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## Tips for thesis writing and preparing research papers

For an updated version, see  
Basic Methods of Medical Research, Fourth Edition  
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After toiling hard for completing a research, it is time to share the excitement. Let the world know what new has been achieved or could not be achieved. You have a duty to disseminate the results regardless of achievement. No research is complete unless it is read, discussed, and evaluated. The dissemination could be in a conference through PowerPoint or other kind of presentation but most medical research culminates into a written report that could take a form of a paper, a thesis, a dissertation, or a full-fledged project report. Medical colleges generally marginalize writing skills. Many emerging researchers find medical writing a difficult proposition. Successful researchers are skillful biomedical communicators too.

Good writers are not born but made. Writing skill comes with practice. Do not worry if your first draft is terrible – most of us have. Prepare first draft as early as you can – even possibly before the results are known. This will help you to anticipate problems. Plan for several revisions, and notice how the manuscript improves.

Manuscript writing is both an art and a science. Scientific writing reflects a creative process that depends on quality of thinking (Brand 2003). The text should weave a story that follows a central theme. It should steer the reader through a labyrinth of thought. Imagination is required in putting ideas together in an interesting and lively manner, and a systematic step-by-step approach is required for achieving coherence. It should present an organized report out of chaos by emphasizing the relevant ideas and discarding the irrelevant ones.

Style of writing is as important as the statement of facts. The basic ingredient is that a manuscript should be effective in conveying the meaning. Put yourself in the position of an indifferent reader and write in a manner that it communicates. Scientific writing sans digression and calls for focused exposition. In any case, the message in any research presentation must be new and original that can evince interest. The text must contain all the details of the decision you took at every step, such as the choice of the topic, specification of the objectives, identification of the variables, method of their operationalisation, choice of instruments, control of bias, contents of designs, sample size and its justification, method of assessing data quality, and statistical methods.

This note is on contents of various components of a research report such as title, authors, abstract, introduction, methods, results, discussion, acknowledgment, and references.

An important resource on manuscript preparation, particularly for journals, is the Uniform Requirements (2010) of the International Committee of Medical Journal Editors representing more than 500 journals around the world. This committee is popularly known as Vancouver Group. In addition, consult web sites of popular journals such as British Medical Journal and Journal of American Medical Association. They also discuss many issues not covered in this chapter such as writing a letter, group authorship, and differing manuscripts based on the same data. Some of the ideas presented in this chapter are based on these sources.

If your research is complex, consider if the results can be reported into two or three or more parts that are nearly independent of one-another. In this case, the overlap should be minimal. If there is some overlap, always acknowledge previously reported results.

## COMPONENTS OF A RESEARCH REPORT

For the primary medical research that we are discussing in this book, it is customary to divide the report in Introduction, Methods, Results, and Discussion (**IMRaD**) format. Sometimes this is extended to AIMRaD to include Abstract also. Whereas most papers published in medical journals follow this format, theses and particularly dissertations, and full reports may choose to follow topic-by-topic approach. Results can be described in multiple chapters in bigger reports. For research on kidney transplants, for example, these chapters can have titles such as 'Choice of Donors', 'Preparation of Recipients', 'Surgical Procedure', and 'Post-surgical Management'.

Bigger reports, particularly theses and dissertations, too are sometimes later on apportioned into two or three papers for publication in medical journals where again IMRaD format would be required.

In a 3000-word article, which is sometimes considered standard for a research paper, Introduction would generally occupy 500 words, Methods 1000 words, Results nearly 500 words, and Discussion another 1000 words. Note that results section does not occupy much of space. Introduction should contain the questions and Results their answers. Discussion is a coherent mix of questions and answers in the context of the observations reported by other authors. Details are given in the documents linked to this note.

Subsequent paragraphs in this section give details of what each component of a research report is expected to contain, and how to prepare a good manuscript. Consider them as guidelines only. Consult the Instruction for Authors of the concerned journal for papers, or university guidelines for thesis and dissertation. Go to a reputed medical library and see some successful theses. For help in writing thesis and dissertation, refer also to Gladthorn (1998). For clarity in medical writing, consult Goodman and Edwards (1991).

IMRaD is only for the main body of a paper. There are always some preliminaries such as title and authors, and end features such as acknowledgments and references. All of them are important components in their own right and deserve a careful consideration. A brief description is in Box 1.

### **Box 1: Guidelines for contents of a manuscript of a paper**

**T**itle - Concise (generally not exceeding 15 words) yet informative.

**A**uthors - Only those who have *substantially* contributed and are prepared to take up public responsibility of the contents.

**K**eywords - About 5-6 for indexing purposes that could retrieve the paper from a database.

**A**bstract - Generally structured into Background, Methods, Results and Conclusion; lucid, stand alone, and containing all salient features of the study in not exceeding 300 words (consult the journals instructions).

**I**ntroduction - Rationale of the study and what new is expected to be achieved: research questions, objectives and hypothesis.

**M**ethods - Why the study was done in that particular manner including the impact on validity and reliability of results.

**R**esults - Select data that focus on the stated objectives; make judicious use of tables and illustrations for precision and impact respectively without duplication.

**and**

**D**iscussion - Implication of the results in the light of existing knowledge and resolution of conflict if any; conclusion based on evidence alongwith the limitations; keep opinions and comments separate from evidence-based results.

**A**cknowledgments - Thank those who contributed but not enough to qualify as author.

**K**ey messages - Two or three messages in a box that highlight the achievements of the study.

**R**eferences - Preferably in Vancouver format, and restrict the list to the minimum needed to substantiate the statements made in the text.

Brand RA (2003). Writing for Clinical Orthopedics and Related Research. Clin Orthop Rel Res 413:1-7.

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