



## Regulatory Guidelines to Publish a Medical Research Article - A Current Scenario

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### ABSTRACT

A scientific research should help in improvement of our understanding to improve quality of human life. Writing a research article and getting it published in a suitable journal ensures recognition and career advancement. A new researcher faces a lot of difficulties while trying to publish the research results in a reputed journal. Recently several indexed “predatory” journals have mushroomed in India and they are accepting articles without a blinded peer review which is not beneficial for researcher. The standard impact factor (IF) scoring for a journal has been debatable and so has been the authenticity of indexing. Awareness regarding recent guidelines is required for a valid research. MCI publish guidelines regularly to help scientific researcher to meet sustainable developmental goals. This article analyses the concepts of publishing an article by using the recent guidelines used by various reputed and indexed journals.

**Keywords:** Indexing, Impact Factor, MCI guidelines, Peer Review, Predatory Journals.

### INTRODUCTION

Research is a creative work undertaken by researchers to seek answers of questions that arise in their brain. The results of research studies are published in scholarly journals primarily to share the new findings with a larger peer group and ultimately to increase the stock of knowledge. The old dictum “publish or perish” suggests the critical role of publishing research in academics. The newer version, “publish and flourish”, suggests that publishing solid scientific research is good for individual researchers and good for the scientific community.<sup>1</sup> Linking publications with academic advancement might benefit both the individual researcher and the society. But, in India, insistence on a certain amount of published research to maintain teaching credentials may lead to the phenomenon of ‘publish or perish’.<sup>2</sup>

The Medical Council of India (MCI) publishes circular and guidelines for appointments and promotions of teachers in medical institutions in India. On 7th June, 2019, the MCI issued a circular to amend the Minimum Qualifications for Teachers in Medical Institutions Regulations; 1998. These regulations may be called as “Minimum Qualifications for Teachers in Medical Institutions (Amendment) Regulations, 2019”. Publication of a research is an essential requirement for academic promotions (Table-1). As per the recent guidelines of MCI, publication of two papers in indexed journals is obligatory for promotion to the post of associate professor, as first author or as corresponding author and for further promotion to the post of professor two more papers are needed to be published during the tenure of associate professor as first author or as corresponding author.<sup>3</sup>

**Table 1:** Guidelines for counting research publications for promotion of teaching faculty of medical colleges/ institutions in India as laid down in an order by the Medical Council of India in September 2015\*<sup>4</sup>

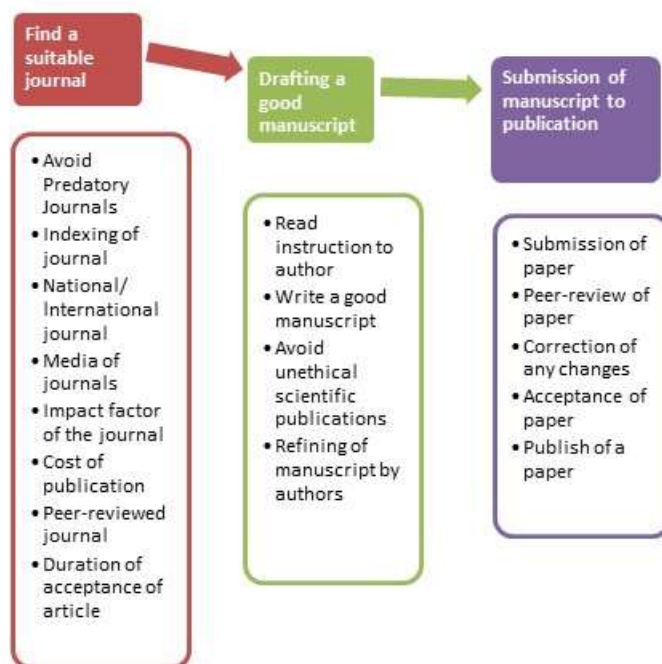
Sr. No.	Title
1.	Index agencies: Scopus, PubMed, Medline, Embase/ExcerptaMedica, Index Medicus, and Index Copernicus
2.	Types of articles to be considered: Original research articles and original research papers
3.	Criteria for National/International journal: Published by a National/ International- specialty journal/ journal of a national/ international society provided it included in one of the indexes mentioned above
4.	Authorship: First author, second author
5.	E-journals: E-journals not included

