

## ART OF WRITING

# Writing the Discussion Section: Describing the Significance of the Study Findings

Sandeep B Bavdekar

## Abstract

The Discussion section is an important part of the research manuscript that allows the authors to showcase the study. It is used to interpret the results for readers, describe the virtues and limitations of the study, discuss the theoretical and practical implications of the research work done and provide important "take home" message.

The Discussion section of a paper intends to convey what the findings of the study mean and hence has been likened to the closing arguments put forth by counselors in a court case. It is the last chance for an author to "sell" his paper. The discussion section should be written in a focused manner getting straight to answering the research question raised in the introduction section. Such a direct approach is likely to make a lasting impression on the minds of the readers. The discussion section is considered harder to define as compared to the other sections of the research paper. While other sections require orderly and simple logical writing; composing discussion section requires logical thinking, reflection and critical appraisal. A well-written discussion section includes a statement of important results, reference to previously published relevant literature, comparison of study results with previously reported findings, explanation of results, elucidations of strengths and weaknesses of the study, interpretation of the whole evidence, description of impact of the study and recommendations for the future course of action.

## The Structure

The beginning: Most authors prefer to begin this section by providing a summary of the key findings in the study. Such a summary offers context to the debates and arguments that follow. In addition, there are readers; who after reading the title (do not read the methodology or the Results sections, but) straightaway go to the Discussion section to find out the implications of the study findings. These readers need to be provided with a gist of results, to enhance their understanding of the discussion. However, it must be remembered that there is no reason to provide details of all observations, as the readers who are interested in such detailed accounts have a whole section dedicated to study findings. Some prefer to begin the discussion section by stating the important conclusions of the study, while there are others, who prefer to begin the section by narrating why the study is special or unique and then go on to discuss the study

findings<sup>(3)</sup>. Some find it prudent to re-state the purpose of the study, using a terminology similar to that used in the Introduction section and answering the question raised in the introduction. This is an acceptable reiteration, as the Introduction and Discussion section are separated by other sections. While describing the gist of the results, the authors must include all important observations. They must report on the primary outcome, irrespective of the fact whether these are in line with the stated hypothesis or not.

The next part of the Discussion should be devoted to interpreting the results, citing the strengths and limitations of the study, and listing the implications of the study findings in the light of whole evidence. This should begin with comparing and contrasting the study results with those of other relevant studies. However, it is advisable for authors to desist from providing a detailed critique of each and every study on the topic. Studies with similar as well as differing results should be cited. The possible reasons for differences in the results can then be discussed<sup>(3)</sup>. Getting results that are different from previously conducted studies does not necessarily mean that there has been some error or mistake in conducting the study. It could simply be due to differences in the populations studied. It is also



**Table 1: Common pitfalls**

Pitfall	Corrective Action
Providing results in great detail	A gist of results is enough to provide context for the discussion that follows
Discussing observations not reported in the Results section	Only observations reported in the Results section should be discussed
Avoiding discussion on unexpected results	Discuss unexpected results and try to explain results not in line with the hypothesis. Be honest. These could stimulate further research
Same or similar information is provided in introduction and discussion sections	Introduction and Discussion sections should complement each other (Table 2). It is necessary that arguments begun in Introduction are followed through in the discussion section, but repetition of ideas and arguments should be avoided.
Long, wordy arguments that meander	Use focused arguments
Using discussion section to provide historical details or irrelevant information. Comparing study findings all the studies done on the subject.	Compare study findings with those from recent, relevant high-quality studies in order to hold the readers' attention.
Not listing study limitations	Not a good idea. Reviewers will point to them out, anyway
Conclusions not supported by the data or over-inflating the importance or 'generalizability' of the study findings	Avoid drawing conclusions that are not backed by data. Always provide a balanced and honest viewpoint.
Speculating too much or too little	Discussion section should be used for predicting how results would impact practice, health policy and future research. Such predictions help readers understand the value of the research study. But exaggerations and excessive speculation should be avoided as it would bring discredit.

possible that the differences were because of a more sensitive or specific test used in the current study. The authors can also attempt to explore the possible mechanisms or explanation for the study findings. If there have been some unexpected findings, these should be reported honestly and an attempt should be made to explain their occurrence, if possible. These findings could sow the seeds of future exploration and research.

The authors can then describe how the study was unique or different and what were the strengths and limitations of the study. The strengths could be related to objectives of the study, participant characteristics or conduct of study. For example, the present study may have had a better choice of the research question, a stringent selection of an appropriate study population, or an intervention similar to that used in the medical practice. In addition, it might have employed a more sensitive or more specific test

for screening or diagnosis, enrolled an appropriately large participant population (adequate sample size), ensured a higher compliance and lower drop-out rates or used an objectively assessed and clinically relevant endpoint, or utilized various effective methods to minimize bias.

