



How to avoid common errors in writing scientific manuscripts

Franco A. Maiorana¹ · Horacio F. Mayer¹

Received: 16 February 2018 / Accepted: 2 April 2018 / Published online: 10 April 2018
© Springer-Verlag GmbH Germany, part of Springer Nature 2018

Abstract

When writing scientific manuscripts, many important details are left a side which many times causes the rejection of the manuscript from high impact journals. Scientific writing is a combination of a comprehensive literature search and study, collection of statistical data, and a clear and concise structured writing, while avoiding common and known errors. The knowledge and implementation of basic rules of style, structure, and presentation when writing a scientific paper increase the chances of success and ultimately publication. This article aims to contribute with the existing information on how to recognize and avoid common errors for a successful scientific writing and consequently being published.
Level of Evidence: Not ratable.

Keywords Scientific writing · Common errors · Obstacles · Writing skills

“The way to start is to stop talking and start doing.” Walt Disney, co-founder of the Walt Disney Company

Introduction

Writing and publishing is the key in a scientist’s life. The reasons for wanting to publish scientific manuscripts are many. Perhaps, the first and most important one is to share the discoveries with colleagues, since the publication converts the private knowledge into public. It is a demanding process considered necessary to ascend the academic ladder. Success or failure to publish can determinate a great advance and progress during the medical career path [1]. It is a learned process that requires effort, motivation, patience, persistent, and study where many physicians abandon after the first attempt [2].

Young surgeons, interested in developing a scientific career, make frequent errors when they try to communicate their

research, which reduces the possibilities of publication. Actually, it is a fact that only a few of them have received any formal instruction [3].

The knowledge and implementation of basic rules of style, structure, and presentation of a scientific paper increase the chances of success. Choosing the most appropriate journal and learning to deal effectively with the editors will help to achieve the expected publication and dissemination of the results.

This article aims to convey how to recognize common difficulties and avoid errors in order to succeed in writing a scientific paper for publication.

Barriers in scientific writing

Many barriers are usually found in scientific writing, being the language the most common between non-English-speaker authors. When the native language of the author is not English, writing in a clear and concise way can be difficult. Grammatical mistakes and odd phrasings should be avoided. The authors should mimic the native scientific idioms avoiding to fall in plagiarism [4]. A poorly written article could shed doubts on the interpretation of results and scientific value of the study, increasing the chances of rejection. Main reasons for rejecting papers are listed in Table 1 [5, 6].

✉ Horacio F. Mayer
horacio.mayer@hospitalitaliano.org.ar

¹ Plastic Surgery Department, Hospital Italiano de Buenos Aires, University of Buenos Aires School of Medicine and Hospital Italiano de Buenos Aires University Institute, Buenos Aires, Argentina

Table 1 Main reasons for rejecting a manuscript

Inappropriate, incomplete, or insufficiently described statistics.
Over interpretation of results.
Use of inappropriate, suboptimal, or insufficiently described populations or instruments.
Small or biased samples.
Text poorly written or difficult to follow

The lack of time is a major problem for academic surgeons interested in publishing. Many surgeons have long surgical and consulting days, besides administrative functions. Many of them rely on residents to carry our research activities aimed at publishing. For them, the surgical activity, the study, and being on call are also problematic. In many academic departments, research activities are carried out by research fellows entirely devoted to research. The lack of experience in scientific writing is an additional barrier which produces anxiety, lack of confidence, and fear of being rejected attempting against the desire of starting an academic career. Not being familiarized with the common requirements of every journal, which are usually displayed in the instruction for author section, is an additional cause of anxiety. As soon as a proper journal to submit the study has been chosen, all requirement must be known to organize the study from the beginning.

Common errors

We must always take into account the most common errors in order to avoid making them when writing a scientific paper. They are summarized in Table 2.

Also, by learning some do not's, we can facilitate the whole scientific writing process. The most important do not's for preparing a scientific manuscript are listed in Table 3.

Table 2 Common errors in scientific writing

The study is not well structured.
The arguments put forward are illogical or invalid.
The methods used do not conform to the established.
The study has no clear control group.
The analysis is not statistically valid.
It discusses results in relation to some works but ignores others.
The conclusions cannot be justified with the results.
References are incomplete or very old.
The study is an extension of a previous article by the same authors.

Table 3 Do not's for writing a scientific manuscript

Do not issue personal opinions, the collected data must be supported by studies giving validity with reliable results.
Do not take the lazy route and plagiarize, falsify, or duplicate. That is the route to academic self-destruction.
Do not overestimate results. Recognition will come with the well-done work.
Do not make destructive criticism to other's works, it is a lack of respect to a colleague and a very bad way of trying to attract some attention.
Do not give little care to grammar, spelling, figure, and tables.
Do not ignore the editorial and reviewer comments.
Do not overuse italics, abbreviations [7], or passive language [8].
Do not reiterate someone else's ideas and cite a wide range of authors [9].

