

Publishing Research Papers in Peer Reviewed Journals: Guidelines to Pharmacists

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ABSTRACT

Publishing papers in peer-reviewed journals bring laurels to the pharmacists. While writing a paper, the author has to think carefully, then collect the subject matter, identify that who will read their paper?, to which journal this paper suits?, what type of paper has to be prepared? and to whom the authorship can be given?. The sections of research papers are the title, abstract, introduction, methods, results, discussion, conclusion, acknowledgements, references, tables and figures. The information written in one section should not appear in another section. It is always better to start writing the method section first, followed by results, discussion, and then introduction, whereas abstract can be written at the last. It is the bound duty of the authors to take intellectual and ethical responsibility of the paper. To increase the possibility of publication, the author should thoroughly check the manuscript and follow the journal's "instructions to author" page. After submitting the paper to the editorial office, it will be sent to the experts for peer reviewing, where reviewer may put several queries before accepting the paper.

1. AN OVERVIEW

The vital part of research is publishing new experimental results in scientific journals, which provide the information to researchers and students; that helps them to interpret their own results. The scientific paper is a published report, which explains the results of original research work. The standard journals accept the papers for publication only after peer review by an experts. In the current scenario, pharmacists can get promotions, grants for further research work, awards, recognition and opportunities for research work at abroad by publishing quality papers in standard journals.¹ Many pharmacists in the industry and academia are engaged in preparing educational materials, where they monitor medical literature, analyze drug promotional materials and communicate this information to doctors and patients, whereas some pharmacists are involved in writing reviews for pharmacy and therapeutics committee and drug use evaluation reports. Though they do all these jobs, some are hesitating to write scientific papers for publication; the reason may be 'starting trouble' and the pharmacists, who have just started their career, may not know about publication ethics². Therefore it is essential to provide the basic information on scientific writing

and publication ethics to junior pharmacists, hence timely this article.

2. PRE-WRITING PROCESS

The pre-writing process includes the identification of subject, readers, specific journal, type of paper and authorship. The research papers should reflect some message to the readers and it must be worthy of publication. By using sophisticated writing, one cannot mask the poor results. In the pre-writing stage, the author should conduct a detailed literature survey on the selected topic and collect all the subject materials.

2.1. Searching the specific journal

An author can search specific journals by browsing through journals in the E-library and by going through *current contents* and author should know which types of papers are published in those journals. Some journal editors may ask authors to contact them for the help in searching for suitability of a paper; if author writes an e-mail or letter to the editor, he/she will get immediate reply. Official society journals are considered as standard than commercial journals. The authors should check the impact factor for individual journals, which reflects the quality of a journal; impact factors for various journals are available in *journal citation reports* (JCR), which is an annual volume in *science citation index* (SCI). The peer review of

papers can give the quality but there will be delay in publication. The peer-reviewed journals require at-least 6 to 12 months to publish a paper; whereas non-peer reviewed commercial journals require 2 to 3 months. But today many journals are permitting on-line submission of papers for quick publication process. After selecting a specific journal, author should go through the journal's "instructions to contributors" page, which contain the information on journal's style, ethical issues and procedures for paper submission. Further authors are advised to read the manuals, papers and books which, provide information on preparation and submission of research papers^{3,4}.

2.2. Searching the journal impact factor

Impact factor is a quantitative tool for ranking, evaluating, and comparing the journals. It is a ratio between citations and recent citable items published. Publishing papers in journals with high impact factor gives more credit to the authors. It also provides qualitative evidence for editors and publishers for positioning their journals in relation to the competition. Table 1 narrates the impact factors of some pharmacy journals for the year 2006. The impact factor of a journal can be calculated by as follows;

