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HOW I PREPARE A MANUSCRIPT FOR PUBLICATION IN A MEDICAL JOURNAL

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Introduction

Since 1961, I have annually published a number of manuscripts in medical journals. This work has been enormously rewarding but continually challenging. My purpose here is to describe how I prepare a manuscript for publication in a medical journal.

Question

When considering a potential clinical topic for investigation and later publication in a medical journal, the first step is to formulate a precise question that is answerable. Sometimes it takes considerable thought to formulate the question properly. I then ask myself the following questions: Is the answer to the question important enough to pursue? Does the answer add to the present knowledge base or does it simply confirm a previous observation or describe it better than before?

The Tables and Figures

The first thing I do is prepare the tables and figures. For studies involving ≤ 30 patients, individual patient data can be presented with no more than one line across for any patient. The patients need to be listed in some logical order such as by increasing ages or separated according to gender or another factor. Each heading needs to be formulated such that the question can be answered with a number or a plus sign (+) for positive or present, a zero (0) for negative or absent, or a dash (-) for no information available or not applicable. The challenge is to construct the table such that words or phrases are absent except in the headings. Tables with many words are usually unsatisfactory. An example of what I consider a good individual patient table can be seen in reference number 1.¹

Tables with pooled data are of course the most common ones in medical publications. So often these compare data in one group of patients to another group with *P* values showing whether the data between groups is different or not. The various variables are usually listed on the left side vertically and the patient or control columns to the right, with the *P* value column far right. Footnotes at the bottom are often necessary to define the various variables. I prefer to spell out all the variables. If any are abbreviated, they need to be listed in alphabetical order in the footnotes. Definitions of ill-defined variables should also be listed in the footnotes. Examples of this type table may be seen in references 2 and 3.^{2,3}

The challenge of the figures is to produce one or more to provide the manuscript's message in graphic form. With my own manuscripts I spend more time in developing the figures and tables than I do in writing the manuscripts. The graphic and tabular presentations of the data carry more impact than the written text, which in essence simply describes the findings in the tables and figures and/or the interpretations. An example of a good figure might be seen in reference 4.⁴

Formulating an Answerable

The Title

Although it is the most frequently read part of a manuscript, the title often is given too little attention by authors. Indeed, the last thing written by many authors, just before the final typing of their manuscript, is the title. If done in this manner, the title may be more of an afterthought and not of the same standards as the rest of the manuscript.

The first words put on paper should be the title. Then, with each revision of the manuscript, the title is carefully reexamined and usually reworded such that it is changed several times before the manuscript's final typing. Above all, the title should describe the manuscript's contents in the most specific and precise terms possible.⁵ It should be devoid of excessive words but sufficient enough to adequately reflect the manuscript's contents. The title should have a smooth flow and, ideally, arouse the readers' curiosity so that he/she will want to delve into the manuscript's text. If the manuscript's message is in the title, the reader's curiosity may be immediately satisfied and the next article then sought. Subtitles should be avoided as they often are more specific than the main title and, therefore, deserve to be the main title, and they are frequently omitted when the article is later referenced. Titles of experimental studies should include the animal species when not involving human beings. Titles as questions generally should be avoided, as should abbreviations. Occasionally, use of italics for one or two words in a title provides useful emphasis. Common recurring cardiologic titles include "Comparison of...", "Usefulness of...", "Safety of...", "Effect of...", "Evaluation of...", "Limitations of..." etc.

The Abstract

After the title, the next most frequently read portion of the manuscript is the abstract, or summary.⁶ But is this given the same attention by authors as is given by readers? I think not. The summary, I suspect, tends to be written by many authors just before the final typing of the manuscript. As a result, the summary tends to be disjointed as it attempts to tie together the important points of the paper. By being done last, the summary often does not receive the thoughtful deliberation given other portions of the manuscript.

Because the summary is so important to a manuscript, I suggest that authors write this portion *immediately* after the title. By doing so, one may better focus on the number of points the particular manuscript is trying to make. If the manuscript has essentially only one point, the summary can be particularly crisp and short; if more than one point, it serves as an outline of the points to be made. The

summary needs to be given the same emphasis and importance by authors as it receives from readers.

