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REVIEW ARTICLE

How to write an original article[☆]

L. Mateu Arrom^{*}, J. Huguet, C. Errando, A. Breda, J. Palou

Servicio de Urología, Fundació Puigvert, Universidad Autónoma de Barcelona, Barcelona, Spain

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PALABRAS CLAVE

Escribir un artículo;
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Publicar un artículo

Abstract

Context: A correctly drafted original article gives information on what was done, why it was done, how it was done, the result of what was done, and the significance of what was done. Many articles fail to report their results effectively.

Objective: To describe the characteristics of an original article and to give practical recommendations to prevent the most common errors in our environment.

Evidence acquisition: We performed a systematic search of the terms "how to write a scientific article", "structure of the original article" and "publishing an article" in the databases PubMed and SCOPUS. We analyzed the structure of an original article and the characteristics of its parts and prepared advice on the publication of an article.

Evidence synthesis: The journal's guidelines for authors should be read. It is usual for the original article to follow the IMRAD structure: Introduction, Methods, Results and Discussion. The introduction states briefly why the study was performed. The methods' section should give a detailed explanation of how the study was performed. The results should be clearly presented, with the help of tables, without repeating information. The discussion explains the relevance of the results and contrasts them with those of other authors. Any limitations and a conclusion supported by the results must be included.

Conclusions: Writing an original article correctly requires practice and it must be supported by a good research work in order to be published.

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Cómo escribir un artículo original

Resumen

Contexto: Un artículo original correctamente redactado informa sobre lo que se hizo, por qué se hizo, cómo se hizo, qué resultó de lo que se hizo y qué significa lo que se hizo. Muchos artículos no son capaces de comunicar sus resultados de forma eficaz.

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^{*} Corresponding author.

E-mail address: lmateu@fundacio-puigvert.es (L. Mateu Arrom).

Objetivo: Describir las características de las partes de un artículo original y dar recomendaciones prácticas para evitar los errores más comunes en nuestro medio.

Adquisición de la evidencia: Se realizó una búsqueda sistemática de los términos «cómo escribir un artículo científico», «estructura del artículo original» y «publicar un artículo» en las bases de datos PubMed y SCOPUS. Se analizó la estructura de un artículo original y las características de sus partes y se elaboraron consejos para la publicación de un artículo.

Síntesis de la evidencia: Deben leerse las guías para autores de la revista. Habitualmente, el artículo original sigue la estructura IMRAD: Introducción, Métodos, Resultados y Discusión. La introducción expone concisamente por qué se hizo el trabajo. En la sección de métodos es necesaria una explicación detallada de cómo se realizó el trabajo. Los resultados deben exponerse de forma clara, ayudándose de tablas sin repetir información. La discusión explica la relevancia de los resultados y los contrasta con los obtenidos por otros autores. Deben incluirse las limitaciones y una conclusión respaldada por los resultados.

Conclusiones: Escribir un artículo original correctamente requiere práctica. Para que sea publicado debe estar respaldado por un buen trabajo de investigación.

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Context

Exposing the results of a study in an article for its publication in a scientific journal is a common process for researchers in any discipline. Traditionally, those who wish to consolidate a scientific trajectory are evaluated and known by the impact of their research. However, it is not until those results are published that they are recognized as researchers. Thus, the aim of scientific research is to get original articles published.¹

When the article is written in an appropriate way, that is, in a clear, structured and intelligible way, it provides the scientific community with information about what was done, why it was done, how it was done, what resulted from what was done and what it means.² However, many scientific articles are not able to communicate their results effectively. Some of the most frequent mistakes are redundancies, ambiguities and inconsistencies, grammatical errors, or incomplete or outdated bibliographical revisions.^{2,3}

For an article to be published in a scientific journal, it will have to undergo a review process, usually a peer review. Thus, if an article is not properly written, editors or reviewers are likely to reject its publication in the journal.⁴ If, even with errors, the article gets through the review process, it will be published and archived digitally, with no possibility of subsequent changes, and it will remain visible to all readers as long as the electronic records exist, which, in short, represents a negative mark on the author's curriculum vitae.³

Objective

The objective of this paper is to describe the characteristics of each of the parts of an original scientific article, as well as to give practical recommendations to avoid the most common mistakes in our environment.

