

Authorship and Arbitration of Medical Articles for Publication in Scientific Journals

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ABSTRACT

Authorship and publication of research papers is necessary for academic advancement. Articles submitted to scientific journals need to be arbitrated by expert reviewers and experienced researchers. Reviews are performed based on specific criteria and principles, which are similar in different journals. These principles could also be applied in writing scientific papers. In this study, major principles of essay writing used in popular international journals are discussed in detail. Given the growing importance of scientific research, our study aimed to acquaint and familiarize young researchers, especially medical students and residents, with the principles of essay writing. The present content could also be considered for the arbitration of medical articles.

KEYWORDS: Writing papers, Reviewing papers, Paper publication.

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Introduction

Research is one of the most important tasks in the field of science, and article writing is necessary for academic improvement (1, 2). Research results are often published in scientific journals, and scientific articles occupy a substantial proportion of international publications. Through publication of scientific articles, researchers could become familiar with the works of other experts while making their experience available to the global community of science (1). Principles of essay writing approved by international journals should be applied to the preparation of scientific papers. If articles submitted to scientific journals meet the preliminary conditions, they have the potential for being accepted and would be arbitrated after the initial assessment by an editor. Publication of articles has certain steps, which are common

between most journals, and arbitration is considered as the most important element of publication. Arbitrators confirm the scientific value of articles and diagnose the criteria for writing a scientific paper. Final results of arbitration process are often sent to the editor in the form of a report, which plays a key role in the acceptance of the article by a journal (3, 4). Despite the fact that publication of research papers is a major task for improving the academic rank in faculty members, it is not commonly included in the curriculum of medical students. Several studies have been conducted about the authorship and publication of scientific papers around the world. However, there is limited data on this subject in Iranian journals. This study aimed to familiarize researchers with the main principles of article writing in the field of medicine.

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Our findings could also be applicable for the arbitration of medical articles.

How to Start a Paper: Choosing the title for a paper is the most important stage in the process of research authorship. Firstly, authors should survey available scientific resources and identify any lack of information in the relevant field. In other words, they should decide what information is going to be transferred to the reader, what questions will be answered through the research, and how to write an article that is easily understandable to the reader (1). Generally, there are no established procedures for essay writing; a simple way is to provide a summary of the whole research process at first. Afterwards, the research plan should be divided into the sub-parts of the intended paper, including the purpose, applied methods, results, discussion and conclusion. Each of these parts must be written independently (5). The paper must be able to answer the following questions:

- 1) What is the main objective of the article?
- 2) What were the scientific procedures in the study?
- 3) What were the main observations of the study?
- 4) What is the significance of the research findings?

Topic Selection: Topic selection is an essential step in the process of research authorship. First and foremost, the topic has to be new; in other words, there should be no former studies on the selected subject, or if there are, they should call for future research due to the inadequacy of the obtained data. Moreover, the researcher should be familiar with the studies that have been performed previously in the area of the selected topic; lack of information about previous studies leads to the duplication of data and unnecessary costs. As for the title of the article, it should directly address the objectives of research, so that the readers would be able to predict the subject of the paper only by reading the title. The key sections of a research paper are the methodology and findings, which are written prior to other parts of the essay. Afterwards, the author should write the discussion and introduction, and the abstract is prepared after the article is fully written (1).

Writing the Introduction: The introduction of an essay aims to draw the attention of the reader to the significance of the research. To this end, authors must elaborate on the importance of their research, clarifying how their findings could help overcome one of the problems of society. Researchers need to

investigate former articles published in the relevant field in order to recognize the possible limitations. Additionally, they should identify the issues that need to be addressed by summing up the results obtained by previous studies. This will help the author identify the need for research while choosing the title (1, 6).

It is not necessary for the introduction to contain all the findings of previous studies, but rather, the author should only summarize the results of relevant articles so that the reader could comprehend the purpose and necessity of the study (1, 7). In addition, the introduction should not be lengthy; the standard limit for this section is about three or five hundred words. The aim of study could be answering a question that has not been addressed or offering a different response to that question. In such regard, the author must identify the possible risk factors in previous studies which led to inconsistent results and determine how to eliminate the effect of these factors to achieve accurate results (2, 8, 9, 12). In the last paragraph of the introduction, the purposes of the study must be expressed, and the study population should be introduced as well (6).

