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Format for a quantitative research article

In November 2011 I posted a format that I developed for a quantitative research proposal on my website. This has become one of my most popular posts (watched almost 7000 times in the past year) and I have received many comments from students/professionals that this has been helpful. I therefore decided to also develop a format for a quantitative research article.

What are the different sections included in a scientific article? Note that journals might have their own requirements, but you can use this as a general guideline: Title page, Abstract, Introduction, Methods, Results, Discussion, Acknowledgements, References and Appendices.

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The **title page** includes a title for your article that describes the content or the main result of the paper, when it was conducted and where. The better the title, the easier it is for those interested in your study to find it. This page also includes the authors names, institutional affiliations and details for correspondence.

The **abstract** should summarize the major aspects of the entire article, but you can only use a limited number of words (in general 200-300). Guideline is to use 2-3 sentences per section of the paper (introduction, methods, results, discussion), although the results often require some more lines. So from the Introduction you take the question(s) you investigated or purpose of the study. The basic design and methods used are taken from the next section. The major findings that answer the question(s) are taken from the Results section. And finally, your conclusion based on the results and implications are taken from the Discussion. Likewise the title, it is very important that the information essential for the reader to determine whether this article is interesting for him/her should be captured. Most readers will decide based on the abstract if they will retrieve the full text. Although this is one of the first sections of the article, it is the last to be written. Note that you should not include any references in the abstract.

The **Introduction** should contain the following sections: problem statement, rationale for the study, significance of the study, objectives of the study. If you have written a research proposal for the study, this are all things that you have written down before. However, it should be much more concise in an article, and furthermore, new literature might have

been published during the time you were doing your study (so include these here). This section goes from general (what is reported in the literature, what is done in practice) to more specific (your study).

The problem statement is a concise description of the nature of the problem (the discrepancy between what is and what should be) and of the size, distribution and severity of the problem (who is affected, where, since when, and what are the consequences). Use a literature review (original research papers and review articles) to provide this context. Go from general to specific e.g. If you are doing a study on adherence to HIV treatment in South Africa, start with some information on the HIV epidemic, then the treatment options and lastly the issues with adherence. And within these sections start with global evidence, then Africa, then South Africa. Note that extensive descriptions of studies with the same objective will be included in the Discussion section.

The rationale for the study relates to the origin/source of the topic and the importance of the problem. A brief description of any solutions to the problem that have been tried in the past should be given, how well they have worked, and why further research is needed. Again, use literature to support this.

The significance of the study is a description of the type of information expected to result from the project and a clarification of how this information will be used to help solve the problem (contribution to existing knowledge).

And finally, you have a general **objective** (general aim or purpose of the study which is derived from the research topic) and specific objectives which are based on your general objective. The Results section will be guided by these objectives. Note that the study itself can have more objectives, but you only mention those that will be answered in this article.

The **Methods** section contains the following items: study design, study setting, (sampling of) the participants, measurement instrument(s), data collection, data analysis and ethics. Sometimes you can refer to other articles published on the same (larger) study. Then you can limited yourself here to the essentials for the objectives covered in this article. And again, this should all have been included in your proposal, although changes might have occurred when executing the study.

The study design is often explained in one sentence e.g. a randomized controlled trial conducted from October 1998 to April 2000 at 13 neurological outpatient clinics in The Netherlands.

Then you continue to describe the study setting (e.g. hospital), the sampling or selection method/criteria for those included in the study, and justification of the sample size (power calculation). In case an intervention study is conducted, you need to add a section in which you describe the interventions that the treatment and control groups received.

Describe the instrument(s) used for data collection (e.g. interview guide, questionnaire, checklist or data collection form) including validity and reliability. If you used a (adaptation of a) standard tool, you can refer to an article in which it is described. In case you developed a tool yourself, you can possibly include it as an appendix. For intervention studies you should mention whether blinding has been applied (for caregivers, participants, outcome assessors).

