

# Writing for Scientific Medical Manuscript: a Guide for Preparing Manuscript Submitted to Biomedical Journals

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## ABSTRACT

*Publishing a manuscript of study results in a medical or biomedical journal is not as easy as we imagine. There are some components that should be noticed in publishing a medical scientific journal. Although every journal has different manuscript format, in general, a manuscript contain some components, which consist of: introduction, methods, results, and discussion. Before submitting the manuscript, be sure that it has been consistent with instructions to authors of the desired journal. Submitted manuscript should be enclosed by a cover letter, a statement about any sponsor or other potential relationship that may cause conflict of interest, a statement that the manuscript has been read and agreed by the author(s), and any information about a corresponding author. Writing skills is very important to obtain a good manuscript of study result, in order to achieve greater possibility for publication. Writing skills can be learned through various books or electronic sources such as internet which discuss about writing techniques.*

**Key words:** manuscript, biomedical journal, writing skills.

## INTRODUCTION

*“The amount of writings of a profession is a measure of its vitality and activity, whilst their quality is a rough indication of its intellectual state”- Sir Robert Hutchison (1871-1960) Lancet 1939;2:1059.*

When a doctor decides to conduct a study, at the same time the doctor should decide to write and publish the study result as well.

Michael Faraday, a physicist, declares an adagium “Work; finish; publish”. If you start to work but you will not finish it, why do you start it? Moreover, if you finish the work but you will not publish it, why do you finish it?

Writing and publishing a study result is important either for the investigator or the reader. For the investigator or writer, publication is evidence that he/she has

conducted a clinical trial according to good clinical practice. While for the reader, publication of a study may provide greater knowledge on research of medical/health care science which may bring advantages to enhance medical services for patients.

Nancy Dixon indicates several special advantages of the published study result, i.e.:

- There is current knowledge which will enhance medical practice and will be useful for doctors who work in an organization or other countries;
- Other people will be able to analyze the study result carefully and will be able to give constructive critics and suggestions to the writer;
- A study result may change the existing medical practice or at least may encourage a debate or further study;
- It may create a network of similar interest or colleagues.

On the other hand, publishing a manuscript of study result in medical or biomedical journal is not as easy as we imagine. For novice investigators in Indonesia, it is still difficult to have their manuscript published in prestigious journals either at national, regional or international level. There are many reasons for it, starting from a bad or insufficient substance or study methods to lack of confidence to submit their manuscript of study result.

There is a reason for unpublished or refused manuscript, which is frequently forgotten by most of investigators, i.e. incorrect and inappropriate way of writing. Most of them consider their task as investigators are to collect and analyze data with patches of sentences in their reports, and consider that creating a good and comprehensive reading as the task of the concerned journal editor. For a new journal which still has a small number of manuscript contributions, these considerations may be acceptable, but for an established journal which has received many manuscripts, it is very easy for the editor to diagnose of manuscripts with inappropriate writing without any consideration for the substance and study methods.

Most journals always provide a special page for “*Instructions to Authors*”, as absolute prerequisites for manuscript submitted to the journal editors. In addition to the minimal prerequisites, other principles of medical/ biomedical scientific writing should also be recognized by investigators who propose to write and to publish their study result. This article will explain in brief about principle and techniques of scientific medical writing (especially for original article) which may be used as a basic principle for investigator and novice writer in order to have a manuscript which, according to the common principles and if it is submitted to a scientific medical journal for publication, at least will be interesting to the editor or peer-reviewer to read it.

### WHAT DO THE READER AND EDITOR WANT?

Before starting to write an article of study result or other article and submitting it to a certain journal, there are a basic questions that should be considered by an investigator who wishing to write his/her work:

- a. Who will be the main readers of my article?
- b. Who else will read the article?
- c. What are the backgrounds of the main readers and other readers? What are they?
- d. What will make the readers interested in this article? What will be the main concern of the readers?
- e. How great is experience of the readers about subjects that will be written?
- f. Do the readers understand the situation and condition explained in this article?
- g. Why should they read this article? In the writer’s opinion, what will be learned by the readers from this article?
- h. What does the writer expect after the reader has finished reading this article?

Most readers expect details of what have been done. They do want to know why the study was conducted, and why there is the brief review about previous studies, approach and method used in the study result, interpretation and conclusion of the study.

An editor of a medical journal has more expectations than the readers, craves for interesting and amusing article for the readers. The editor also hopes an important article that may enhance knowledge and provide novel thought or ideas of certain study subjects. Editor also craves for an article which is appropriate to the aim (or: mission) of the journal, according to the predetermined “*Instructions to Authors*” and a well written article. Finally, an editor loves to publish an article which gives a correct and accurate illustration of the conducted study.