Basic rules

After collecting data and analyzing it, it is important to learn the methodology for writing a scientific work which will be peer-reviewed, as opposed to telling a story without any structure. To begin with, we must find a mentor who leads and gives guidelines during the process of data collection and analysis. An intense and dedicated literature research in the most reputed databases, such as Medline/PubMed, Embase, Scopus, and Google Scholar, is mandatory. After that, we should carefully read the instruction for author section of the journal where we intend to publish. The way we manage to organize our thoughts is considering what do we want to communicate and to whom, what contributes to science, and if the topic potentially is of interest to our colleagues, especially for the journal in which we try to publish. Guiding questions are summarized in Table 4 [10].

The title

The title is a critical component and can affect journal reviewers' and editor's impressions of the importance of the

Table 4 Guiding question in writing a scientific manuscript

What do we do day to day at work that fascinates us and makes us an expert in that?
What is the gap in knowledge in the existing body of literature?
Who may be interested in our findings? Important to choose the audience of our article
Which is the right journal for our study?
Which is the main question that answers our study? Do we try to answer a single question or several related questions?
What has already been published on the topic?

work performed. Some journals consider only the title and abstract when selecting manuscripts to review; a poor title could mean the rejection of the manuscript.

The words in the title will determine whether readers can find the article with the search terms. Most electronic search engines and databases will use the words found in the title and abstract and the keywords to display articles to interested readers.

The title should describe the subject matter of the article. As the title and abstract are often the only parts of a paper that are freely available online, a strong title is vital to make sure readers will be interested in it. The title should be specific enough to describe the contents of the paper and appropriate for the intended audience. Abbreviations, filler phrases, and humor should be avoided.

Another tip to take into consideration is the length of the title. Short but descriptive titles are effective. Research by Paiva et al. shows that articles with shorter titles are viewed and cited more frequently [11]. Knight and Ingersoll suggest that 16 words should be the maximum length of a title [12].

Always check the author instructions of your target journal for title requirements before submission. Some journals require to provide a short running head which is a brief version of the title with no more than 50 characters long including spaces. Four to six keywords are also usually required and used for indexing purposes.

The authorship

Authorship confers credit and has important academic, social, and financial implications. Authorship also implies responsibility and accountability for the published work. The limit to the number of authors in an article depends on the journal. Most journals have specific guidelines about the maximum number of authors allowed in a manuscript being ten the usual limit for a single-center study.

The abstract

This is the most important section, since most readers will only take the time to read the abstract and decide if it is worthy to continue reading the rest. It is the opportunity of the authors to demonstrate their ability to communicate the main message. Therefore, it has to be attractive, concise, and as clear as it is possible. Above all, it must be shocking. Remember that readers will not be engaged with the article if the abstract is poorly written, even if the topic is of interest. It should be able to stand alone and

should be as succinct as possible [13]. Abbreviations should be avoided in abstracts if at all possible. Overly specialized language is also best avoided in abstracts except in the case of the most specialized of scientific journals. Depending on the type of article and journal, abstracts could be unstructured or structured in four sections: background, methods, results, and conclusions. We always must take into consideration the length of the abstract to satisfy the requirements and instructions for authors of the target journal. Abstracts are usually limited to 250–300 words depending on the journal.

Setting up the structure

The objective of this stage is to achieve a global vision of all the work and a development with clear arguments following the order given by the scientific method. The traditional sequence of a manuscript is introduction, methods, results, and discussion, which has been referred by the acronym IMRAD. However, Pollock et al. have suggested drafting the manuscript in the sequence MRDAI [14].

The introduction

It must present a brief summary of the current knowledge of the topic that is under investigation. It should be succinct and concise presenting what is known in the literature about the topic and what the present adds to the literature. A common error is to do an exhaustive revision on the topic that should not be done in this section. It should be written in present tense [15] and the last paragraph should be the aim of study [16]. A competent introduction should include at least four key concepts, which are summarized in Table 5 [17].

The material and methods

The most important for the writing of the material and methods is how we manage to explain the hypothesis of the main question, detailing the methods in a very precise way. It

Table 5 Key concepts for writing the introduction

Significance of the topic
The information gap in the available literature associated with the topic
A brief literature review in support of the key questions
Subsequently developed purposes/objectives and hypotheses

should be written in a past tense [15]. Some contents should not be missed in this section. Those are study design, target population and study population, measurements, statistical analysis, and protocols used. In the first paragraphs, a description of the inclusion and exclusion criteria is mandatory. Most journals will require that the details of the sample are included in the method section.