\*The above would also be applicable for “accepted for publication” papers/articles

### How to publish an article?

A new researcher finds difficulties in search of a suitable journal for publication of the research work. Getting published isn't easy but it is also vital to find a suitable academic journal for research topic to increase chances of publication and wider recognition. The purpose of research will fail if the knowledge gathered is not communicated to the scientific world. An author faces a dilemma as he/she weighs the advantages of lower rejection/ faster turn-around time of a small journal versus

the higher rejection rate and may be long waiting period (for publication after acceptance) by a 'high impact' journal. There are mainly three steps to publish a research article in a peer reviewed journal (Fig-1).



**Figure 1:** Steps to publish a research article

## 1. FINDING A SUITABLE JOURNAL

Choice of a suitable journal is a multifactorial approach. India has nearly 450 medical colleges that include nearly 100 teachers in each college. Each of these nearly 45,000 teachers may need to publish a research paper every three years translating to around 15000 research papers per year. In addition, around 20000 students join a medical postgraduate course yearly has to compulsorily do a thesis. Assuming a scenario that each thesis results in a paper with a student and his teacher-guide as the two eligible authors would generate at least 20000 new research ideas every year. As per the above data, publishing every research article in a standard journal will be a formidable task. Students and young researchers should be closely supervised by senior mentor with knowledge and expertise in performing the research and publishing it thereafter. All submissions, as a rule, must be reviewed and approved by all authors involved in the study after which the target journal is carefully selected.

### Factors to choose a suitable journal

#### 1. Avoid Predatory Journals

The term 'predatory publishers' was coined by American librarian Jeffrey Beall who developed his own blacklist of predatory open-access journals.<sup>5</sup> Predatory publishing is defined as publication of scholarly articles in open access journal without a proper peer-review process by experts in the field. Such journals have no standards and no quality control and frequently publish within a very brief period of time while claiming that articles are peer-reviewed. Such

publishers collect article processing charges and provide rapid publishing. Predatory publishers frequently choose names and logos that are very similar to the reputed legitimate peer-reviewed journals.<sup>6</sup> Additionally, the names of such journals are often misleading with strong preference to start with 'International', 'American' or 'European'; such publishers use e-mail addresses that end in gmail.com, yahoo.com or other free e-mails.<sup>7</sup> The serious ethical issues around predatory journals include misrepresentation; lack of editorial and publishing standards and practices; academic deception; waste of research efforts and funding; lack of archived content; and undermining confidence in the research literature.<sup>8</sup> An analytic database launched in 2014 by the Nature Publishing Group has highlighted the growing research output from India's research outputs since 2012 and that India ranks 13<sup>th</sup> for its high-quality scientific publications among a selected group of 68 high quality scientific journals.<sup>9</sup> A recent paper published in Nature journal in September 2017 found that authors from India accounted for 27% of the 1,907 papers published in predatory journal.<sup>10</sup> The publication pressure among researchers and lack of monitoring the research being conducted are the major factors contributing to articles published in poor-quality predatory open access journals from India.<sup>11,12,13</sup> Unfortunately, there is no validated mechanism to reliably define or identify fake, predatory, or pseudo journals.<sup>14</sup> To help the researchers in choosing the right journal for publishing their research work, a movement called as "Think Check Submit" has been started by representatives of different publishing groups across the globe.<sup>15</sup> A new Researcher must be aware of the existence of fake, predatory, or pseudo journals and avoid submitting research to such journals for publication or citing their content.<sup>16</sup>