Writing the Methodology: In this section, the author should explain the procedures of the study, as well as the applied measures, including the study population, sampling methods, method of determining the sample size, inclusion and exclusion criteria and the characteristics of the studied patients. Moreover, procedures, time and place of the study, tools and instruments, and measurement methods should be clearly stated in the methodology section. Authors should use words well enough to convey information as clearly and simply as possible, and in such a way that the reader would be able to repeat the experiments. Furthermore, the author should use the simple past verb tense in third person singular in this section. Although it is sometimes recommended that the sentences in a scientific article be written in the active voice, use of the passive voice is usually preferable (1, 8). For another thing, type of the study must be clarified in this section; it is noteworthy that the type of the study must be selected in a way that it could achieve the objectives of the research. If the type of the study is not correspondent with the research question, the results could turn debatable. Evidently, the reasons

for choosing a study type and necessity of using it should be clarified by the author. In the methodology section, study variables and their measurement should be clearly defined, as well as the type of statistical tests and their precise use. If the study is conducted on human subjects, ethical observations should be taken into account. The methodology section should be organized in the chronological order based on the significance of study variables.

Writing the Results: Methodology is followed by the results section, which elaborates on the findings of a study. The results of a study should be understandable and presented clearly. Moreover, the chronological order in this section must be consistent with the methodology of the article and arranged according to the study objectives (1, 3). Firstly, characteristics of the study population are expressed, and all the findings should be reported, regardless of their significance in achieving the objectives of the research (3,9). Findings of a research should not be interpreted in the results section. Key findings, especially those relevant to the research hypothesis or question, must be presented first (1).

Data in the results section are arranged based on the time or significance of the studied variables. In addition, the results should be arranged based on their importance in each paragraph. Markedly, the results of a study must be in accordance with the methodology section. In the results section, it is advisable that important information be defined in the text, while other data are presented in tables, figures or graphs. According to some reviewers, displaying data in tables, figures and graphs plays a pivotal role in increasing the scientific value of an article. Terms and expressions that need to be abbreviated in the text or tables should be fully written when appearing for the first time, with the abbreviations placed in parentheses throughout the article. Moreover, abbreviated words used in the tables should be written in complete form under each table.

Tables and graphs must be designed in such a way that their content be understandable and comparable to each other; it is advisable that numbers be displayed in percentage. Similar to the methodology, data should be presented in the simple past verb tense in the results section. Throughout the article, numbers must be written

correctly and uniformly, and statistical analysis should be summarized as well, mentioning the p-value in the end.

Writing the Discussion: Discussion of an article aims to sum up the results of the study, explain and interpret the findings and offer suggestions for future researches. The most important part in the discussion is the final answer to the question raised in the introduction. It is noteworthy that the data presented in the results section should not be repeated in the discussion. In a scientific paper, discussion should be organized to accomplish the objectives of the study within a standard limit of 1000 words, or less. Moreover, findings that were listed in the results section must be defended in the discussion. Use of present tense is preferable in this section. At the beginning of discussion, the main results of the study should be expressed and summed up in two or three sentences in order to direct the reader (1, 2).

The main purpose of the discussion is for the researcher to show whether the hypothesis or research question has been answered by the obtained results. Furthermore, use of statistical tests, choice of the study design and population and the inclusion and exclusion criteria should be defended in this section. For another thing, the obtained results of the study should be compared to the findings of previous studies on the same subject, and the differences between them should also be explained in the discussion section. Also, if the hypothesis of the research has not been confirmed by the obtained results of previous studies, the causes need to be clarified in this section of the article. For the comparison of results between studies, appropriate references and relevant researches should be provided. Additionally, discussion should be focused on the findings listed in the results section. Therefore, findings that have not been stated in the article cannot be interpreted in the discussion. Limitations or weaknesses of the study are among other essential points to be mentioned in this section. When it comes to the authorship of scientific articles, expressing the limitations and their possible impact on the findings of the study is of paramount importance. It is mainly because it emphasizes the attention of the researchers to these limitations, as well as their attempt to use appropriate procedures in order to resolve these

shortcomings. Furthermore, it shows the level of accuracy in the selection of the sampling and statistical methods in the study. As such, the researcher could elaborate on the strengths of the study in the discussion section. Correct choice of some parameters, such as measurement and statistical methods and sampling procedures, guarantee the accuracy of the obtained results and increase data reliability in an article. On the other hand, effects of the obtained results on the data sources must be clarified by the author. To do so, the author should consider whether the intended research adds new information to the current medical resources, or merely confirms the findings of previous studies. If the findings of a research are likely to affect the routine clinical practice or treatment procedures, the "need for further research" should be mentioned in the discussion section of the article. Claims of the researcher should be consistent with the findings of the study. Using phrases such as "this is the first study in this area" or "this is the first study conducted in this area" is not suitable since other studies might be available on the subject without the knowledge of the researcher. Moreover, such statements may have an undesirable effect on the expert opinion of reviewers (6). At the end of the article, overall results of the study should be summarized and explained in one paragraph. If the research subject needs to be further investigated, it should be suggested by the researcher in the conclusion section of the paper. Constructive recommendations could be considered as the proceeding goals of the study.

