality of the articles but there is nothing better and it has the advantage of already being in existence and is therefore a good technique for scientific evaluation.[4] A questionnaire-based study was conducted where opinions were elicited from the physicians, specialized in internal medicine in US to assess the validity of IF as a measure of quality of general medical journals by testing its association with journal quality as rated by clinical practitioners and researchers.[6] They found a strong correlation between IF and physicians rating of journal quality. However, the correlation was higher for the research group than for the practitioner group.[7]

The citation and journal IF can be increased by publishing best research done by us in our own journal, by reducing the submission and publication time line, reading recent publications and writing letters to editors if some critical issues is missed by original author. The publication of abstracts will give a few citations and at the same time not counted as source item (denominator). Publishing invited reviews by subject experts, publishing less number of case reports and commissioning special issues with prestigious guest editors publishing best paper early in the year are other methods to increase the IF.[8]

The *Indian Journal of Orthopaedics* was included in Science Citation database in the end of year 2009. We shall be getting our first IF in 2011. We do not expect it to be high because our journal was only available on www.ijoonline.com but it was not included in the Pubmed. IJO was included in PubMed in Oct 2009 w.e.f. Jan 2007.[9] Hence our reach to the research community was very sparse. Our citation for year 2008 in 2010 are around 20 while if we count citation in 2010 for the year 2009 are almost doubled. Since 2 years which were counted for IF in 2010 were not available to us, hence we do not expect a very high IF. As the years passes by our citation will improve in the years to come. We as clinicians, teachers, and researchers have to submit our best original work to *Indian Journal of Orthopaedics* and critically reading the published issues and sending critical comments to authors.

Anil K Jain

Prof. of Orthopaedics,
University College of Medical Sciences & GTB Hospital,
Editor, Indian Journal of Orthopaedics, Delhi, India

Address for correspondence: Dr. Anil Jain,
Department of Orthopaedics,
University College of Medical Sciences, University of Delhi, Delhi, India.
E-mail: dranilkjain@gmail.com

References

1. Neuberger J, Counsell C. Impact factors: uses and abuses. Eur J Gastroenterol Hepatol 2002;14:209-11.
2. Jones A.W. Impact factors of forensic science and toxicology journals: what do the numbers really mean? Forensic Sci Int 2003;133:1-8.
3. Makeham JM, Pilowsky PM. Journal Impact Factors and Research submission pressures. ANZ J Surg 2003;73:93-4.
4. Mathur VP, Sharma A. Impact factor and other standardized measures of journal citation: A perspective. Indian J Dent Res 2009;20:81-5.
5. Nayak BK. The enigma of impact factor. Indian J Ophthalmol 2006;54:225-6.
6. Smith G. Impact factor in anaesthesia journals. Br J Anaesth 1996;76:753-4.
7. Saha S, Saint S, Christakis DA. Impact factor: A valid measure of journal quality? J Med Libr Assoc 2003;91:42-6.
8. Cookson Road. Making the impact factor work for you: a case study. ALPSP Advice Note No. 26
9. Jain AK, Sahu D. The Indian Journal of Orthopaedics: The journey so far. Indian J Orthop 2010;44:1-4.

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