#### 2. Indexing of journal

Indexed journals are considered to be quality journals and they have higher scientific quality as compared to non-indexed journals. Indexing is based on the journals scientific policy and scientific quality.<sup>17</sup> The 2017 MCI Amendment states that in order to be eligible for assessment, a paper must be published in 'indexed' journals that should be listed in a recognised database like **Scopus, PubMed, Medline, Embase/ Excerpta Medica, Index Medicus and Index Copernicus**. However, these databases have their flaws. Index Copernicus was last updated in 2014. Some authors like Beall said that it had limited value because they had identified some potentially predatory in its database.<sup>18</sup> Although the MCI's order lists Medline and Index Medicus separately, both are actually same database.<sup>19</sup> Similarly, Pubmed is not a database but a search engine that searches various databases including Medline and Pubmed Central. MCI guidelines does not include Science Citation Index, an important database currently published by Thomson Reuters and Indmed, a database for the Indian medical journals, curated and maintained by Indian Council of Medical Research (ICMR).

### 3. Criteria for national/international journal

The MCI guideline states that article should be published in one of the indexes mentioned in MCI regulations irrespective of National/ International site of publication. It states that inclusion of words such as “India” or “Indian” in the title does not necessarily make a journal of lesser quality. Similarly, the presence of words such as “international”, “global” or “world” in a journal’s name does not confer it with a higher quality.<sup>20</sup> National journals are in fact more likely to publish research that is relevant to the local population. International journals published from UK, USA, Japan, Australia and other developed countries by Elsevier, Wiley, Springer, Lippincott Williams and Wilkins, Wolters Kluwer, etc. are considered as good journals. They are indexed in standard indexing system and they also have good impact factor.

### 4. Media of Journals

Journals are basically of three types-based upon publication style- online journal, print journal and one which uses both versions of publication methods. Online Journals are published online only and do not have a print issue. Print journals are available in printed form like a magazine. Journals that use both publication methods have articles which have the same content in different format. However, not all print journals have an e-version, and not all e-journals are available in print. ISSN (International Standard Serial Number) is a number assigned to media version of journals which are published serial wise volume. A different ISSN is assigned to print and online version (E-version) of journal. The ISSN system refers to these types as **print ISSN (p-ISSN)** and **electronic ISSN (e-ISSN)**, respectively. Although ISSN does not indicate standard of journal, but it is still important to know if a journal has different ISSN for different media version of publication. The severe impact of publications in predatory journals compelled MCI to exclude use of E-journals for promotion of teaching faculty in medical institutions.<sup>21, 22</sup>

### 5. Impact Factor of the Journal

Impact factor (IF) is average number of citations per article published in the journal which is based on performance in previous two years<sup>23</sup> IF of journals is calculated by Thomson Reuters and analysed in Journal Citation Reports (JCR). JCR is an annual publication of quantitative evaluation of journals by Clarivate Analytics (previously the intellectual property of Thomson Reuters). For example, the impact factor 2019 for a journal would be calculated as follows:

A = the number of times articles published in 2017-18 were cited in indexed journals during 2019

B = the number of articles, reviews, proceedings or notes published in 2017-2018

$$\text{Impact factor 2019} = A/B$$

A recent example is Indian Journal of Pharmacology (IJP) whose impact factor has recently increased from 0.902

(JCR- 2017, Clarivate analytics) to 1.04 (JCR-2018, Clarivate analytics).<sup>24</sup>

A journal having an impact factor value of more than one is considered as a standard and internationally competent irrespective of the place of their publication.<sup>25, 26</sup> Some journals project their impact factor on their website or cover page. They are not often assigned by Thomson Reuters and are usually given by some other agency or calculated by themselves. Such journals are not considered as standard journals.

### 6. Cost of Publication

Academic journals/publishers can be classified into two main types: free/ non-paid journals and paid journals. The paid journal publication is broadly categorized into two models: ‘reader pays model’ and ‘author-side pays model’. In ‘Reader pays’ model, publishers obtain their revenues from subscription fees charged to libraries and individual users. In ‘Author-side pays’ model publishers obtain their revenues through article processing charges from the authors who pay to make their articles open access (OA) to the readers.<sup>27</sup> Open access increases the visibility and ease of use of information. The popularity of such journals is alarming because of increasing predatory journals/predatory publishers.<sup>28</sup>

### 7. Peer-reviewed Journal

Peer-reviewed is the evaluation of research paper by one or more person of similar competence to the authors of the research paper, who is neither the author nor the editor, to decide the scientific quality, validity, originality and publication potential of publishing article. The objective is to maintain the scientific integrity and weed out poor quality articles.<sup>29</sup> It is highly important to check for peer review process before submitting the research. Publication in journals which are not peer – reviewed is not creditable as per guidelines.