Abstract: Abstract should be prepared after completing the main parts of an article. The abstract is a vital section to a scientific paper since it is the first part to be studied by readers. In most cases, if the abstract sounds credible, the reader feels compelled to read further through the main parts of the article. For this reason, the abstract should contain all the noteworthy aspects of a study. In other words, the abstract must be able to represent the contents of a paper as a whole, leading to the general understanding of the article by the reader (2). Regarding the publication of a scientific paper, appropriate style of abstract could result in increased chances of acceptance by the related journals. This section is normally divided into different parts, including background and

objectives, materials and methods, results, conclusion and keywords. To write the abstract, the author should extract the important points of each of the sections in the main article within a standard limit of 250 words or less (in some journals 200 words, in some others it could surpass 250 words). Conclusion is the last section in the abstract, which should be organized based on the presented data and reflect the main objectives of the study. In some journals, dividing the abstract to different sections is not necessary (refer to "Instructions for Authors"). In addition, content of the abstract cannot contradict the main text of the article. In the abstract, data should be presented using the simple past verb tense (2).

Arbitration of Scientific Articles: All articles submitted to scientific journals are sent for arbitration after the initial assessment by an editor. Arbitrators are experienced researchers with expertise in the relevant field, who were not involved in the preparation of the article. Arbitration is defined as the evaluation of different aspects of a researcher's scientific work by other researchers. In addition to scientific approval, arbitration aims to inspect whether the authors have correctly applied the principles of scientific writing. Although the arbitration process is time-consuming, it is regarded as an opportunity for the reviewers to test their abilities and become familiar with the practices of other researchers.

Qualifications of Arbitrator/Process of Arbitration: Arbitrators without specialty in the area of a research should not be involved in reviewing the articles in that field. Furthermore, arbitrators should be time-conscious and deliver on the review within the period determined by the editor. In case arbitration is not completed by the due time, the editor is allowed to disrupt the process and assign the article to another reviewer (9). Arbitration should be critical and constructive, while adhering to the principles of confidentiality. In order to protect the interests of the author, content of the article should not be disclosed or published by the arbitrator. The main purpose of arbitration is to amend an article. By the same token, arbitrators could prepare a list of suggestions about the article at the end of the process. Suggestions and comments made by the arbitrator should be polite and constructive so as to assist the author in the revision and improvement of the manuscript.

Criticism of the arbitrator should be made in such a way that the author would be able to respond to the demand appropriately (10).

For instance, if the age of the patients is not stated in an article, instead of asking "Why is the age not stated?", the arbitrator should comment "Please mention the age of the patients". In the first case, the author may wrongfully explain "why" he/she has not mentioned the age of the patients, while in the second case, he/she understands the age of the patients requires clarification. The arbitrator should study all the sections of an article and prepare a report for the editor; this report needs to bear enough evidence for the editor to have confidence in the judgment of the arbitrator. For instance, if an article is accepted by an arbitrator without him/her studying all the sections of the paper or considering the strengths and weaknesses of the study, the editor is likely to question the recommendations made by the arbitrator (2). As for the process of arbitration, the paper should be initially evaluated with brief comments on the type, objectives and necessity of the study. At this stage, research questions and hypotheses, as well as the way they are addressed, become clear. In the next step, the arbitrator needs to review the main sections of the paper carefully and independently.

Start of Arbitration and the Different Aspects:

The most important points in the arbitration process are as follows:

- Methodology to respond to the research hypothesis
- Study design and choice of the tables and graphs
- Supporting of the conclusion by the study data
- Quality of writing and grammar
- Proportionality between the title and article content
- Abstract setting
- Innovation in expressing the limitations of the study

Review of the Introduction: During this process, the arbitrator should decide whether the author has managed to exhibit the significance of the research, as well as the limitations in the information and subject of the study. In addition, the arbitrator must consider what the study hypothesis is, whether the study has addressed the questions that were not answered in previous studies and if the objectives of the study have been explained accurately in this section of the article.

Review of the Methodology: In this section, the arbitrator should comprehend the study type and population, as well as the methods used for selecting the subjects, determining the sample size and inclusion and exclusion criteria. Moreover, the arbitrator should become informed of the applied methods, and whether the study population, study design, and statistical analysis are appropriate for addressing the research question. Among other points considered by the arbitrator are the accuracy of variable measurements, correct description of the statistical tools and the proper comparison of the study groups.