A = Citations in 2006 to papers published in 2004-2005. e.g., 55

B = Self-cites in 2006 to papers published in 2004-2005. e.g., 13

C = (A-B) excluding self-cites. e.g., 42

D = Papers published in 2004-2005. e.g., 25

The impact factor for the year 2006 = $C/D = 42/25$
= 1.68

2.3. Who should be an author?

It is most embarrassing part to the researchers that, to whom authorship can be given? A person who takes intellectual responsibility and ethical aspects of the paper can become an author⁵. Author should be actively involved in the design of study and its final analysis. An author may or may not write the whole manuscript, but he/she should actively contribute to the study. A team approach is always useful in preparing scientific manuscripts,⁶ but the multiple authorship may results will results in dilution of paper's quality. The principal or departmental head who approves the protocol or give permission to work, but does not participate in the study is not eligible for authorship, one can recognize them through an acknowledgement⁷. There are no universally accepted guidelines on authorship; it is believed that the first author does most of the table work and writing, last author will be senior investigator and additional authors usually perform specific work during the period of study. The senior investigator

has to take the responsibility of correspondence with journal office.

3. UNETHICAL PRACTICES

The work to be communicated to journal should be honest because the system of scientific publication is based on integrity and trust; neglecting the values will seriously affect the pharmacy profession. The authors should take care not violate the ethical principles while communicating the papers. Generally no scientist or author is officially educated what is ethical and what is unethical, one has to learn somehow. Since it is the author's responsibility, they should be aware of the unethical practices in communications.

Almost all biomedical/pharmacy journals say that the manuscript submitted to one journal should not be under consideration elsewhere, it indicates paper must be submitted to only one journal at a time and it is unethical to submit a paper to more than one journal. All the authors should read and approve the final version of paper before submission. The intentional hiding of the important information, making false statements, alteration of data during revision, misquoting the others work and too many self-citations, which are not relevant to the study, are considered as unethical. Publishing a paper, which has already appeared in the same or different journal and rephrasing the already published article and publishing it again with minor modifications in another journal is also a scientific misconduct. Use of others words, ideas, images, etc. without citation is called as plagiarism, which is not to be tolerated. Copying large portions verbatim from other paper is also plagiarism, even if references are given. The paper must be original write up of authors supported by the adequate references. When it is necessary to include small portions as it is (like few lines) from a source, it should be made distinctly visible by quoting the authors and source in running text and printing the copied portions in italics within inverted quotes.

4. JOURNAL STYLE WRITING

The various scientific journals use slightly different formats and writing styles. There will be an improvement in the own scientific writing skills by repeated reading and writing of scientific papers. All journals have a set of "instructions for authors" which clearly say how the paper should be formatted for submission.

The writing should be in complete sentences and easily understood and should be clear and concise. Make sure that every paragraph has a clear topic sentence and that the paragraph content supports the topic. The readers will not look at fancy text; but they look into the subject. The paper should be made easy an average reader. The contractions

should not be used in the text: for example, “don’t” must be written as “do not” and “isn’t” must be written as “is not” etc. The research papers reports the work that has been already completed; therefore past tense can be used throughout paper when referring to the actual work did. By the use of active voices in the text, one can shorten length of text because passive verbs (e.g., is, was, has, have, had) results in more words than necessary to say the same thing. e.g., PASSIVE sentence: “the dissolution study was carried out by us..”. Whereas ACTIVE sentence is: “we carried out dissolution study...”. The clarity and effectiveness of writing will be improved by including the active voices in text.

5. WHAT GOES INTO EACH SECTIONS OF A PAPER

In research papers, each section has a unique role and it divided into i) abstract ii) introduction, iii) materials and methods, iv) results, v) discussion, vi) conclusion, vii) acknowledgements and viii) references. in addition to this, scientific paper also includes tables and figures. Authors should start with the method section first because this can be readily taken from the protocol⁸. The second step is writing of results, which requires logic. The introduction and discussion parts can be written at the end.

5.1 Abstract

An abstract is a shortened version of the paper and it should contain all the information necessary for readers to know brief description on objectives of the study, methodology, results obtained and its significance and discussion. The abstracts can be written at the end. The aim of presenting the abstract is to briefly summarize the results of a paper. The results section of abstract should provide indications of statistical significance. The conclusion should be limited to one or two sentences. Most of the times, readers of a scientific journal will only read the abstract; they will read the full paper if it is interesting to them. This section should be written very carefully and briefly to have the great impact because only abstracts are available to scientists through computer abstracting services.