### 8. Duration of acceptance of article

Majority of the Indian journals and some international journals have a lengthy process of acceptance and publication. This is not suitable for a time bound programme. Some journals also provide a fast track peer review process under some pre-specified conditions.

## 2. DRAFTING A GOOD MANUSCRIPT

### 1. Read instruction to author

Based on your target reader audience, the author needs to develop a list of three to five journals, and arrange these journals according to their impact factor. Author must take a look at journal acceptance/rejection rates and average time taken for acceptance/ publication. Manuscript is submitted to one journal at a time, starting from the top of the list. Every journal has online availability of instructions for authors. These instructions describe the types of articles that the journal publishes and provides specific advice about format, word length, as well as what needs to be included in a cover letter at the time of submission. It is



advised to consult the past issues of the targeted journals to see examples of the different types of articles published and types of research topic that were covered in the targeted journal.

## 2. Writing a good manuscript

After the target audience and targeted journal requirements are identified, the first draft is created to establish a logical, compelling storyline for a scientific manuscript. Authors are encouraged to follow reporting guidelines for the type of study conducted to ensure that specific reporting requirements are duly met (Table-2).

The manuscript of articles reporting original research is usually divided into Introduction, Methods, Results, and Discussion sections. This so-called “IMRAD” structure is not an arbitrary publication format but a reflection of the process of scientific discovery (Table-3). Other types of articles, such as meta-analyses, may require different formats, while case reports, narrative reviews, and editorials may have less structured or unstructured formats.

**Table 2:** Reporting guidelines of main study types<sup>30</sup>

Sr. no.	Initiative	Full form	Type of Study
1.	CONSORT	Consolidated Standards of Reporting Trials	Randomized controlled trials
2.	STARD	Standards for Reporting of Diagnostic Accuracy Studies	Studies of diagnostic accuracy
3.	QUOROM	Quality of Reporting of Meta-analyses	Systematic reviews and meta-analyses
4.	STROBE	Strengthening the Reporting of Observational studies in Epidemiology	Observational studies in epidemiology
5.	MOOSE	Meta-analyses of Observational Studies in Epidemiology	Meta-analyses of observational studies in epidemiology
6.	PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses	Systemic reviews and meta-analyses
7.	CARE	Case Report Guidelines	Case report
8.	ARRIVE	Animal Research: Reporting of In Vivo Experiments	Animal preclinical studies

**Table 3:** The basic structure of the manuscript<sup>31</sup>

Sr. no.	Subtopics	Contents
1.	Abstract	<ul style="list-style-type: none"> <li>Specific with recommended word limit according to the journal’s guidelines (usually word limit is &lt;250) without any reference citation</li> </ul>
2.	Keywords	<ul style="list-style-type: none"> <li>3–10 keywords (words registered under Medical Subject Heading of National Library of Medicine database)</li> </ul>
3.	Introduction	<ul style="list-style-type: none"> <li>Provides information about the background of the problem (what is known) and its current state (what is unknown) and the gaps in the literature that is going to be filled by research study</li> <li>The summary of the literature is done in the present tense, as it represents generally accepted facts and principles</li> </ul>
4.	Methods	<ul style="list-style-type: none"> <li>Describes how the study was conducted in headings of design, methodology and feasibility to replicate</li> <li>The Methods section is described in the past tense (as it describes what you did)</li> <li>Authors and institutional identity should never be disclosed in the main manuscript as majority of the journals follow a double blinded, peer reviewed process</li> <li>If scoring sheets or scales are used, one should ensure that they are validated and should have scientific support</li> <li>Describe the procedures and statistical tests used in detail and the rationale for choosing these</li> </ul>
5.	Results	<ul style="list-style-type: none"> <li>The results section describes what was found in the study in the same sequence of information established in the Introduction and the Methods sections</li> <li>Results should be described in the past tense (as they describe what you found)</li> <li>There should not be any overlapping in the text material and the table content</li> </ul>
6.	Discussion	<ul style="list-style-type: none"> <li>Interpret your findings in light of possible biases or sources of errors</li> <li>Compare findings to other studies with similar or different findings</li> <li>Consider both the strengths and weaknesses of your study</li> <li>Consider the implications and identify the next steps</li> <li>The discussion is described in past, present or future tense depending on context</li> </ul>