Describe who collected the data and when. The data analysis section should cover how you analysed your (primary and secondary) outcomes: how the data were summarized (e.g. means, % including measures of variability e.g. SD, 95% CI), the statistical techniques used; the program used.

You will end this section with a line on ethics; has the study been approved by an ethics committee (provide the number); has (written) informed consent been given by participants.

The function of the **Results** section is to objectively (and concisely) present key results, without any interpretation (that you will do in the Discussion). A good approach is to develop your tables / figures based on your analysis and place these in a logical sequence following your objectives. (Note that intervention studies often have a Table 1 describing the characteristics of the participants in the groups that are compared.) Then add text to highlight one or two findings (e.g. trends, differences, similarities, correlations) that can be found in each table/figure. Avoid repeating all the information that is displayed in the tables and figures.

If you report your results, mention also the statistical test and the number on which the test has been done. Don't avoid reporting negative results as these are also important. You must not feel obliged to report on all the results of your study in one article. If you have to many results you want to share that belong to different objectives, you can write multiple articles. Most journals now also accept online appendices with additional (more detailed) tables, extra figures, even datasets.

In the last (**Discussion**) section of the article, and often the most difficult one to write, you give an answer to the objectives of the study (summarize). Then you interpret the most important results, including any unexpected findings; what do these results mean? Here you also compare the results with other studies done on the topic. Make sure you provide sufficient information on these studies (e.g. when conducted? where? study design? who participated? number?) so that the reader can judge whether these studies are similar to yours. In this section you also highlight the limitations of your study, and possible consequences thereof. But also don't forget to mention the strengths of your study. You end with a paragraph on what the implications of your results are and what the way forward is for research, practice and policy. You often end with one concluding sentence (In conclusion, ...).

Note that you must not present any new results here (these should go into the Results section). And contrary to the introduction, you go in this section from specific (your study) to general (practice, policy, future research).

In the **Acknowledgments** you name persons that are not an author but which assisted you when conducting the research, writing up the article etc. Here you mention also sources of funding that supported the research.

The format of your **references** is often prescribed by the journal you submit your article to. Therefore it is very helpful if you insert your references using a referencing programme (e.g. Endnote, Reference Manager) as then you can easily adapt the format to the journal requirements.

Appendices contain information that is not essential for understanding the paper, but that e.g. further clarifies a point without burdening the body of the presentation. An appendix is an optional part of the paper, and more and more used for online publications. Examples of what might be put in an appendix are: large tables, figures, maps; raw data; explanation of 'new' statistical/ mathematical procedures; data collection instruments.

And again, please note that the above is only a suggested format, based on existing literature. Note that there are also reporting guidelines for different study designs:

CONSORT statement (<http://www.consort-statement.org/>) for intervention studies and

Strobe statement (<http://www.strobe-statement.org/>) for observational studies. If the journal has different requirements, you should adhere to those. In general, limited the number of words, but say what you need to say.

I want to end this article with some suggestions on the actual process of writing: Start with an outline (subheadings, paragraphs, key words on what is covered). Then write a first draft (change key words into sentences, develop tables/figures), put it aside, revise it, etc. Then finalize article for internal review (supervisor(s), co-authors), revise according to comments, and send out for a second (or final) internal review. Finalize your journal choice and adapt the article according to requirements. When that is done submit your article to the journal and hold thumbs that they accept your contribution!

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I recently examined a MPH thesis in which the student stated that “the intervention and control were assigned using a random sampling technique.” I have noted in the past that students mix-up random sampling and randomization. I therefore explain both concepts together in this article.

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TONG SERA BAROBA on January 30, 2017 at 2:04 am

I ALSO GAVE UP ON MY COURSE AND SUBJECT DUE TO NOT KNOWING WHAT TO DO. HOWEVER, JUST SEARCHING CAME ACROS YOUR RESEARCH PROPOSAL ON QUATITATIVE MODEL, AND NOW I FEEL I CAN PURSUE MY COURSE WITH JOY.

THANKS VERY MUCH AND WILL KEEP INTOUCH.

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