

# Core skills of effective medical writing

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Writing for scientific journals or research grants requires particular skills but very few researchers have been trained formally in writing. That is why a large number of papers or research study protocols submitted for grants are rejected because they are poorly written and documented. That is one of the reasons that many important ideas and research findings fail to reach the scientific community.

## ***Writing for biomedical journals and research study protocols:***

Writing for biomedical journals or research study protocols for grants is different. Each journal and institution providing grants for research accepts papers on a limited range of subjects. In the research study protocol the primary readership is defined. The style of writing is usually governed by established standards, rules and conventions. The layout or format of manuscript is determined by the publisher and is designed to be standardized.

## **Core Writing Skills:**

There are five well established core principles of medical writing. These are:

1. Developing a concept
2. Preparing an outline
3. Writing the first draft
4. Topping and tailing
5. Publishing

*Developing a concept:* This should cover the following:

Why publish, What to publish, What is the main message, Who are the likely readers and finally where to publish.

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*Preparing an outline:* While preparing an outline, the points which need to be addressed include:

- \* Principal objectives or hypotheses/Introduction.
- \* Main message of the paper
- \* Materials (Patients, Subjects) and Methods
- \* Principal findings (Results)
- \* Discussion
- \* Conclusions

*Introduction:* While writing introduction, it is important to state what is already known before this study was planned. Then state the problem why the things could not be left as they were. It should also cover what answers are needed to the questions and what is being done to answer these questions. It is better to use few sub-headings but make sure that introduction is not unnecessary lengthy. Do not forget to add appropriate references to strengthen your viewpoint.

*Main Message:* It is suggested that one should select about twenty to twenty five words as a key message which should form the main body of the manuscript. Write the principal objectives of the study or hypothesis and make sure that both of them are relevant.

*Materials (Patients, Subjects) and Methods:* This section in the manuscript should cover how the population was defined, sampling, materials, methods, data analysis, inclusion and exclusion criteria. Give details how sampling was done. What sample size was determined. What were the relevant characteristics of the sample i.e. age, sex distribution. Comment on these if the sample's features are markedly different. Remember the characteristics of the sample should be covered in this section and not in the Results. How the ethical concerns were addressed. Species and strains if relevant of experimental animals, plants and micro-organisms.

Include relevant references to the literature for the relevant technical specifications, sources, methods of preparation and other relevant information of the materials. Describe whether these are standard materials? If so, refer to the relevant literature for specifications. If you have used new materials, describe them in sufficient detail to allow another expert to prepare the same materials. Describe the methods used briefly, but in sufficient detail to ensure that another expert can reproduce your experiment. Mention which outcome variables were measured and how? What

techniques were used? Has the technique been described elsewhere - in which case you need only cite the reference.

*Data analysis:* If you have used unusual data analysis techniques, briefly describe them. In case you have used any special methods that an expert would need to know in order to repeat the analysis, then provide sufficient information? Only describe statistical tests if they were specially developed for this analysis and you may need to justify their use.

*Ethical concerns:* The manuscript must contain information as to how the data was complied with all relevant ethical requirements, including those governing experiments on humans and animals? Explain how the identity of research subjects were protected and that informed consent was obtained from all the participants enrolled in the study.

*Results:* This section will cover all the important findings of the study in order of their importance. Each of them should be summarized in one sentence. Include the supportive evidence. Look at the findings once again alongside with the statement of objectives. Make sure that all the results are listed directly relevant to the objectives of the study.

*Presentation of the data:* It should have a brief description in the narrative form. It can also be presented in the form of Tables, Graphs, Photographs and illustrations.

*Discussion:* Describe principle conclusions from the study and then assess, evaluate them in the light of existing knowledge. Highlight the main implications of your findings. State the limitations of the study if any. Indicate where further work is necessary and then summarize your main conclusions.

*Writing the first draft:* Different people have their own style of preparing the first draft. Either one can prepare a structured abstract first and then give the details in the full manuscript or one can write few paragraphs about all the important sections of the manuscript i.e. Introduction, Materials (Patients and Subjects) and Methods, Results, Discussion. The last paragraph should summarize how the study was conducted followed by appropriate and relevant references.

The first draft should be written quickly, without interruption and without editing. It is important that one keeps to the plan of the outline. As regards writing style, usually the past tense is used. Prefer using the Word "We" instead of "I". Be brief as there is too much pressure on the limited space available in the biomedical journals. Most of the reputed and well estab-

lished biomedical journals have a long waiting list of approved manuscripts for publication. Hence, brief manuscripts will ensure speedy peer review and early publication. Do not mind showing the manuscript to experienced colleagues and seek their advice, suggestions to further improve it.

Having prepared the first draft, keep it pending for a few days or weeks and then have another look before you start final editing. Even distinguished and successful writers ask for second opinion. Editing is done for clarity to ensure the message is conveyed effectively. Editing on paper is best particularly for the beginners but some experienced writers are used to do editing on the screen and they find it absolutely comfortable.

### **Conclusions**

Scientific papers/research study protocols are written so that a group of peers and experts can assess observations, repeat experiments and evaluate scholarly thinking to judge whether the content meets the agreed standards. Therefore, writing papers for these purposes is governed by certain well established criteria, rules, regulations and conventions. Hence biomedical researchers and academic physicians need to acquire the knowledge and skills of writing and understand the guidelines of publication.