Abstracts can be designed by writing a sentence or two for each main sections of the paper. The data given in the abstract should match those in the text and tables. There are two types of abstracts; structured and unstructured. In structured abstracts, a brief paragraphs for the objective, methods, results and conclusion may be given. The structured abstract is more informative than the unstructured (conventional paragraph) abstracts e.g., Indian Journal of Pharmacology (IJP) uses structured abstracts, whereas Indian Journal of Pharmaceutical Sciences (IJPS) uses unstructured (conventional) abstract⁹.

5.2. The introduction section

In this section authors may explain the results and conclusions of previously published studies, to explain why they have taken up the present study. The background of the study must be summarized briefly and introduction must be specific to studies undertaken. The last sentences of the introduction should be a statement of objectives and a statement of hypotheses because this will be a good link between introduction section and methods section. It is important to cite the sources in introduction section as evidence of the claims, so that the reader can find the full papers in the references section at the end of the paper. If the introduction is too short, readers may neglect the paper because of superficiality and if it is too long, it is boring and irritating. The introduction should explain why the present research is undertaken. The abbreviations can be defined where they occur first. Sometimes conclusion can be added at the end of the introduction section in order to increase the reader’s interest.

5.3. Materials and methods section

This section explains all the procedures necessary for others to carryout the experiment and describes how data has been generated. The method section should be written and continually revised as the study is being conducted, preferably it can be written in the beginning. Methods should be brief; wherever necessary, details of procedures can be referenced rather than describing in detail. In this section, author can explain the experimental arrangement, subjects, equipments, materials, and data analysis. Drugs obtained as gift sample or purchased should be mentioned along with manufacturer name in parenthesis [e.g., Verapamil hydrochloride (Torrent Pharmaceutical Ltd., Ahmedabad, Gujarat, India)].

5.4. Results section

The collected raw data can be presented and summarized in the form of tables and/or figures in this section. The results can be written in text part of the paper and then referred to a table or figure. For example, “transdermal patches were subjected for physicochemical evaluation and data is summarized in table 1.” The same data should not be presented in both table and figures. It is better to present the data in tables; whereas, figures can be used for reporting a regression analysis (line graph). Each table and figure should possess legends (or caption), which explain the information that is being presented. If table contains the results of a statistical analysis, one should provide the probability levels, degrees of freedom, sample size, etc.

The results section can be written as soon as the data collection is complete. Before beginning to write the results, data should be entered into a database program and perform the statistical calculations. Some publishers permit liberal use of tables and

Table-1: Impact factors of pharmacy journals for the year 2006

Sl. No	Name of the journal	Impact factor
1.	AAPS PharmSci	1.553
2.	Acta pharmacologica sinica	1.397
3.	Advanced drug delivery reviews	7.977
4.	American journal of health-system pharmacy	1.440
5.	American journal of pharmaceutical education	0.743
6.	Anti-cancer drug design	2.245
7.	Biological & pharmaceutical bulletin	1.522
8.	Bioorganic & medicinal chemistry	2.624
9.	Bio-organic & medicinal chemistry letters	2.538
10.	Current drug targets	4.274
11.	Current drug metabolism	5.762
12.	Current opinion on drug discovery	4.319
13.	Current pharmaceutical anal	1.12
14.	Current pharmaceutical design	5.27
15.	Current medicinal chemistry	5.207
16.	Drug delivery	1.424
17.	Drug development and industrial pharmacy	0.821
18.	Drug development research	0.752
19.	Drug discovery today	7.152
20.	Drug information journal	0.262
21.	Drug metabolism and disposition	3.638
22.	Drug metabolism reviews	5.754
23.	Drugs	4.472
24.	Drugs of the future	0.777
25.	European journal of medicinal chemistry	2.187
26.	European journal of pharmaceutical sciences	2.482
27.	European journal of pharmaceutics & bio-pharmaceutics	3.185
28.	European journal of pharmacology	2.522
29.	Fitoterapia	0.908
30.	Indian journal of chemistry section-A	0.631
31.	Indian journal of chemistry section-B	0.491
32.	Indian journal of heterocyclic chemistry	0.254
33.	Indian journal of Chemical Technology	0.301
34.	International journal of pharmaceutics	2.212
35.	J biomaterials science. Polymer edition	1.607
36.	Journal of Biomaterials applications	1.310
37.	Journal of bioactive and compatible polymers	0.925
38.	Journal of biomedical materials research. A	2.497
39.	Journal of biomedical materials research. B	1.778
40.	Journal of bioscience and bioengineering	1.136
41.	Journal of controlled release	4.012
42.	Journal of drug delivery science and technology	0.664
43.	Journal of drug targeting	1.699
44.	Journal of medicinal chemistry	5.115
45.	Journal of pharmaceutical and biomedical analysis	2.032
46.	Journal of pharmaceutical sciences	2.242
47.	Journal of pharmacokinetics and pharmacodynamics	0.895
48.	Journal of pharmacology and experimental therapeutics	3.956

