# Writing and scientific literature
# Methods: the cake's recipe

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Publication is a mandatory task of scientific research. Describing and explaining phenomena, denying or confirming concepts, it is through publication that science alters human knowledge, often for the better. This task, however, represents a nightmare for many researchers. It is not unusual to describe a scientist as an antisocial individual, averse to communication and dialogue. In fact, many scientists are bad writers and bad teachers, which could explain why there are so many ghostwriters, and so many professors who consider delivering a lecture a punishment. Publication requires an additional effort through an activity entirely different from that required by research. Publishing involves putting oneself in another's shoes, anticipating the reader's interpretation, a difficult task for individuals who often have problems with the theory of mind – the ability to understand the mental states of others.

In order to make the exercise of writing scientific articles a "lighter" task, RAMB has been publishing Editorials containing the editor's perception of each part of a scientific manuscript, classically structured in the IMRAD format: introduction, methods, results, and discussion1,2. Methods (or Methodology) represents the most technical and objective part of the text, requiring "less theory of mind", and it is probably the easiest part for the scientist, but its writing is not less important. The editor and the reviewer will seldomly begin the article's evaluation by the Methods, but they certainly will return to the methodology to check the procedures and clarify doubts concerning the results. Due to its more technical nature, this is the part presenting errors that compromise all the research and serve as a basis to justify rejection of the scientific article by reviewers.

The Methods section usually starts with a description of the study design. This section may contain sub-items, which often occurs in clinical trials or epidemiological studies, as it is necessary to characterize the population or the case studied. The universe from which the study sample was taken should be described, including location (scenario), time, name of institution, inclusion and exclusion criteria, description of subdivision or population distribution into subgroups, and outcomes. The selection biases or inadequate designs that can compromise the article's evaluation are here identified by the reviewers. A detailed description of examinations, tests, and material preparation is the next step. It is to this section that reviewers turn their critical eye when very strange or unusual result values are found.

An important part of the Methods section is the statistical analysis. The reviewer must find justification for the sample size determination, test presentation, and software used for the analysis. A key tip is to write clearly and thoroughly to avoid having the text sent by editors to an expert statistical reviewer. Most journals offer this option on the form filled out by the reviewers. Experience shows that the reviewer marks this option when he/she has questions or believes that the statistical analysis may be incorrect. Another valuable piece of information is how the statistical analysis is described in previous publications by the same journal. Caution is necessary because if the paper is submitted to analysis by an expert reviewer, other variables will be involved, including a more rigorous description and a more technical language that is not always mastered by the authors.

Finally, it must be said that a well designed and prepared study undergoes a process of internal and external validation. The former ensures the reliability, and shows the reader that the research process is correctly designed, using solid definitions, concepts, and adequate tools. The latter (external validation) ensures reproducibility: the methodology should contain enough information so that the experiment can be reproduced, attaining similar results. In both cases, instead of a detailed description, citations of previous publications by the same authors may be used, provided that these citations are identical and can ensure reliability and reproducibility.

## References

1. Caramelli B. The title: herald of scientific communication. Rev Assoc Med Bras. 2011;57(4): 359.
2. Caramelli B. Abstract: the trailer of scientific communication. Rev Assoc Med Bras. 2011;57(6): 607.