Evidence acquisition

A systematic search of the terms 'how to write a scientific article', 'structure of the original article', and 'publish an article' was carried out in the PubMed and SCOPUS

database. The articles of most interest have been selected. Two reviewers (JH and LMA) independently examined all abstracts and full-text articles. In the examination, the structure of an original article and the characteristics of each of its parts were analyzed. Finally, they came up with tips for the preparation and publication of an article.

Evidence synthesis

Before starting writing

The first step, not only before starting writing, but before carrying out any research work, is the search for literature. The collection of prior evidence and its study and reflection should be the starting point and solid basis for any publication.³ If this step is omitted, the mistake of doing a job that has already been done can be made, which is a waste of time and resources.³ Along the same lines, before thinking about writing, a reflection and self-criticism exercise is necessary to decide whether the future publication should occur or not. In order to do this, one must ask oneself a series of questions: Have I done new and interesting work? Is the work related to a current topic? Is there solid evidence and clear answers to the hypothesis and the proposed objectives? And are the conclusions of the study relevant?^{2,5} If the answer to each question is 'yes', then one may consider writing the article.

At this point, the author should take the time to choose the most suitable type of article: an original article, reporting a clinical case or series of cases, a letter to the editor, etc. Each of them has a well-defined intention and its elaboration follows a different outline.²

Another essential aspect is the choice of the journal to which the article will be sent. An article may be rejected only for not having been sent to the appropriate journal. A common way to identify candidate journals is looking at the articles consulted to do the work. It is important to know the objectives of each journal well in order to check its possible interest in the subject of the article, to do so, it is helpful to read the recent publications of each journal. Other issues to consider when choosing a journal are whether it is a journal included in national and international databases, which will

give visibility to the article, whether it has a peer review system, its speed in the editorial process or its citation rate (impact factor). Basing the choice solely and exclusively on the latter variable is often an error that leads to a delay in the acceptance of the article.²

Once the journal has been selected, it is essential to read carefully the guide for authors, which is usually available on the journal's website. It specifies the design and structure of the article, the style of the bibliography, the maximum number of words, the format of figures and tables, etc. It is important that the article meets all the requirements of these guidelines. If reviewers and editors do not have to waste time correcting these aspects, it is more likely that the article will be accepted.⁵

Preparation of the article

General principles

In general, 3 large parts should be planned when preparing an original article.⁵ The first one allows to index and focus the topic, as well as to make the article informative and attractive. This part includes the title, the authors and their affiliations, the abstract and the keywords.⁵ The second part encompasses the main text, the article itself, which in turn is usually subdivided into the following sections: Introduction, Methods, Results and Discussion (IMRAD).⁶ The final part includes acknowledgements, references and supplementary material or annexes.⁵

However, some journals require that the articles follow a different structure, so it is essential that writers have previously read the guidelines for authors, as specified in the previous section.

The IMRAD structure does not follow an arbitrary scheme, but is a direct reflection of the scientific process.⁷ Each section answers a question, as shown in Table 1,² and facilitates a modular reading of the article, since readers usually do not read in a linear fashion, but look for specific information in each section.

Home page

The home page must include:

- The title: a good title is essential, it provokes curiosity and leads the reader into the text. However, its main function is to accurately describe the content of the manuscript. It should contain as few words as possible, but at the same time it must explain the design of the study.² The title should include all the information that makes the electronic retrieval of the article sensitive and specific.⁷

Table 1 IMRAD structure of an original article.

Section	Question to be answered
Introduction	Why was it done?
Methods	How was it done?
Results	What was found?
Discussion	What is its relevance?

