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Review Article

How to Write and Publish Research Findings

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Abstract

Introduction: Research findings are a central part of any publication and must address the proposed objectives with explicit reasoning that answers the research question. **Objective:** To highlight the core elements of an article to be published as the result of a research study. **Results:** A review of the literature is conducted to identify the key, practical, and most useful elements for presenting the results of a research study intended for publication. Additionally, common mistakes to avoid in the presentation are highlighted. **Conclusions:** Practical aspects within the context of a scientific publication are emphasized, aiming to streamline the process and prevent errors in presenting research findings.

Keywords

Methods, results, tables, research.

INTRODUCTION

It is recommended that the ultimate outcome of any scientific research should be a publication that facilitates its dissemination. Scientists or researchers are recognized not for their knowledge or expertise but for what they publish. A scientific experiment, no matter how remarkable its results, is not complete until it is published. In essence, the cornerstone of the philosophy of science is based on the premise that research must be published, as this is the only way to verify the validity of the results and contribute to scientific knowledge. A properly published manuscript allows results to be reproduced, which lends credibility to scientific research[1,2]. In other words, a scientist must not only conduct research but also write about it with impeccable clarity, ensuring the research question, the methods used to address it, and the results are effectively communicated. Poor writing can undermine the significance of the research[2].

In summary, when preparing a publication, we should ask ourselves: Is it relevant to publish the available data? Do the data address the study's hypothesis and objectives? Are the conclusions important, plausible, and reproducible?

Depending on the type of research and study design, publications can take the form of a case report, a case series, a topic review, an original article, or a meta-analysis. Choosing the appropriate journal involves evaluating whether it is indexed in national or international databases and its impact factor (citation rate). However, the key determinant for selecting a journal should be its alignment with the research objectives[3].

There are various methods and suggestions for drafting the final article. An easy way to remember the structure of a scientific publication is the acronym IMRAD (Introduction, Methods, Result Analysis, and Discussion), starting with the abstract in both Spanish and English, along with keywords to facilitate indexing[4]. It is essential to understand that the structure and organization of the article must vary depending on the type and nature of the study as well as the target journal, considering that each journal has its own publication guidelines. Generally, in all journals, the first section is the abstract, which must be written in the original language and in English. This is followed by an introduction to the topic, mentioning the origin of the research question. The methodology section then explains how the study design was selected to address the research question.

The subsequent sections of a scientific article intended for publication will present the results and highlight the core findings[5].

SECTIONS OF A SCIENTIFIC ARTICLE

Introduction and Background

This section should clearly and concisely explain the rationale for conducting the research, the research question, and the current state of the art on the topic. The introduction serves to present the research question and establish the relationship between the study and the existing evidence, offering a brief description of the study's purpose, including the hypothesis and objectives.

Materials and Methods

This section describes how the study was conducted in sufficient detail to allow replication by another researcher. It must explicitly state the type of study or design, the inclusion and exclusion criteria, the variables defined to achieve the objectives, the measurement methods, the sample size calculation, the statistical methods used, and the ethical considerations. If any interventions were performed or equipment, reagents, or medications were used, these should be described. Visual aids such as diagrams and figures are recommended to enhance clarity and comprehension.

For the hypothesis testing to be robust, the sample size calculation must be precise to ensure plausible results and valid hypothesis testing. In technical terms, this involves controlling the beta error.

Results

This section presents the study's findings clearly and is written in the past tense, avoiding the first person to ensure all authors' contributions are acknowledged. Tables and figures should be used effectively to support the narrative, with the text developed around them.

The first paragraph should succinctly summarize the study's primary finding in a clear and direct statement, and the results should be presented in the same order as described in the methodology. Begin by describing the sample or population, followed by the most significant findings that either confirm or refute the study's hypothesis.

Tables and figures must have appropriate titles and clear, concise content. Graphs are particularly useful for illustrating trends and should adhere to the journal's formatting guidelines[6,7].

Analysis

This section involves the mathematical and statistical methodologies used to organize, describe, analyze, and interpret data in a valid manner, establishing probabilities to allow extrapolation. In other words, it enables data-driven decision-making[8].

Discussion

The discussion explains the significance of the results and is typically written in the present tense. It is recommended to begin with a statement that addresses the initial research question, followed by a comparison of the findings with those in the existing literature. This should include identifying studies that support the results and those that do not, explaining the reasons for discrepancies, and illustrating how the results can improve medical practice. This section should also acknowledge potential methodological flaws and discuss how they could be addressed in future research to produce more robust findings, thus paving the way for new research areas.

In summary, a well-constructed scientific article should:

1. Present relevant findings.
2. Explain the importance of the results and compare them with those of other authors.
3. Discuss the results.
4. Acknowledge the study's limitations.
5. Suggest new research questions or lines of inquiry.
6. Provide conclusions.

KEY POINTS TO HIGHLIGHT IN THE RESULTS SECTION

The results section should include the following elements[6]:

1. An introduction outlining the research question.
2. A report on data collection, recruitment, or study participants, specifying whether inclusion and exclusion criteria were applied. This often includes a table summarizing the demographic, clinical, and other relevant characteristics of the study subjects.
3. A description of the data collection methods and the statistical approach chosen based on the type of study conducted. The most relevant results should be presented in a logical order consistent with the methods section.
4. Graphs and tables accompanied by sufficiently informative captions should be included. A general description of the experiments should be provided, and the data should be presented in a sequence that highlights significant associations or correlations.
5. A review and adherence to the specific requirements of the journal to which the manuscript will be submitted.
6. The presentation of figures, tables, and flowcharts to capture the reader's attention. These elements must be cited in the text and numbered in the order in which they are introduced. Non-textual components should include concise identifying text, and each figure or graph should be self-explanatory regarding the findings it depicts.
7. Inclusion of significant secondary results or subgroup analyses, if applicable.
8. Presentation of the frequency of events and their relationship to variables within the study and the research question, using tables and figures to summarize statistical analysis results.
9. Results should directly address the research question and study objectives. They should be analyzed straightforwardly and expressed in clear, concise language.

Writing a scientific article is not a solo endeavor; co-authors must contribute and review the manuscript to avoid frequent errors in this section[6,7], such as:

- Including raw or redundant data; instead, results should be summarized.
- Repetitive presentation of information— data included in tables or figures should not be repeated in the text.
- Reiterating information from the materials and methods section.
- Misalignment between methods and results.
- Omitting negative results or findings that do not support the conclusions. This raises ethical concerns in the work done, leading to a loss of consistency and validity. All relevant results must be reported, even if they do not support the predictions or hypotheses. Negative results are valuable and can serve as a guide for future research on the topic.
- Discussion or interpretation of the results: This should be addressed in the discussion section.
- Errors in figures and tables: These are varied and common.

The results form the core of the study and substantiate its claims. It is crucial to take sufficient time to organize them effectively and to design and prepare figures and tables to convey the intended message to the reader clearly.

CONCLUSION

When submitting an article to a journal for peer review, one of the most common reasons for rejection, based on my experience as a reviewer for multiple publications, is the lack of coherence between the various sections of the article and poor writing quality. Additionally, while most journals follow the Vancouver citation style, each journal may have its own specific requirements.

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