Sl. No	Name of the journal	Impact factor
49.	Journal of pharmacy and pharmaceutical sciences	1.592
50.	Journal of pharmacy and pharmacology	1.533
51.	Macromolecular bioscience	2.521
52.	Macromolecular research	1.166
53.	Medicinal chemistry research	0.225
54.	Nature reviews drug discovery	20.97
55.	Nature	26.681
56.	PDA Journal of pharmaceutical science and technology	0.393
57.	Pharmaceutical biology	0.397
58.	Pharmaceutical development and technology	0.695
59.	Pharmaceutical research	2.848
60.	Pharmacological research	0.764
61.	Pharmacy world & science	0.941
62.	Pharmazeutische industrie	0.153
63.	Pharmazie	0.606
64.	Phytochemistry	2.417
65.	Phytomedicine	1.403
66.	Science	30.028
67.	Tetrahedron	2.817
68.	Tetrahedron letters	2.509
69.	Trends in pharmacological sciences	10.40

figures, while others restrict excessive use of tables and figures because of economic or aesthetic factor however, author has to look into journal's "instructions to authors" page and decide¹⁰. If the authors want to reproduce the tables or figures from a published paper, they must get the permission from publisher. Most publishers grant permission to reproduce copyright protected material free of charge, but some publishers may charge a fee. The request in this regard should be made early to avoid delays.

5.5. Discussion and conclusion section

In this section, authors can interpret their results preferably in the light of other published results, by adding information from sources those cited in the introduction section as well as by adding new sources. If previously published data contradict our conclusions, the authors have to look at their results carefully. This section provides a forum for self-criticism before the readers get a chance. The authors should give their conclusions clearly and they should not express the opinions. The conclusion must be related to the objectives and should be supported by the evidence. Discussion styles written by the authors should not be too safe or too aggressive, because a safe discussion can bore a reader and an aggressive discussion gives impression of too much daring or bombastic. It is always better to start the discussion with a brief paragraph that restates the most salient findings of the study.

5.6. Acknowledgements

The financial help of sponsoring and/or funding agencies should be acknowledged. Apart from this, the help of others may also be acknowledged. However, the routine work or duty is not counted as help and it may not be acknowledged, like the work of a laboratory technician or a secretary employed need not be acknowledged. In the similar way principals or head of the departments may not be acknowledged for giving permission and providing facilities to carry out the work.

5.7. Reference section

References are the important part of scientific communication. These indicate the sources of information, borrowed ideas, quotations and the basis on which the research work was designed. Referencing indicates author has gone through the literature. There are many systems of citing references, but three major systems commonly used, those are,

- 1) Vancouver system
- 2) Harvard system and
- 3) Alphabet number system.

In Vancouver system, references are numbered and listed in the order in which they are cited in the text. This is the most common system, which is used for bio-medical journals at present; this system gives more information about the source than others. In the Harvard system, the references are cited in the text with last name of initial author and the year of publication

(e.g., Hirokawa and Tanaka, 1984) and reference list is arranged alphabetically by the author's names. Any source, which can be authenticated, may be used as reference. Text books, review articles, original research papers, electronic sources may all be used as references. Many journals have a restriction on number of references; however, review articles normally do not have this limit.