- *Authors and their affiliations*: the authorship and order of authors has been a subject of debate.² The *International Committee of Medical Journal Editors* proposes the criteria to be met by the signatories of a scientific article, which are focused on the individual contribution and the degree of participation of researchers.⁷ At this point, it is advisable to adopt a signature and not to change it throughout your career, especially if you have a composite name or surname, since its subsequent identification in automatic indexing systems can be laborious if you have not adopted an invariable signature.²

- *Author for correspondence*: the full name, place of work, postal and e-mail addresses, as well as telephone and fax numbers of the author to whom the editors of the journal will address all correspondence and who is responsible for keeping the entire research team informed should be detailed.²

- *Funding and conflict of interest* if any.
- *Header or footer*: short description of the item, usually no more than 40 characters, which helps the affiliation and location of the item.
- *Word count and number of figures and tables*.

Abstract

The essential ideas and results should be set out in order to provide a snapshot of the content and the scope of the article. It is the only part that many readers will read, as well as the only part that is used in bibliographic search systems, so it is important to convey in a concise and concrete way the most relevant aspects of the work. It is advisable to write the abstract once the manuscript has been written, as this is the time when it is clear which aspects to highlight. A structured abstract (introduction, objective, methods, results and conclusions) is usually required, although it is again important to consult the guidelines for authors of each journal.²

Keywords

They should be carefully chosen to provide visibility to the article and to facilitate its dissemination through computerized search systems. The terms listed in the Medical Subject Headings (MeSH) of the National Library of Medicine should be used.²

Introduction

The introduction should put the work in context, that is, to expose the nature and relevance of the problem that has motivated the research. It can be divided into 3 parts that answer the questions: What is the problem? What is the importance of the problem and what questions are still to be solved? What question does your work answer?.⁸ In this last part, the hypothesis and the objectives of the work should be detailed. The introduction should be clear and concise and it should contain only the strictly necessary references.⁷ Three paragraphs are usually enough.² A very long introduction will cause the reader to give up reading the rest of the article. Do not include results or conclusions in the introduction. Also, details, speculations or

comparisons with other studies should be left to the *Discussion* section.

Methods

This section describes how the study was conducted and should therefore be exhaustive in order to allow another author to reproduce it in whole or in part.² It is written in the past and should include only the information available at the time of designing the study, while all the information obtained from the study corresponds to the *Results* section.⁷ The following information must be included:

- *Design of the study*: case series, cross-section, cohorts, clinical trial, randomized study, etc.
- *Population participating in the study*: volunteers, patients, animals, etc., as well as the control group, if any. It should be described where the study was conducted, how participants were selected, the inclusion and exclusion criteria, how the randomization process was generated, and how many of each branch completed the study and why some of them were withdrawn.² There is debate about whether the individual or collective characteristics of the population should appear in this section or in *Results*. The demographic characterization of the population may be part of the “material under study” and not the result of the research process. However, it may be a “result” where the application of an intervention may modify these variables.²
- *Variables*: They must be clearly defined. If the variables have any type of division or categorization into 2 or more groups, the methodology by which the cut-off points are established must be made explicit.
- *Measurement and monitoring criteria*: With what the variables were measured (if specific instruments were used, the brands, models and manufacturer’s data should be detailed), how they were measured, who did it and what experience they have in measurements, how many times they were measured, etc. Depending on the type of design, this section should include a description of all the clinical procedures, the interventions, and the time sequence to which the subject has been subjected.
- *Estimation of the sample size*.
- *Data analysis*: The statistical tools used (including the computer software used), the *p*-value chosen to indicate the statistical significance, and the measures of effect magnitude used (odds ratio, relative risk, number of patients to be treated, etc.). Cite any literature citations if you use any unusual analysis.²
- *Ethical aspects*: The approval of the ethics or animal experimentation committees must be included. If the study were in humans, it should be noted that informed consent was obtained.