In order to write a good manuscript, the best study design should be chosen and an appropriate research has to be done. It is also mandatory being honest with the case volume. When data is not enough to make a randomized controlled double-blind study, the way of making a good research is working with other colleagues from other centers and carrying out a multicenter design group to get a higher volume [18]. It is important to note that in plastic surgery, not all questions are suitable for a randomized clinical trial and case series will still be needed whether for rare conditions or for interesting technical developments amongst other reasons [19].

The practice of evidence-based medicine has changed the way physicians practice by emphasizing scientific and validated evidence over anecdotal clinical practices [20, 21]. In 2011, the level of evidence (LOE) pyramid was implemented as a tool in plastic surgery literature in an effort to bring attention to evidence-based medicine and promote quality of research [22]. The American Society of Plastic Surgeons Scale stratifies randomized controlled trials with high power (power > 80%) as level I, lesser-quality randomized controlled trials as level II, cohort or case-control studies as level III, case series as level IV, and expert opinion as level V [23]. The standard is to exclude basic science, bench work, and animal studies because the information gained from these studies is not something that can be applied directly to patient treatment decisions.

The following paragraphs can detail the procedures used for the study. Procedures should not be justified in this section which is a very common error. Such justification should be included in the discussion section. The last paragraph of this section must be dedicated to present the statistical methods used to analyze the data [24].

The results

All results must be presented first and finally discussed in the discussion section [25]. Result section should only describe the evidence authors have with their data to answer the question [26]. Authors can be tempted to include all the analysis of their results. Any interpretation of results should be avoided. This can confuse the reader, who might quickly lose confidence in the validity of the study. In this section, it should not include any citation. The result section should be written in the past tense [25].

The discussion

In this section, the findings are interpreted. The first paragraph opens the discussion and explains what the study shows, without including any references. Then, authors should critically evaluate their own work. Diplomatically, they should explain contradictions between their findings and findings from other authors, comparing and contrasting their results with other previously published papers. Similar findings will strengthen the presented results. Always the importance and clinical relevance of the findings should be discussed as well as limitations and strengths. Suggestions should be made for future research on the studied topic. Towards the end, it should appear the final answer to the main question of the study and the description of the theoretical implications.

Discussion section should not describe the results all over again and even less show results that were not presented previously. One of the biggest mistakes is to reaffirm the meaning of the findings; these should be smoothed and not overstretched [27]. Past tense is always used to discuss our study and present tense for discussions of other studies [8]. In addition, severe criticism of previously published works could be a cause of rejection.

The conclusions

The conclusion is never a restatement of the results, but the final answer to the question, and includes the theoretical and practical implications. It must be based on the evidence of the results. They should be presented in a concise and focused way for easy understanding.

The references

Every journal in its instruction for authors refers on how to quote references. There are basic rules for quoting. A wrong format shows a lack of attention to detail and sometimes indicates the authors meant to submit the work to another journal or perhaps already submitted the work to another journal and was rejected.

General structure of quoting references in a journal includes the list of authors in the order in which they appear in the original text. The year of publication follows the author list. Periods are used to separate each element, including author(s), article and journal title, and volume and page information.

References quoted in the text should be numbered consecutively in the order in which they appear in the text. References to papers accepted but not yet published should be designated as “in press.” When the article is already published online

ahead of the print publication, the reference should include the digital object identifier (DOI) number.

Authors should provide direct references to original research sources whenever possible. It is important to note that although references to review articles can be an efficient way to guide readers to a body of literature, review articles do not always reflect original work accurately.

The statements

Full declarations of the authors' potential conflicts of interest (financial and non-financial) and sources of funding for the study, including sponsor names along with explanations of the role of those sources, are required when submitting a manuscript to a journal. Such disclosures are usually published to assist readers in evaluating the article. The editor-in-chief may decide to reject the article on the basis of any declared conflict.

When the research involved human participants, authors should include a statement that the study was approved by the appropriate ethics committee and therefore was carried out in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments. When the research involved animals, authors should indicate that international, national, and/or institutional guidelines for the welfare of animals were followed and that the study was approved by the corresponding ethics committee. Authors of manuscripts that describe experimental studies on humans should also include a statement that the subjects gave informed consent before their inclusion in the study. Additional consent is also usually required for the publication of photographs.

Conclusions

It is possible and not that difficult to be a scientific writer. In order to become a published author, the knowledge on the rules and structures of scientific writing must be acquired. Authors aware of the common mistakes that should be avoided and barriers that must be overcome, have high chances of success in publishing their work transcending in this way generations of medical knowledge.

“Start by doing what is necessary, then what is possible, and suddenly you are doing the impossible.” Saint Francis of Assisi

Compliance with ethical standards

Funding This study did not receive any specific grant from funding agencies in the public, commercial and not-for-profit sectors.