Writing the paper with error free references is very important. This can be done manually by checking each and every reference. But today there are four different software packages are available namely "Reference Manager", "ProCite", "EndNote", and "WriteNote". These software packages will search online databases, create bibliographic databases from which reference can be included into the manuscript, organize references, and instantly change the style for listing references as per journal's requirements, this will minimize the time spent for writing manuscript and will be free from errors. We can download a trial version from: <http://www.isiresearchsoft.com> in addition to this, a few free software programs are available on the web, they are,

- 1) <http://www.mlagen.sourceforge.net>
- 2) <http://www.Biblioscape.com/biblioexpress.html>
- 3) <http://www.cc.gatech.edu/classes/RWL/Projects/citation/>
- 4) <http://www.Gnu.org/software/gruff/groof.html>
- 5) <http://www.santafe.edu/~dirk/sixpack/>

The information for journal article references consists of the author's names, article title, journal title, the year and volume number, the issue number and page numbers. Book references have author's name, the editor if any, the title, the publisher and place of publication, the year and page numbers. Primary references (original research papers) are usually preferred over secondary references (review articles). If secondary references are used, the author should verify that the primary references were correctly cited.

6. SUBMISSION OF A PAPER

After completion of writing process, the author has to look at the "Instruction for authors" page of the journal and read details of submission. If there is a manuscript requirement on floppy disc, the author should label the disc clearly with the file name and computer hardware and software used and latest virus free manuscript should be on disc. The authors are required to send a cover letter along with the manuscript containing the following points,

- 1) To which journal is the manuscript being sent?
- 2) To which section of the journal should this manuscript be considered for?
- 3) A statement regarding the originality of the paper

4) A statement of each author's contribution to the original work

5) A statement that all authors have read and approved the paper

6) Name, address, telephone, E-mail ID and fax numbers of corresponding author

7) Signatures of all the authors and

8) If available, a copyright agreement form should also be filled out and sent along with manuscript (some journals send this form to author after the paper has been received).

7. THE EDITORIAL TECHNIQUES

To improve the chances of acceptance, author has to carefully follow the journal's instructions and format the paper accordingly, submit the required number of copies and send the signed copyright statement, animal ethical committee approval etc. Once the paper reaches the editorial office, the editor will hand over it to staff editor to check the suitability of a paper. If the manuscript is suitable for the journal, then it will be sent to reviewers and simultaneously an acknowledgement will be issued to an author (see Fig 1.).

Usually two or three reviewers are chosen for a paper. After reviewing the manuscript, reviewers send their specific comments along with recommendation to the editor. Generally these recommendations are; 1) accept the manuscript as it is; 2) Revise and resubmit; 3) Reject the manuscript. The editor will have look into the reviewer's comments and decide regarding the manuscript. This decision is then sent to the author. The time taken for review process is variable. Usually an acknowledgement will be issued to the author within 15 days of sending the manuscript. The actual review of paper may require 2 to 12 weeks depending on the journals. The author can communicate with editor regarding status of the paper; if review process takes much time authors can make a telephone call to editor.

If authors receive "accept as submitted" response, they should definitely celebrate it, because this type of response is very rare. The most common response is "revise and resubmit" or "accept after revision". This means the paper is acceptable after answering the reviewer's questions. The authors should look closely into the reviewer's comments and answer carefully and make suggested changes in the paper. The clarification to reviewer's comments should be in a point-by-point manner. The authors should write a cover letter explaining all changes made in the paper. Then the paper can be resubmitted to editorial office. Sometimes journals may ask for several revisions before accepting the paper. Once a paper is accepted, a copy editor will check grammar, spelling and journal style. The edited manuscript will be returned to author

in the form of galley proof, the author should carefully review text, tables and figures because sometimes numbers in the tables may have been missed during data entry and figures may be mislabeled or reproduced poorly; however addition of some more text is not advisable at this point. The galley proofs should be sent back to journal office immediately without delay. If paper is rejected, the author should not be discouraged; most of the good journals reject at least 50 % of paper submitted. The author can look at the reviewer's comments, answer them to improve the manuscript and submit to another suitable journal.

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