The Discussion

This is the only portion of a manuscript that I outline before writing. In general, the first paragraph provides a brief summary of the major findings. Next comes a review of previous publications on the same topic, followed by a discussion of the differences between the present study compared to previous publications. Does the present study provide new information or simply confirm that provided by previous publications? The paper should also include some comments on the strengths and limitations of the present study.

The References

References are an important part of a manuscript.⁷ Their selection is an indicator of the authors' knowledge of and regard for work preceding their own, and their accuracy of recording is a clue to the quality of their own work. Indeed, their selection and their recording accuracy is a clue to their scholarship. A reference must support the statement for which it is being used. That a publication has been read during the preparation of a manuscript is not justification for its being cited as a reference. References should not represent a list of publications read by the author but should be carefully selected. In general, the references cited should be for quality articles, should clearly support the statements to which they are attributed, and should have a meaningful purpose. Just as a good paragraph should have no unnecessary sentences and a good sentence no unnecessary words, there should be no unnecessary references.

Many errors are made in recording references. Examine any 10 references in a medical journal and usually at least one, often more, will contain an error. Errors in references represent inadequate regard for the work of previous researchers, and I suspect inaccurately recorded references are found most frequently in manuscripts containing inadequately recorded data. Names are often misspelled, initials preceding the last name are often wrong, and "Junior" or "III" occasionally are omitted; titles often are recorded inaccurately and subtitles are frequently omitted; volume numbers, page numbers, and year of publication may be erroneously recorded. When recording references, it is best to list all authors, all titles, and full inclusive pages.

A major source of errors in references is recording a reference listed in another journal without actually reading the original referenced publication. In this way, previous recording errors are propagated in subsequent publications. References should be recorded only from the original publication and not from a previously published reference list. In other words, never reference a publication without first reading it!

Abbreviations in Medical Articles

I favor appropriate abbreviations for two reasons: (1) they save space and therefore permit more manuscripts to be published, and (2) they decrease rather than increase reading time if limited to commonly used terms.⁸ I prefer to limit abbreviations to the terms appearing in the manuscript's title. For example, I recently read an article titled "Left ventricular response to isometric exercise and its value in predicting the change in ventricular function after mitral valve replacement for mitral regurgitation." It contained the phrase "left ventricular" 38 times, "mitral regurgitation" 28 times, and "mitral valve replacement" 12 times. Spelled out, these three phrases would have occupied 1,456 spaces, but by abbreviating each (LV, MVR, MR), only 168 spaces were used.

Abbreviations should, in general, be limited to commonly recognized terms. I examined a manuscript that used the

abbreviation "LVT," indicating "left ventricular thrombus," which is not a commonly recognized cardiologic abbreviation. I therefore changed it to "LV thrombus," abbreviating "left ventricular" throughout but not "thrombus." In the same article, the same abbreviation was used on other occasions: LV mass, LV ejection fraction, LV peak-systolic pressure, LV end-diastolic pressure, etc. ("Left ventricular" is the most commonly used phrase in cardiologic journals; hence, the abbreviation "LV" is highly useful if used for "left ventricular," although not for "left ventricle," which appears far less frequently.)

Making Clinical Studies Involving Many Patients Useful to the Single Patient

"Doctoring" centers on the single patient, the one-to-one relationship. Yet most clinical studies published in medical journals involve many patients. How can articles in medical journals be presented such that practitioners can fit their single patient into a large clinical study? First, keep patient populations as homogenous as possible. A study comprising 100 patients including 95 women and 5 men might best be limited to the 95 women. A study including 100 patients with heart failure in whom 80 resulted from ischemic cardiomyopathy and the other 20 from different conditions should be limited to the 80 with the single cause of heart failure. Second, provide individual patient data rather than pooled data if the study includes ≤ 30 patients.⁹

Preparing the Manuscript According to that Publication's Style Guidelines

Study a recent issue of the journal to which the manuscript is to be sent, and prepare the manuscript accordingly. One should also examine the journal's Instructions to Authors and follow the suggested guidelines.¹⁰

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