Many newly-initiated authors tend to shy away from listing limitations in the study thinking that if they point out weaknesses in their study, the probability of manuscript being rejected would be higher. This is far from the truth. It is well to remember that no study is perfect and that every study has one or the other limitation. In any case, the editors invite experts to review the manuscripts. In such a situation, these expert reviewers are anyway going to identify and point out the weaknesses in the study. And then they would have the impression that the investigators have planned and executed the study and are now reporting the study findings without having any

idea about the limitations of their study. It is better for the authors to point out the possible weaknesses such as sources of imprecision and sources, magnitude and directions of potential bias. They can also elaborate on the efforts taken to minimize these errors and maybe even clarify why they could not be eliminated or controlled further. The authors can then go on to discuss the impact of these limitations on the study findings and argue how the results can still be considered valid in spite of the listed limitations.

After having presented the whole evidence (from the previous studies and the current study) and having critically analyzed the study quality (in terms of limitations and strengths); the authors should may then provide a balanced interpretation of the whole evidence, citing what the study has added to the current knowledge and how it has enhanced understanding of the subject. They then need to discuss the generalizability (validity and applicability) of the study findings and based on the totality of evidence should state if and how clinical practice (diagnostics, therapy or preventive strategy) and/ or health policy needs to change. While reporting on these aspects, care should be taken to ensure that the conclusions are based on the study data, and the importance of the study is not exaggerated. The last paragraph of the section should show-case the study, stating clearly whether the study findings support the hypothesis or not. The authors can also list the new questions and controversies raised by the study and explore implications of the study findings for the clinical practice and future research.

### Pitfalls to Avoid

Discussion section needs to be written with great care and thought, as it informs the reader about the significance of the study. And it is necessary that authors plan it



**Table 2: Comparison between the Introduction and Discussion sections**

	Introduction Section	Discussion Section
Purpose	To help reader understand the need to conduct the research study	To help reader interpret the results and understand the implications of the study findings
Research Question	Narrates the hypothesis or the research question	Provides answer to the research question and states if the study findings support the hypothesis
Contents	Information about the current state of knowledge, enlisting knowledge gaps, importance of bridging the knowledge gap and stating the hypothesis or the research question	Summary of study findings, explanation of study findings, comparison with available evidence, enlisting strengths and weaknesses of the study, interpretation of the whole evidence, discussion on the external validity and impact of the study findings and recommendations for future course of action
Flow and Organization	From general information to specific study objectives	From specific study findings to implications for the relevant general population

well. Before beginning to write the section, the authors should have a good grasp of literature on the subject including the recently generated evidence. Although they may have read several studies, they need to choose what literature to quote and which studies' findings to compare. They should choose high-quality relevant studies for comparison. They should never lose focus and provide unnecessary historical details. It is important that authors avoid pitfalls listed in Table 1. Since introduction section contains information based on current knowledge on the basis of published literature and as study findings are compared with those reported in literature in the discussion section, there is a risk of similar information finding place in these two sections. This can be minimized and even avoided by remembering the purpose and context of these two sections (Table 2).

Authors should pay due attention

to the instructions to authors that journals provide. Though most journals do not specify a page limit or word count limit for discussion, it is imperative that the overall word count limit advised for the manuscript is adhered to and all unnecessary sentences (and even words) are edited out from the Discussion. As with most other sections, active voice should predominate, though a mix of active voice with a few sentences in passive voice are welcome. It is better to be direct and concise while making a point. Tables and figures are rarely used to depict what the authors wish to convey. This is understandable since discussion mainly deals with exchange of ideas, views and opinions. However, sometimes figures are used to elucidate complex mechanisms. Tables are used (not infrequently) for depicting information culled from many sources. Tables showing details of previous studies allow readers to grasp and understand

the evidence generated by earlier studies at a glance.

To summarize, discussion section is considered to be the most important section of a research manuscript, as it puts the study findings in an appropriate perspective and describes the contribution made by and the significance of the study. Many a times, it decides if the manuscript will be accepted for publication or not. Hence, it is necessary for the authors to plan it well, and write it in a focused manner describing the significance and importance of the study findings.

## References

1. Annesley TM. The Discussion Section: Your Closing Argument. *Clin Chem* 2010; 56:1066671-4.
2. Garcia Santos JM. How to write an original article in a biomedical journal. *Radiologia* 2011; 53:209-19.
3. Markovich H. Discussion. In: Hall GM (ed.) *How to Write a Paper* 3<sup>rd</sup> edition, New Delhi, Byword Viva Publishers Private Limited, Pp 36-41.
4. Schulz KF, Altman DG, Moher D, CONSORT Group. CONSORT 2010 statement: updated guidelines for reporting parallel group randomised trials. *BMJ Medicine* 2010; 8:18.
5. von Elm E, Altman DG, Egger M, Pocock SJ, Gotsche PC, Vandenbrouche JP, for the STROBE Group. *Int J Surg* 2014; 12:1495-9.
6. International Committee of Medical Journal Editors (ICMJE). Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals. Updated December 2014. <http://www.icmje.org/icmje-recommendations.pdf> [Last accessed on August 22, 2015].
7. Ng KH, Peh WCG. Writing the Discussion. *Singapore Med J* 2009; 50:438-60.