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One of the ways that researchers can disseminate the results of their investigations and observations is publishing scientific articles. In order to publish an article in a scientific journal, some qualities are required. The subject should be relevant, the research should have quality and the report should be well written.^{1,2} The present article presents practical concepts that may help researchers in the preparation of good scientific reports (Figure 1).

- Step 1 Decide the article's objective

Writing becomes easier when the objective is clear and well-focused. Poorly defined objectives or many objectives hamper the writing process, because they make it harder to achieve the qualities of a good text, such as clarity, concision and logical sequence. The objective of a research may become clearer if it is drafted as a question. For example, recently, when an increase in the number of microcephaly cases was observed, researchers formulated the following questions: Is there an association between microcephaly and the infection by Zika virus? Is this a cause-effect relationship? Today, there are strong evidences based on scientific reports that the association between microcephaly and Zika virus infection is causal.

- Step 2 Choose the journal to which you will submit your article

There are plenty of scientific journals in several knowledge areas. There is also some hierarchy between them, based on the influence they have over the scientific community. There are many criteria that influence this hierarchy, such as the indexation of the journal in prestigious bibliographic databases, the number of citations received by the journal and the publication language. Being aware of these criteria enables better choices. However, in highly prestigious journals, which

are the most searched by authors, the proportion of refusals is higher. It is important to take this difficulty in consideration when choosing the journal. An average prestigious journal can reach the desired target audience as well.

- Step 3 Provide yourself with guides that help writing

After selecting the journal to which you will submit your article, the next step is to read its instructions to authors. It is a good practice to verify recent issues of the chosen journal to understand the profile of articles that have been published. Moreover, there are many reporting guidelines that can be used as reference,³ as well as several resources, such as articles or books, which can be useful to clarify doubts and avoid unnecessary improvisation.

- Step 4 Write the article's structure

Any type of communication, oral or written, has a logical sequence. It can be formed by an introduction, development of the subject and conclusion. The conclusion represents the author's answer to the research question to be answered. Many journals adopt a different division for the text, the format IMRD – introduction, methods, results and discussion. Editors and many readers defend that a four-part standardization is more useful, because it enables a better understanding and text analysis. Each part of the manuscript must contain information required so the reader can understand what has been done and be convinced of the adequacy and credibility of the authors' conclusion. See the guidelines at Figure 2.

- Step 5 Complete the other parts of the text

Besides preparing the article, in the IMRD format, there are other demands from the journals' editors. Among them, make a list of references of all the material cited in the texts, an abstract, the title of the article and

1. Decide the article's objective.
2. Choose the journal to which you will submit your article.
3. Provide yourself with guides that help writing.
4. Write the article's structure.
5. Complete the other parts of the text.
6. Revise the text over and over.
7. Make sure that the article is methodologically right.
8. Make sure there are no flaws in writing.
9. Submit the article for publication.
10. Cope well with the editors and reviewers.

Figure 1 – Ten steps for writing a successful scientific article

the authors' names.⁴ For each of these aspects, there are guidelines to be followed. For example, the list cannot exceed thirty references and the abstract should have a maximum of 150 words. It is important to verify these and other limits in the instructions to authors of the chosen journal and, if it is not available, search on scientific writing guides.

- Step 6 Review the text over and over

The objective of proofreading is to ensure that the words used reflect correctly what the authors intended to report. It is usually necessary to perform many reviews. Other objectives of proofreading are: confirm numbers, eliminate grammar mistakes, exclude repetitions and remove whatever is unnecessary. The American writer Mark Twain (1835-1910) affirmed that there are three rules to write well: "The first is to review; the second is to review; and the third is to review." See Figure 3 for more on this topic.

- Step 7 Make sure the article is methodologically right

The author who intends to submit an article to a journal must know that the text will be assessed and that it will compete for space in scientific journals. Therefore, it is important to produce a high quality text, so the chances of success are greater. It means that, among other things, authors have to produce a text which contains answers to possible methodological questioning. The article will be assessed by strict experts who, not rarely, will demand perfection in situations which not even themselves are capable of achieving. It is fundamental to have the text ready for this type of evaluation. Taking into account the high number of articles that the readers are supposed to read to keep themselves updated, they would be glad if they found only clear and concise texts. The proofreaders and editors act like readers' representatives and, in a

broader way, representatives of the scientific community, having the duty of only allowing the publication of quality articles.