### 3. Avoid unethical scientific publications

Unethical scientific publications include incomplete reporting, reporting of fraudulent data, plagiarism, duplicate publication, overlapping publications. Incomplete reporting is selective reporting of findings or not reporting at all. It is important to report negative data, or any unexpected finding.<sup>32</sup> Reporting of fraudulent data is an untold harm by undermining public confidence in research study. Duplicate publication is publishing an article that is the same or overlaps substantially with another article by the author or publisher. It may result in double-counting of data. This is to be distinguished from co-publication, which is when the same article is published in more than one journal at approximately the same time to increase reach to different disciplines.

Overlapping publications is a variant of duplicate publication. It typically occurs with multi-centre trials and is characterized by publications from single centres, several centres as well as all centres. This can lead to double-counting of data and distorts the perception of the result of the evidence.<sup>33</sup> It may be appropriate to have more than one publication come from a multi-centre trial, but this is usually to address secondary outcomes. Secondary publications should cite the primary analysis and all publications of trials should identify the trial registration number.

Some journals suggest that failure to publish the result of research is also unethical practice. It can create bias in the published record.<sup>34</sup>

#### Plagiarism

Incorporating other's ideas or research results into any manuscript needs to be done with appropriate referencing. Among different forms of plagiarized content,<sup>35</sup> verbatim plagiarized content and inadequately paraphrased content can be checked online. Journal editors routinely check manuscripts with anti-plagiarism software before determining a manuscript's appropriateness for peer review in any stages before, during, or after peer review process. Free software programs are available for authors to check for duplication of content<sup>36</sup> such as CopyScape, DupliChecker, Plagiarisma, Plagium, Search Engine Reports, SEOTools, Site Liner and Unplag. The acceptable extent of plagiarism depends on core ("abstract, summary, hypothesis, observations, results, conclusions, and recommendations") and noncore areas (i.e., other areas such as introduction and methods). University Grants Commission (UGC) draft guidelines propose a policy of "zero tolerance" of similarity in core areas, whereas for noncore areas, up to 10% similarity may be permissible, with increasingly higher penalties for 10%–40%, <40%–60%, and <60% (Level 1, 2, and 3, respectively).<sup>37</sup>(Table-4)

**Table 4:** Penalties in case of plagiarism in academic and research publications<sup>37</sup>

S. No.	Level of plagiarism	Penalty
1.	Level 0: Similarities up to 10%	Minor similarities, no penalty
2.	Level 1: Similarities above 10% to 40%	Shall be asked to withdraw manuscript
3.	Level 2: Similarities above 40% to 60%	<ol style="list-style-type: none"> <li>1. Shall be asked to withdraw manuscript</li> <li>2. Shall be denied a right to one annual increment</li> <li>3. Shall not be allowed to be a supervisor to any new Master's, M.Phil., Ph.D. Student/scholar for a period of two years</li> </ol>
4.	Level 3: Similarities above 60%	<ol style="list-style-type: none"> <li>1. Shall be asked to withdraw manuscript</li> <li>2. Shall be denied a right to two successive annual increments</li> <li>3. Shall not be allowed to be a supervisor to any new Master's, M.Phil., Ph.D. Student/scholar for a period of three years</li> </ol>