### PREPARING A MANUSCRIPT FOR SUBMISSION TO A MEDICAL JOURNAL

Editors and reviewers of a scientific medical journal spend a lot of time to read the submitted manuscripts, therefore, they will extremely appreciate a manuscript which is easily read and has been edited. “*Instructions to Authors*” is made to standardize the submitted manuscripts and also to simplify the workload of editors and reviewers. Therefore, read it carefully before you write or submit any manuscript to the journal editorial staff.

Although every journal has different manuscript format, in general, a manuscript contains some components, which consist of: introduction, methods, results, and discussion.

The structure known as an acronym of IMRAD is not always used by all journals with similar term, but essentially the structure reflects a process of scientific evidence-based study conducted by an investigator. A long manuscript occasionally needs several subtitles for some components (especially in result and discussion section) in order to clarify meaning.

Manuscript is a double-spaced article with sufficient space margins which will facilitate editorial staff to make editorial changes for every lines and to add comments or questions directly on the same paper. If the manuscript is submitted in the form of electronic media (disc, compact-disc, e-mail, etc), it should be in double spaces, because it may be printed for editorial changes and reviewing.

Components that commonly exist in a manuscript prepared to be submitted to medical journal are as follows:

#### Title Page

Title page should contain information as follows:

- a. Title of article. Title should be simple, concise and not complicated. However, occasionally, an extremely concise title may provide lack of information. In the current electronic era, the title of an article should include some information that will give a sensitive and specific result if electronic search is performed.
- b. Author, name of department(s) and institution(s). Some journals include authors with their degrees while others do not. Author(s) is person(s) who gives substantive intellectual contribution of the conducted research. The International Committee of Medical Journal Editor (ICMJE) declares that an author should meet all of the following conditions: (1) has a substantial contribution on proposal and design, or data accuracy, or analysis and data interpretation,

- (2) critically prepare or revise important manuscript contents through intellectual ability, and (3) provide final agreement on the revised article for publication. People involved in the study but do not meet all of requirements as mentioned above can be regarded as “clinical investigator” or “participating investigator”, and will have their name on “Acknowledgement” section.
- c. Disclaimer, if any.
  - d. Corresponding author. Author’s name, correspondence address, telephone number, fax and e-mail are included. Corresponding author may be the author who “guarantee” integrity of overall manuscript, but may be not. Corresponding author should noticeably declare that he/she does not mind if the above information is published.
  - e. Available author’s name and contact address if there is a request of manuscript copy, or a statement that manuscript copy cannot be provided by the author.
  - f. All of aid sources and assistance such as fund, equipment, medicines, etc.
  - g. Running head. Some journals ask for running head or a brief title of article which has been condensed into less than 40 characters (including letters and spacing) on the footer of title page. This running head may appear on the published article, but it may be only used by the editorial staff for manuscript documentation.
  - h. Word count. Word count for all of manuscript content (abstract, acknowledgments, figure explanation, title of tables and references are excluded) will help the editor or reviewer to determine whether the information is appropriate to the length of manuscript and to decide whether the submitted manuscript does not exceed the limited word count determined by the journal. Separated word count for abstract is also useful for similar reason.
  - i. The number of illustrations and tables.

### Special Page for ‘Conflict of Interest’ Statement

To anticipate any potential conflict of interest among the writer, editor or reviewer (either because of the received fund or other facilities, or writer, editor and reviewer come from the same institution); therefore, if necessary, the writer may explicitly state whether there is any potential conflict of interest occurred.

### Abstract and Key words

An abstract is a substantial part of overall manuscript in brief. Although there are various abstract forms—which depend on each journal-, generally, abstract should include the context of background of study, the study aim, basic procedures or methods (subject selec-

tion, observation method and analysis), the main result (mentioning about the importance of effect and statistical significance, if possible), and principal conclusion. Abstract should be able to present the novel and important aspects of the conducted study.

Since there are some important parts of an abstract commonly used as index of various electronic database and most of the readers only have abstract of the study, it should be assured that the abstract reveals overall study report accurately. Unfortunately, there are many abstracts inappropriate to the manuscripts.

Key words are 3 to 10 words or concise-phrase that may reveal the main topic of the study, usually it is stated along with the abstract. Keywords should include words registered in the list of Medical Subject Heading (MeSH) of index medicus.