- Step 8 Make sure there are no flaws in writing

Readability is the authors' responsibility. After revising the text and asking for suggestions to co-workers and experts in the subject, a good possibility to make sure the text is free of flaws is to send it to a language professional. Choose someone who assists you on grammar and writing matters, but without changing your style. If this person has substantially contributed, we recommend the authors to recognize it at the acknowledgments section. The person must agree to have his or her name cited in the acknowledgments.⁴

- Step 9 Submit the article for publication

We suggest the authors to read one more time the instructions to authors and to verify the most recent issue of the chosen journal before submitting the article. Follow strictly what is asked in the instructions, even if you do not understand the reasons for the request. This way, you will be cooperating with the journal's staff. The submission of the manuscript that does not comply with the journal's rules delays the process, being, many times, reason for refusal. The journal's website contains instructions on how to send the files and what documents should be attached during manuscript submission.

When the editor receives the article, he or she will send it to expert professionals, including themselves, so it can be evaluated. The text will be evaluated by specialists who are experts in the research subject and the method. As those two conditions are not usually found in the same person, and aiming to reduce subjectivity in evaluation, more people will assess the text in order to provide recommendations to the editor. If possible, the manuscript should be further improved. This is

Section	Content	Key-questions
Introduction	Presentation of information on the subject, rationale for the investigation and the objective.	What is the study subject? Why was the investigation conducted? What was already known about the subject?
Methods	Description of the study type, research scenario, sample, procedures and ethical aspects.	How was the study conducted?
Results	Presentation of the findings, with their respective statistical analyses, if applicable.	What was found? What are the facts revealed by the investigation?
Discussion	Interpretation of results, comparison and conclusion.	What do the findings mean? What does the study add on this subject?

Source: Pereira MG. Artigos científicos: como redigir, publicar e avaliar. Rio de Janeiro, Editora Guanabara-Koogan, 2011. p.30.

Figure 2 – Structure of a four-section scientific article and the content of each section

We must write the same way the washerwomen from Alagoas do their craft. They begin with a first wash, soak the dirty clothes at the pond or the stream, twist the cloth, soak it again, and twist it once again. They put the indigo blue, soap and twist once, twice. Then, they wash it, soak it once more, but now throwing water with the hands. They slam the cloth on the slab or on the clean stone, then they twist it again and again, they twist it until there not even a drop of water left. Only after all this, they hang the washed clothes on the rope or the line. So, who get into writing should do the same.

Figure 3 – How to write, according to the Brazilian writer Graciliano Ramos, born in Alagoas State (1892-1953)

the essence of the peer review process, adopted by the most respected journals in the scientific community.

- Step 10 Cope well with the editors and reviewers
After the article is submitted, the author must wait for the journal's decision, of whether it will be accepted or refused. It can come shortly, or take weeks, even months. In cases of long delay, the author could write a message to the editor, inquiring about the progress of the evaluation. In the case of acceptance, the author will need to fit the material into the reviewers' suggestions. If the article is refused, the author should stay calm. Editors and reviewers are human beings, who

are very attentive to the role they play when deciding the future of an article they evaluate. They may make mistakes, but rarely admit it. The problem is that there is no room in a journal for all submitted articles. The refusal may not always be due to value judgment on the text quality. Avoid asking extra information to the editor, because they are rarely given. What should you do? Maybe another journal can accept it. Experienced authors have been through similar problems. Try, the sooner you can, another journal. Before that, review the text and include all the relevant suggestions that the editor have sent. And good luck.

References

1. Pereira MG. Estrutura do artigo científico. *Epidemiol Serv Saúde*. 2012 abr-jun;21(2):351-2.
2. Pereira MG. Artigos científicos: como redigir, publicar e avaliar. Rio de Janeiro: Guanabara-Koogan; 2011. 383 p.
3. Galvão TE, Silva MT, Garcia LP. Ferramentas para melhorar a qualidade e a transparência dos relatos de pesquisa em saúde: guias de redação científica. *Epidemiol Serv Saúde*. 2016 abr-jun; 25(2): 427-36.
4. Duarte EF, Pansani TSA. Recomendações para elaboração, redação, edição e publicação de trabalhos acadêmicos em periódicos médicos. *Epidemiol. Serv. Saúde*. 2015 jul-set; 24(3):577-601.