

# Impact Factor of Medical Journals

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## ABSTRACT

Impact factor, which is a measure of the frequency of citation of articles published in a journal over a specified time, measures the rank or importance of a journal. There is a trend towards publication of high quality research in journals with high impact factor. This paper has outlined the importance, method of calculation, clinical implications, pitfalls and financial issues related to the impact factor of medical journals.

## INTRODUCTION

There are approximately 30000 journals included in the PubMed journal list of the United States National Library of Medicine and over 28 million citations on biomedical literature are recorded in the PubMed. Every year, several new journals on all medical specialties are being added up on the list.<sup>1</sup> Journals are published either by well-established academic institutions and societies or private organisations. The common goal of all medical journals is to disseminate new scientific knowledge and evidences amongst the clinicians and researchers for betterment of the patient care and improve the outcomes of treatment they receive. However, there has been a significant rise in the number of privately-funded open-access medical journals with associated commercial intentions.

Published articles provide different levels of evidence, which may include systematic reviews and meta-analysis (Level 1a), prospective randomised controlled trials (1b), cohort studies (Level 2), and case reports and case series (Level 3). These articles are cited by researchers in their new publications relevant to their research to compare and contrast their works with previously published research. The importance, quality, reputation or the prestige of journals in their fields is measured objectively by calculation of Impact factor (IF).<sup>2</sup> After using journal statistical data in-house to compile the Science Citation Index for many years, Eugene Garfield from USA devised the concept of IF in 1955.<sup>3</sup> He was the founder of the Institute for Scientific Information (ISI®), which is now part of Thomson Reuter, which is a large world-wide US-based publisher. IF is calculated each year by the (ISI®), for those journals which are indexed with it

and are published in the Journal Citation Reports (JCR®).<sup>4</sup> Since the year 2008, ResearchGate (RG), a Germany-based database and social network service, has records of several thousand publications registered by individual researchers and has been calculating IF for journals as well as individual researchers in the form of an “RG Score”.<sup>5</sup> This paper aims to outline the importance, method of calculation, clinical implications, pitfalls, and financial issues related to the IF of medical journals.

## CALCULATION OF IF

Impact Factor is a measure of the frequency with which average article in a journal has been cited in given period of time. The IF for a journal is calculated based on a three -year period and is considered to be the average number of times published papers are cited up to two years after publication.<sup>6</sup> For example, the 2017 IF for a journal is calculated as follows:

X = the number of times articles published in 2015-2016 were cited in indexed journals during 2017

Y = the number of articles, reviews, proceedings or notes published in 2015 -2016

2017 Impact factor = X/Y

It is to be noted that the 2017 IF is actually published in 2018, because it could not be calculated until all of the 2017 publications have been received.

## CLINICAL IMPLICATIONS

Impact factors of some of the popular health-related journals is listed in Table 1.<sup>4</sup> The New England Journal of Medicine and The Lancet have maintained their highest IF over last few decades.<sup>7</sup> It is true that majority research works, which are likely to make significant

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impact in clinical practice get published in journals with high IF and these journals are readily accessible to institutions and personnel who have subscriptions to these journals. Otherwise, gaining access to any article, which do not have open access, requires payment of a fee which differs from one journal to another. Citations of the properly conducted original research works which provide high level of evidence are more likely to get cited in subsequent publications as compared to research papers with low level of evidence.

The disadvantage of inaccessibility of important publications for clinician published in journals of high IF may have negative impacts on the clinical applications of the recent advances in clinical medicine. For the clinicians practicing in underprivileged countries may not have immediate access to the majority of journals of high IF, thereby disadvantaging them significantly in application of recent developments in their specialties for the benefits of their patients.

**Table 1. List of medical journals and their IF in the year 2017.**

Name of the journal	Impact factor
New England Journal of Medicine	72.40
The Lancet	47.83
Journal American Medical Association	44.40
Nature	40.13
British Medical Journal	20.78
Annals of Internal Medicine	17.13
British Journal of Anaesthesia	6.23
American Journal of Transplantation	6.16
British Journal of Surgery	5.89
American Journal of Surgery	2.61
Journal of Nepal Medical Association	0.04
Journal of Nepal Health Research Council	Not available
Kathmandu university Medical Journal	Not available
Nepal Medical College Journal	Not available

Papers published in journals with high IF are usually of higher qualities in terms of their level of evidence, which, however, may not always be true with every single article published in a journal with high IF. Several papers published in reputed journals are associated with flaws in their methodology, results and conclusions, which, therefore, have to appraised critically by the readers before accepting their validity and clinical relevance on the basis of publication in a journal with high IF.<sup>8</sup> The experience and expertise of the peer-reviewers play

vital role in the selection and the final form of the published manuscript, which has to borne in mind while appraising a paper.

#### WAYS TO INCREASE IF

Journal IF does not necessarily reflect the actual quality of the journal, because it is unclear whether the number of citations paper gathers measures its actual quality or simply reflects the sheer number of publications in research and whether there is any difference between them. Some journal may publish a large percentage of review articles, which are usually cited at least once within three years of publication, whereas many research articles remain uncited after three years. Therefore, IF can be manipulated by the editorial policy of the journal as review articles can raise the IF of the journal. Several journals notify the authors to cite as many papers from their journals as possible prior to the acceptance of the manuscript to increase the IF. Therefore, IF may be used inappropriately as surrogates in evaluation exercises and may simply reflect the ability of the journals and editors to attract best papers available.<sup>9</sup>

#### COST FOR OPEN ACCESS

Journals with high IF are more often purchased by libraries and are therefore more often available to researchers free of payment than low IF journals, which influences the IF positively. This positive influence has not, however, been shown specifically for papers published in open access journals, which are universally accessible, and do not need library purchase. It is therefore important to appreciate that IF influences citations in open access journals too.<sup>10</sup>

For temporary access or downloads of papers from the unsubscribed journals, payments have to be made on an individual basis, which usually ranges from 30-40 US dollars per paper. Papers can be made readily accessible to readers by publishing them in open-access journals or by paying a fee to make them open access. The article processing charge may range from 1000- 3200 US dollar per paper. It is very likely that open access to the full-text of articles can lead to increased citations and corresponding increment of IF.

#### IMPACT FACTOR OF NEPALESE MEDICAL JOURNALS

Of all medical journals published in Nepal, Journal of Nepal Medical College Association (JNMA) has the longest history of its publications over 55 years and has gained an IF of 0.04 in 2017 (Table 1). Majority of medical journals published from various medical institutions and specialties have not been successful in attracting an IF, which is largely due to lack of articles those would be considered suitable for citation by the authors

from different parts of the world in their publications. Visibility of published works to the authors writing up a manuscript is paramount. To build up IF by Nepalese journal, the authors submitting manuscripts should be encouraged to publish as many high-quality original and review articles as possible and cite relevant papers published in the respective Nepalese medical journals.

### CONCLUSIONS

The IF of a journal does reflect the quality of paper published and its popularity among readers which is assessed by the frequency of citations of articles published in a set period. However, there are limitations of IF, which must be borne in mind while appraising published literature prior to implementing them into clinical practice.

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