### Introduction

Introduction contains the study background (revealing the importance of a problem so that it should be studied, supported by data of available literatures), study objective and hypothesis that will be tested or questions that will be answered by the study. Parts of introduction is written as a narrative arranged in logic sequences in 1 or 2 paragraphs.

As an analogy of a building, introduction is a “door” to get into the “house” of all part in study report. Therefore, introduction section should be able to ‘drive’ the readers to understand and agree the investigator’s/writer’s idea that the study performed is necessary and reasonable.

### Methods

Methods only contain available information at the time of planning and study protocol; therefore, other information obtained after the study performed should be included in results section.

In this section, the study design should be explained (along with relevant explanation for each design), time and place of the study conducted, subject selection (including the control group), inclusion and exclusion criteria as well as study population. Variables of study and correlation among the variables should be clear. Technical information about measurement (examination) including the executor, equipment and medicine used (if possible, mention about the brand-name and manufacture), informed-consent of the subject, etc should also be included in details.

Analytical statistic which is used in the study (such as hypothesis test, significance test, statistic power and confident interval) should also be included in details, so that other people who have data access may clarify the reported result. The common analytical method may

not be explained. However, if there is certain new or occasional hypothesis test or statistical test, then it should be explained or references should be provided. Explain about statistical terms, abbreviations and symbols. Mention about the computer program used in the study.

## Results

Present the study result with logical sequences through texts (narration), tables, and illustration; starting from main result or the most important result first. Do not repeat any information that has been presented in tables and illustration into text, except for emphasizing or highlighting important findings. Additional information and technical details may be put in the appendix section so that it can be revealed without disturbing the narration. Provide the absolute number of data not only as a percentage. Avoid non-technical statistical terms, such as “random”, “normal”, “significant”, “correlations”, and “sample”.

Use tables and illustrations only for information which has better value on tables and illustration compared to text form, because usually the editor determined a limited number of tables and illustrations. Use an illustration as an alternative of table with a lot of components, and do not duplicate data on illustrations and tables. Tables or illustrations should be appropriate to text. “Wild” tables or illustration that do not indicate on text should be avoided. Explain about uncommon abbreviations and symbols on the footnote of related tables. Usually, an editor would like a professional illustration is ready to be printed. For manuscript which will be submitted to a journal, provide tables and illustrations on separated pages.

Be careful about details of number writing, numerical accuracy, terms, and statistical symbols, and technical details of tables and illustration production, which are referred to as a guide to ICMJE (can be seen on [www.icmje.org](http://www.icmje.org), 2006) and Sastroasmoro monogram (1999).

## Discussion

Reveal novel and important findings of the study. Do not repeat every details of data presented on introduction or Result section. In experimental study and some of observational studies, discussion usually begins with concise and clear explanation about main result of the study, and followed by analysis of possible mechanism or explanation of such findings, compare and differ it with other relevant studies, and mention about drawbacks of the study, and analysis of implication in clinical practice and possibility of further studies. Avoid

exaggerating sentences about the study result, as well as hesitant sentences.

At the end of discussion section, mention about the conclusion of the study. Indicate correlation between the conclusion and the aim of study, avoid statements and conclusions which are not supported by data adequately.

## References

References should be numbered in the order in which they are mentioned in the text. References of text, tables and illustration are numbered by Arabic number in parentheses. Style of references of various literatures can be seen on examples recommended by ICMJE ([www.nlm.nih.gov/bsd/bsdhome.html](http://www.nlm.nih.gov/bsd/bsdhome.html)), while the data of titles of journals can be seen in index medicus.

Other things that should be noted in writing references:

- Try to directly refer to original research articles and not to the review articles because review articles do not always indicate accurate results.
- Avoid using abstracts as references
- Articles accepted but not yet published may be added by “in press” or “forthcoming”, and it should have written consent saying that the articles will be referred and provide a verification that the article has been accepted to be published.
- Information of refused articles by certain journal should be written on text as “unpublished observations” with a written consent of the source.
- Avoid citing a “personal communication” unless it provides essential information not available from public source. If it should be done, name the person and date of communication on the text in parentheses.
- Although some of journals conduct accuracy checking of citation and references, the author should assure that nothing is missed.

## FINAL PREPARATION OF MANUSCRIPT

After the manuscript has been written according to “instruction to authors”, let it be (do not read it) for several days, and give it to other people to be read before submitting it to the desired journal. As a result of not ‘touching’ your manuscript for a few days, you will get inputs and questions from the people who read your work and after you read it once more, usually there will be additional ideas about something that should be added, deleted or briefly revised.