Review of the Results: In the results section, the arbitrator should consider whether the most important findings are responding to the research questions, if data arrangements are appropriated to the methods, whether all the tables and graphs have references in the text, if tables and figures are understandable independently, and whether the abbreviated words appearing in the text or tables for the first time have been written in full form previously.

Review of the Discussion: During this stage, the arbitrator should consider whether the hypothesis of the study has been confirmed, if research questions have been addressed by the data, whether the final results are supported by the data, if the obtained results of the study have been compared to the findings of similar studies, and whether the causes of inconsistencies between the studies have been explained.

In addition, if the data in the results section have been repeated in the discussion, they must be removed by the arbitrator. Also, the arbitrator should pay attention to the innovations of the study in presenting the limitations and compare the researcher claims to the obtained results of the study. The arbitrator should also confirm whether the researcher has demonstrated the clinical significance of the new findings and their possible impact on clinical practice, if the references of the study are consistent with the research subject and whether the presented data are inappropriate for the interpretation and conclusion of the paper. For another thing, the arbitrator should consider whether the overall results are summarized and explained in the last paragraph of the discussion and if the need for future studies in the related field have been suggested by the author.

Review of the Abstract: To review the abstract, the arbitrator should consider whether the abstract is representative of the entire content of the article. In other words, there should not be any discrepancies between the abstract and the main content of the text, in a way that the readers would be able to understand the content of the article by studying the abstract. The abstract should encompass all the important aspects of the article. This section should be divided into different parts, including background and objectives, materials and methods, results, conclusion and keywords. Moreover, type of study, main objectives, methodology and final results should be included in this section, and the findings must be supported by the data. Also, keywords in the abstract should be selected carefully so that they correspond with the purpose and other parameters of the study.

Review of the References: The references should be proportional to the subject of the study. It is essential that the references be coordinated to the article title since arbitrators are frequently selected from the authors mentioned in the reference lists. For this reason, the researcher should be meticulous in interpreting the study results that have been marked as reference. Therefore, authors should not merely refer to the abstract for the completion of the article since it may lead to false interpretations by the arbitrator.

Report to the Editor: Arbitrators are able to recognize innovations of an article owing to their expertise in the relevant field. Reports given to the editor by the arbitrator are usually numbered, and all the sections of the article must be individually and specifically reviewed by the arbitrator. In most cases, arbitrators try to highlight the strengths of the study at the beginning of the report. For instance, they emphasize the significance of the study and comment on the appropriateness of the study type, objectives and methodology. Following that, they express their opinion about each of the article sections. Before writing the report, arbitrators summarize the article in one or two paragraphs and provide their expert opinion about the paper. This report plays a key role in familiarizing the editor with the research subject, as well as confirming the full evaluation of the article by the arbitrator. Usually, scientific journals share the same arbitration principles (10). Arbitrators should

consider the following parameters in the preparation of reports for editors:

- 1-Is it a credible research paper?
 - 2-Have the studies published in this area been reviewed by the researcher?
 - 3-Are ethical issues taken into account?
 - 4-Are the methodology and data analysis clearly expressed?
 - 5-Are the tables properly used?
 - 6-Is the discussion section appropriate (Are the limitations of the study fully explained? Are the findings of the study indicative of any clinical significance?)
- After preparing the report, arbitrator send their recommendations to the editor in the following format:

- 1)Manuscript is printable in the same form (Accept);
- 2)Manuscript can be accepted after minor fixes (Minor revision);
- 3)Manuscript needs to be rewritten and should be arbitrated again (Major revision);
- 4)Non-printing paper (Reject)

It is also noteworthy that the arbitrator should provide constructive suggestions and comments for each of the aforementioned in accordance with the status of acceptance. Usually, articles that are rejected need minimal explanation. In such cases, general suggestions should be provided about the study design, methodology or objectives (11).

To do so, a general assessment is performed about the scientific quality, methodology, writing quality and innovation of the article. Afterwards, arbitration details are expressed for each section of the article in the order of the manuscript.

Reasons for Rejection: In most cases, three factors play a key role in the rejection of a scientific article:

- A)Disproportionality between the study subject and the main issues of society
- B)Failure to address the research question
- C)Disproportionate methodology for addressing the research question

Moreover, any of the following could lead to the rapid rejection of an article (1):

- 1.Inconclusive title and disproportionality between the subject and current issues
- 2.When the answer to the research question is already well-established
- 3.When the study hypothesis has not been raised properly

4. When the methodology is inappropriate for addressing the research question
5. When the conclusion is not confirmed by the provided data and/or the research question is not addressed completely.

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