### 4. Refining of manuscript by authors

Manuscript writing is a team effort, so primary draft of manuscript needs to be circulated for input by all the co-authors. An unblinded internal peer review by authors may help to strengthen manuscript before undergoing the blind external peer review conducted by the editorial board of the journals. Every author should contribute in drafting a good manuscript. Authorship has been defined by the International Committee of Medical Journal Editors (ICMJE) as those who meet all of the following four criteria: 1) Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; 2) Drafting the work or revising it critically for

important intellectual content; 3) Final approval of the version to be published; 4) Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.<sup>34</sup> The collection of data or the development of software for a study are not criteria for authorship, nor is securing research funding; however, these are important contributions that should be acknowledged. Some unethical practices in authorship include guest authorship (including someone as an author who does not meet the ICMJE criteria) and ghost authorship (excluding someone as an author who does meet the ICMJE criteria).<sup>38</sup> MCI guideline limits credit to only the first two

authors of a paper to weed out the malpractice of gift authorship. The first name in a paper is generally associated with the person who did the maximum work, with the last name being that of the supervising senior. The MCI guideline suggests that other names except the first two on the by-line are those of “guests”.

### 3. SUBMISSION OF MANUSCRIPT TO PUBLICATION<sup>39</sup>

#### 1. Submission of paper

Once all the authors sign off on the final version of manuscript, it is submitted in the journal of choice with a short cover letter stating that the manuscript has not been published previously and is not under consideration by any other journal. It also advised to briefly explain why the manuscript is relevant to the journal’s readers as it can influence the editor’s decision for further peer review process. Common reasons for rejection are that the topic is out of scope of the journal, gross errors in the methodology, low evidence of research, incomplete or very old references and excessive plagiarism. The author in this stage can receive a polite rejection letter. Editor may also suggest changes before it is further peer-reviewed.

#### 2. Peer-review of paper

All manuscripts which pass the initial screening are sent for a formal external peer review. The usual practice involves 4–5 reviewers. Reviewers include a mix of subject experts whose names are already included in the reviewer’s database. External review is the most important part of the whole submission to publication process.<sup>40</sup> Reviewer’s comments is sent with the decision of rejection so that authors can improve their manuscripts before repeat submission.

#### 3. Correction of any changes

After the peer-review stage, the manuscript sent for revision should be duly attended on point to point basis as per the reviewer’s and editor’s comments. Author could receive a “revise and resubmit” letter, which means that extensive revisions are needed. In either case, it indicates an interest in a revised manuscript. Once revised, a final check of the abstract is done to ensure it still reflects the revised text. Submission of revised manuscript to journal is done after sign-off by all the authors. When the manuscript is sent for revision, authors are requested to respond to each query raised by the reviewers in a point-wise manner and in a tabular format. Based on the author’s response to reviewer’s comments, the manuscript is either pre-accepted or sent for re-revision for unanswered/left-over comments or rejected. Like the review process, this cycle may have to be repeated a number of times till a final decision is taken. A delay at this stage is usually a late or an inadequate/ incomplete response from the authors which needs to be avoided.

#### 4. Acceptance of paper

Once there is no query left, the manuscript is finally accepted. At this stage, a copy is sent to the authors so that

they can check and make corrections in the manuscript, if needed or reply to the queries, if any, raised by the publisher. A total of three proof readings of each manuscript are carried out to remove any minor mistakes till it is hoisted on the web. The fourth and final proof reading of the manuscript is done before it goes for print.

#### 5. Publish of a paper

Publishing an article is satisfactory for researcher because it pays of its hard work in terms of enhancing the knowledge and growth in academic career.

### CONCLUSION

Scientific knowledge is based on facts and findings from research which have been conducted in the past. Research findings which are not shared with world are considered incomplete. Publishing scientific articles is beneficial for an author as well as the reader. New researcher should know where and how to publish an article. The author should be aware of the recent guidelines to avoid chances of rejection. He must be aware of the existence of predatory journals to avoid chances of unethical use of their knowledge. By following all the recent guidelines an author comes to know about his roles and responsibilities and approach a reputed journal. This article may help a new researcher to write a scientific article correctly and to improve its chances of acceptance for publication in a peer-reviewed journal.

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