

Writing a Convincing and Effective Discussion Section of a Biomedical Research Paper.

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Writing a biomedical research paper is hard *work*. The paper must conform to the orthodox: *Introduction, Method, Results, and Discussion*. This format brings some order and logic to the research paper. The primary aim of writing a biomedical research paper is to contribute to scientific knowledge. This contribution must be explicit and it must occupy a prominent position in the paper. That position is the discussion section. Regrettably, the discussion is usually poorly written in most biomedical journals. The author's contribution is often widely scattered throughout the discussion. Sometimes it is overwhelmed by the cited literature. This weakens the message and the impact of the contribution. The approach suggested by this author is aimed at structuring the discussion in such a way that the author's contribution stands out. This will enable the author to write a compelling and effective discussion.

Introduction

A biomedical research paper follows a well-defined format; *Introduction, Methods, Results, and Discussion (an IMRAD mnemonic)*. The discussion section is the 'trumpet' of the paper: it announces the author's contribution to scientific knowledge, elaborates on the significance of the results, and gives direction for future research. Unfortunately, the discussion section is often poorly written by most authors. The reason could be that there is no generally accepted format on how to structure the different sections of the discussion¹. Many authors have suggested guidelines for writing the discussion^{2,3}. Unfortunately, these guidelines are often not followed. The purpose of this educational article is to assist young authors in structuring and organizing the discussion so that they can write compelling and effective discussion. Well-heeled authors can use this article as a revision.

Discussion

What is the main function or purpose of the discussion section? The function is to answer the question posed in the Introduction section⁴. Check the research question again before writing this section⁵. For clarity of thought, divide the section

into paragraphs as indicated in table 1. This structure helps the author to focus. Bear in mind that a paragraph represents a unit of thought. However, all paragraphs must be linked to provide coherence. Start each paragraph with a topic sentence. All subsequent sentences in that paragraph must elaborate on the topic sentence. Let me elaborate on each paragraph.

A. Paragraph 1

The reader expects an answer to your research question. This paragraph represents direct declaration of your results³. Give the answer to your main research question. You may state your answer by saying, for example, 'The results show that spinal tuberculosis has a good prognosis'. This is a direct declaration of your results. Do not summarize your results or parrot what is in the Results section⁵. Do not introduce new information. If you did statistical analysis, give the interpretation and not only the p-value. Confidence interval (C.I.) gives interpretation to the results and it must occupy a prominent position. Elaborate on the significance of the results. What about secondary, interesting, or unexpected results? These results are peripheral to your research question. They must be mentioned, and if necessary, plausible explanation(s) offered.

Do not dwell on them for they are not the focus of the research question or paper.

Table 1. Divisions of Paragraphs in a Discussion

Paragraph 1	Declare Main Results. Discuss secondary unexpected results.
Paragraph 2	Literature Discussion.
Paragraph 4	Discuss limitations of the Study.
Paragraph 4	Summarize major points about the study and literature. Tailor your discussion towards a conclusion. Suggest future research. Close discussion.

Be careful with speculation; it has a place in the discussion provided there is some hint of support to it in your data or in cited studies⁶. Speculation is a trap for the naive, particularly in descriptive studies. Avoiding making priority, because most of the time such claims are false⁷. Do not cite references in this paragraph: your work must take the center-stage. The citations will weaken your contribution and steal the limelight. This is your opportunity to contribute and be visible; grab it.

B. Paragraph 2

This paragraph deals with the literature. It shows the reader that the author is aware of the contributions of other scientists in this area. This gives credibility to the work of the author. Generally, there are three categories of literature that the author must deal with in this paragraph¹:

1. The literature consistent with your findings.
2. Less compatible literature.
3. The literature that is in disagreement with your findings.

Discuss the literature critically. Critique the literature equally.

C. Paragraph 3

Discussion of the study limitations is often not well done in most biomedical journals. All research work has some limitations⁸. The author must review the *Method and Results* sections for possible shortcomings of the study; the shortcoming may be in the selection of the study group, treatment allocation, assumptions in statistical analysis, lost to follow-up, or even the duration of follow-up. Acknowledging

limitations of the study shows the reader that the author has a critical and unbiased scientific thinking. It helps future researchers to improve on the quality of the studies. Your paper will be cited in that research: a great honour indeed.

D. Paragraph 4

This paragraph leads to the conclusion of the research paper. This paragraph must indicate that. The author must summarize his results together with the relatable literature. Finally the author must suggest the type of a research that must be done to address a specific question. The author must *not promise* the reader that he/she (the author) will do the research because most of the time such a promise is not fulfilled.

Conclusion

The discussion section is the most difficult to write. I hope these guidelines will of great help to ease this difficulty.

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