Results

You should only and exclusively include the results of the study. Reserve comments on the meaning of the results for the *Discussion* section.⁸ The results must be visible and understandable in a rapid and clear way. It is therefore advisable to begin by constructing tables and figures and then

to write the relevant text on the basis of these, using the past tense and without repeating information.² Still, restrict the number of tables, figures, and graphs to those needed. These should have a self-explanatory title and include the name of the variables, units, legends, etc.; that is to say, all the information needed for their interpretation without having to refer to the text.²

To present the data in an orderly manner, it may be useful to begin the section with a clear, concise, and direct statement about the main finding of the study, and then to follow the order established in the methodology.² The data presented in this section should appear not only as percentages, but also as absolute values from which the percentage was obtained⁷

Discussion

In this section, emphasis should be placed on the meaning and relevance of the work. Do not repeat here the information already detailed in the *Introduction* or *Results* sections. It is often useful to begin the discussion by briefly summarizing the main findings of the study and then reasoning out possible explanations for these findings and contrasting them with the results of other relevant studies.⁷ Some previous works will differ from your results, so you should highlight the reasons for these differences.

It is imperative to refer to the limitations of the study, which demonstrates your commitment to the scientific method and, apart from that, it will prevent the reviewer(s) of the journal from criticizing your work or refusing to accept the article. Similarly, you should mention the implications that your work may have for both future research and clinical practice, although you should not overestimate your results.⁸ It is interesting to comment on the aspects that still need to be resolved or the lines of research that are opened up after your findings.

This section concludes with the conclusions of the work, which should be based on the data obtained in the study and include the message to be conveyed to the reader. It is a mistake to draw conclusions that have not been clearly evaluated in the work. For example, no reference should be made to the economic impact of the results if the work has not included an economic analysis.⁷

References

In general, the guidelines adopted by the *National Library of Medicine*⁹ should be followed, although it is essential to consult the guidelines for authors of each journal in order to ensure the format and style of the bibliography.² The quotations are included sequentially, according to their appearance in the text. Use only references that contribute something to your article and try to keep them no older than 5 years.² Whenever possible, quote original articles instead of review articles and make sure that the quote corresponds to the original article you want to mention.⁷ Articles that have not yet been published should be marked with *in press*, provided that they have already been accepted for their publication.⁷

Table 2 Tips for writing each part of an original article.

<i>Before starting writing</i>	<ul style="list-style-type: none"> Check and know the literature Judge your own work Select properly the journal Read carefully the guide for authors of the selected journal
<i>Preparation of the article</i>	
Title	Short but explanatory
Authorship	Based on the individual contribution to research
Summary	Do not modify your signature throughout your career
Introduction	Concisely convey the most relevant aspects of your work
	Put in context and justify the work
	Not too long (3 paragraphs)
Methods	Expose exhaustively how the work was done
Results	Clear and ordered
	Help yourself with tables
	Do not repeat information
	Do not give your opinion about the results
Discussion	Make work relevant without overrating it
	Contrast your results with those of other authors
	Include the limitations
	Do not draw conclusions not supported by the results
References	Use only the necessary ones

Practical issues

Key concepts (Table 2)

Tips and tricks.

- Start your article by building the tables and figures. Then type *Results*, followed by *Methods* and then *Introduction* and *Discussion*. The abstract is the latest to be written.
- Do not make grammatical mistakes. If you want to submit your article to a journal in English, please consult people who know the syntax and grammar.
- Write in a clear and ordered way, following the rules of scientific writing.
- Write the methodology with care and detail.
- Make sure there are no internal inconsistencies in your work.
- Do not diminish the importance or value of previous works by other authors.
- Read your article aloud to your colleagues. Non-experts in your field should be able to understand the article. The opinion of colleagues not involved in the work may provide interesting details.
- Take the comments of the reviewers into account, they only serve to improve the quality of your article.

Conclusions

Writing an article requires patience and, above all, practice. The abovementioned rules and advice can facilitate this process and prevent unnecessary mistakes. However, in order

to write a good original article, it is essential to do a good research work beforehand. An original article, even if well written, will not be published in a high-impact-factor journal if the conducted research is poor or has methodological flaws.

Conflict of interest

The authors declare that they have no conflict of interest.

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