Conflict of interest Franco Maiorana and Horacio F. Mayer declare that they have no conflict of interest.

Ethical approval For this kind of study, formal consent from a local ethics committee is not required.

References

1. Schein M, Farndon JR, Fingerhut A (2000) Why should a surgeon publish? *Br J Surg* 87:3–5
2. Uzuner S (2008) Multilingual scholars' participation in core/global academic communities: a literature review. *J Engl Acad Purp* 7(4): 250–263
3. Broaddus VC, Feigal DW Jr (1994) Starting an academic career: a survey of junior academic pulmonary physicians. *Chest* 105:1858–1863
4. Shi L (2012) Rewriting and paraphrasing source texts in second language writing. *J Second Lang Writ* 21(2):134–148
5. Bordage G (2001) Reasons reviewers reject and accept manuscripts: the strengths and weaknesses in medical education reports. *Acad Med* 76:889–896
6. Pierson DJ (2004) The top 10 reasons why manuscripts are not accepted for publication. *Respir Care* 49:1246–12512
7. DeBakey L, DeBakey S (1984) The case report: II. Style and form. *Int J Cardiol* 6:247–254
8. Derish P, Eastwood S (2008) A clarity clinic for surgical writing. *J Surg Res* 147:50–58
9. Sandra V. Kotsis, M.P.H. Kevin C. Chung, M.D. A guide for writing in the scientific forum. *Plast. Reconstr. Surg* 126: 1770, 2010
10. Andrea Pusic M.D. MHS FACS “Getting Your Paper in Shape for PRS and PRS Global Open” teaching course from PSTM 16. <https://journals.lww.com/prsgo/Pages/videogallery.aspx?videoId=111&autoplay=true>. Accessed December 10th, 2018
11. Paiva CE, Lima JP, Paiva BS (1996) Articles with short titles describing the results are cited more often. *J Athl Train* 31(3):201–206
12. Knight K, Ingersoll CD (1996) Structure of a scholarly manuscript: 66 tips for what goes where. *J Athl Train* 31(3):201–206
13. Moreira A, Haahtela T (2011) How to write a scientific paper-and win the game scientists play! *Pneumologia* 17(3):146–149
14. Pollock A, Evans M, Wiggin M, Balch C (1991) Writing your first scientific paper. In: Troidl H (ed) *Principles and practice of research. Strategies for surgical investigators*. Springer-Verlag, New York, pp 391–403
15. Pakes GE (2001) Writing manuscripts describing clinical trials: a guide for pharmacotherapeutic researchers. *Ann Pharmacother* 35: 770–779
16. Branson RD (2004) Anatomy of a research paper. *Respir Care* 49: 1222–1228
17. Cook C, Brismee JM, Courtney C, Hancock M, May S (2009) Publishing a scientific manuscript on manual therapy. *J Man Manip Ther* 17(3):141–147
18. Andrea Pusic M.D. MHS FACS “Getting Your Paper in Shape for PRS and PRS Global Open” teaching course from PSTM 16 <https://journals.lww.com/prsgo/Pages/videogallery.aspx?videoId=111&autoplay=tr>. Accessed December 10th, 2017
19. Agha RA, Devesa M, Whitehurst K, Fowler AJ, Coe R, Wellstead G, Orgill DP, McCulloch P (2016) Levels of evidence in plastic surgery—bibliometric trends and comparison with five other surgical specialties. *Eur J Plast Surg* 39(5):365–370
20. Sackett DL, Rosenberg WM, Gray JA, Haynes RB, Richardson WS (1996) Evidence based medicine: what it is and what it isn't. *BMJ* 312:71–72

21. Chang EY, Pannucci CJ, Wilkins EG (2009) Quality of clinical studies in aesthetic surgery journals: a 10-year review. *Aesthet Surg J* 29:144–147 discussion 147–149
22. Burns PB, Rohrich RJ, Chung KC (2011) The levels of evidence and their role in evidence-based medicine. *Plast Reconstr Surg* 128:305–310
23. American Society of Plastic Surgeons. Scales for rating levels of evidence. Available at: <http://www.plasticsurgery.org/Documents/medical-professionals/health-policy/evidence-practice/ASPS-Rating-Scale-March-2011.pdf>. Accessed December 10th, 2017
24. Van Way CW (2007) Writing a scientific paper. *Nutr Clin Pract* 22:636–640
25. Hoogenboom BJ (2012 Oct) How to write a scientific article. *Int J Sports Phys Ther* 7(5):512–517
26. Kallet RH (2004) How to write the methods section of a research paper. *Respir Care* 49:1229–1232
27. Eriksson P, Altermann W, Editorial CO (2005) Some general advice for writing a scientific paper. *J African Earth Sci* 41:285–288