Read over the whole manuscript, starting from the title to the references. Check every word and sentence carefully, avoid typing error. Revise any complicated

sentence by expressing your ideas through the least number of words. If you are able to delete words without changing the meaning, then do it. Avoid adjacent word repetition, but repetition on some ideas can be made necessary. Keep in mind that there is limited pages in the journal and the editor will appreciate concise manuscript. The narration should flow smoothly- in every sentence and in every paragraph – with logical sequences. But there is one importance, which is usually ignored, in performing literature review relevant to the studied topics since there is high possibility of many novel studies that have been published during the study. Error in literature review will make all of the study reports become 'obsolete' (especially in background and discussion section), which bring small possibility to be accepted by the journal reviewer.

After everything has been completed, the next step is submitting your revised manuscript to the desired journal editorial staff. Make sure that you have completed every component that being asked by the journal. Every details, such as the number of copies (including tables and illustrations) on demand should be completed. Do not rely on the editorial staff that they will make copies of your manuscript and distributing it to editors and reviewers. Currently, there is possibility of submitting manuscript through electronic media, either by disc, e-mail, or directly to the desired journal website. Pay attention to the determined requirements for submitting manuscript through such methods.

Submitted manuscript should be enclosed by cover letter containing statement that the manuscript is original work of the author and has not been published before in a journal or other media. It also contains statements about any sponsor that potentially may cause conflict of interest, the manuscript has been read and agreed by the author, and any information about corresponding author. Other information that should be known by the journal editor must be stated in the cover letter, for example, if the manuscript has been submitted to other journal and has been refused, then you should enclose comments of previous editor and reviewer as well as your comments about it.

Finally, it is the time to wait for response. Response may be in the form of: (1) approved for publication without any substantial revision; (2) considered for publication with substantial revision; or (3) refused for publication. If the manuscript should be revised, then do it based on comments of critical appraisal from the editor or reviewer. If the manuscript is refused, do not be disappointed. Usually, the editor will point out their reason on why the manuscript cannot be published in addition to comments and suggestion of editors and

reviewer which will be important for revision. Use it to revise the manuscript, and submit it to other journal afterwards.

### SEVERAL NOTES ON 'WRITING'

Refer to Sir Robert Hutchison statement cited in the beginning of this article, which is important for professional doctor to write in sufficient number and quality so the vitality and intellectual state as a profession could be acknowledged. However, there is some experience that the enthusiasm of writing among doctors is low. Some have reason for routine activities and daily practice and other exclaims on inability of good writing. There are a lot of ideas created in their head, but they are unable to make it into an comprehensible article. Unfortunately, this inability only exists as an emotion or feeling, which means that there is feeling of inability without any attempt to write it. While there is a principle guide for a novice author: *First get it down and then get it right*. How could we know that we are unable to write correctly if we never start to write? Writing skill is similar to other skills, if you want to write fast and correctly, then you have to practice it.

In general, there are two types of authors: 'gatherer' and 'hunter'. A 'gatherer' author collects all of sources that might be relevant to the article, reading all of the compiled sources, use it to organize an idea then starting to write. This 'gathering' attitude is suitable if you would like to make a literature review, and this is an attitude learned by students during their formal education. But this attitude is not always suitable to every article. 'Gatherer' authors may make various serious mistakes even before starting to write: they hesitate about their target reader, they do not have obvious aim of writings, they are not certain about important messages that will be given, and they have no attention on organizing ideas.

Experienced authors incline to have 'hunter' attitude in writing. They determine about what article should be made and for whom it should be written. They know what specification should be done, and determine the strategy to achieve those specifications as part of outline. Subsequently, they find sources which are appropriate to the constructed outline. Created ideas can be written rapidly, and they are written in comprehensible sentences and have the least misinterpretation. Those ideas are organized in common sense so that information can be followed by the readers. This type of authors can perform editing on their own articles.

To achieve this 'hunter' attitude is not easy. Begin

to write as 'gatherer' author continually and improve your article quality consistently, including learning from other articles of 'hunter' authors, or ask somebody to read our article. As a result, we know whether our ideas can be followed by the readers. People whom we asked to read and to give comments on our article are not always experienced people. Sometimes 'foolish questions' of a junior may improve our judgement about the drawbacks of our article.

Writing skill can be learned through various books on writing techniques, either in general or special writing for scientific medical/biomedical journals which are greatly published recently, including electronic sources such as internet. Do not hesitate to ask or open your dictionary, and books of writing guide for special terms, so that our article are always appropriate. Thus, once more: first get it down and then get it right.

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