

Scientific Writing

INTRODUCTION

“The whole of science is a refinement of everyday thinking,” said Albert Einstein.^[1] It is this thinking by a professional that becomes scientific writing. Writing a scientific article, be it a case report, a review, or original research article, is an integral part of the medical teacher’s career. The number of publications, especially if they are published in indexed journals, with high impact factor, is taken as a gauge to measure the quality of that teacher. The Medical Council of India has stipulated the number of publications of original research articles that are required before promotion to assistant, associate, and professor and thus has become essential for the advancement of one’s career.

WHY DO PEOPLE WRITE?

A journal is a medium through which original ideas and knowledge gained through research and clinical practice can be made known to the scientific world. The original articles serve as a basis for further research. Articles such as case reports and review articles serve as a guide for clinicians to deal with difficult clinical situations that they may come across in their practice. The guidance may be used to choose a particular treatment or technique or may even help avoid complications. Thus, scientific writing is not only very useful but also considered essential for the advancement of science.

When writing is arising out of a forced need to write either due to compulsion, competition, or for the sake of promotion, it can lead to poor quality of papers. The spirit of scientific writing should be for spreading knowledge around the world. The process of publication should be to enhance patient safety and care.

WHY DO PEOPLE NOT WRITE?

Many barriers may exist for writing. It may be lack of experience, lack of confidence, and poor writing habits. The younger faculty can often use some guidance and encouragement. Language issues can be circumvented by getting someone else who is good at the language to check the manuscript before submission. There is also a fear of failure and resistance to feedback. The journal editors often send back the manuscript for revisions, with a note as to what needs improvement. It is not only important to take these suggestions, make the changes and resubmit but also to learn from that experience for the future submissions. One gains familiarity with the process and writing up articles becomes easier with experience. Some clinicians, being busy and preoccupied with their clinical work, may not have an inclination to write. There are others who assume that people publish only to see their

name in print. This attitude may lead to lost opportunities of disseminating their knowledge.

SCREENING POINTS

The editors look for five important criteria to decide whether an article should be accepted or not.^[2] First, the topic should be important and relevant in the current context. Second, the literature review should be focused and up-to-date. The reader must be able to trust the article to give credible information. The third important point applies to methodology. The editor must be convinced that the research method employed is robust. There should be no bias in the study, and all aspects of the research question must have been addressed appropriately. Fourth, the sample size must be adequate. The method or parameter used to calculate the sample size must be stated and must be appropriate. Finally, the writing style is important. It should be clear, easy to read, straightforward, and generally, well written.

CLINICAL TRIAL REGISTRY

All original research studies must now be registered under the national clinical trial registry. This is done to ensure that studies are not duplicated. Furthermore, the scientific community can have an idea as to what is being studied and buildup on it to create new ideas. The registration must be complete before the first patient is enrolled. It gives a stamp of approval to the study. This is particularly important to studies involving intervention in patients. From April 2018, trials will be registered only prospectively, that is, before the first patient is enrolled.^[3]

STRUCTURE

All original articles have a similar “IMRAD” structure, where I = Introduction, M = Methods, R = Results, and D = Discussion.

The building blocks of a research article are as follows: Title page, abstract, introduction, aims and objectives, methods, results, discussion, and conclusions. The text should be supplemented with tables, figures, and captions. The references must be written in a manner appropriate to that journal. This can be followed by acknowledgments to those who helped with the study but were not really the investigators.

Title: The title should be simple, not too lengthy, and should be such that the reader should be encouraged to read further. A catchy title is good but need not always be one.

Authors: This is a much-abused section. An author is one who has made a substantial contribution to the conception or design of the work, participated in the drafting of the work,

or revising it carefully, given the final approval of the version to be published and is accountable for all aspects of the work. Authorship should not be gifted to someone because he is a friend, a spouse, or a colleague in need of a promotion! Anyone who has contributed to the study in parts, such as acquisition of funding, general supervision, administrative support, writing assistance, language editing or proofreading is termed nonauthor contributors and may be acknowledged at the end of the manuscript, with a mention of their contributions. Any conflict of interest such as company involvement and possible financial gains must be disclosed.

Abstract: This is a single paragraph; an independent document consisting of around 250 words summing up the entire study. The reader usually reads through the abstract and then decides whether to read the entire article. Thus, all important points of the study must be mentioned in the abstract. It should begin with a clear statement of the aims and objectives followed by a brief description of the methodology. The results and their significance must be stated next followed by the conclusion. The clinical trial registration number is mentioned at the end of the abstract.

Introduction: The introduction should start as a broad statement of the topic, discuss it briefly, mention the problem being studied, and then state the hypothesis. It should be fairly brief but at the same time, let the reader understand the topic.

Methods: This should be a straightforward description of the materials or patients used, vendor and details, the enrolling process, and randomization. Each key procedure and technique must be explained using brief and concise explanations. The specific experimental design must be described as also the statistical methods utilized including the calculation of sample size.

Certain guidelines are available and must be used for reporting of different types of study. For example, CONSORT flow diagram for randomized trials,^[4] STROBE for observational studies,^[5] PRISMA for systematic reviews,^[6] STARD for diagnostic accuracy,^[7] EQUATOR Network for review manuscripts,^[8] and NLM's Research Reporting Guidelines and Initiatives.^[9]

Avoid too long or too short sentence while describing the methods. About 20–25 words per sentence are probably appropriate. Attention must be paid to ensure the abbreviations, symbols, and units of measurement are stated correctly. Watch the tense of language. The methods and results are stated in the past tense since the study is already done. Write, rewrite, and then get a peer review would help refine the article. Ethical committee clearance and nonviolation of Declaration of Helsinki must be stated. Complete and clear information is critical so that readers have the capability to repeat the work in their own institutions simply by reading this article.

If there are pictures, they should be clear, at least 300 dpi and Jpg or tif format. They should be sent as separate files. Some online journals can publish videos as well. The video clip

should be in MPEG 1 or 2, QuickTime, or avi formats and not more than 5 min or 50 MB.

Results: The experimental data should be presented clearly. Tables and figures are often used to clearly represent the results. A separate paragraph for each table to describe overall trends/data points of special interest. Indicate in the text, where to place each of these tables and figures. The key statistics such as number of patients studied (n), standard deviation, standard error of mean, mean, median or mode, statistical analysis, and specific data, such as *P* values must all be mentioned.

Discussion: This should give a brief overview of the work. Support or reject the hypothesis using results. Address each objective and compare study findings with relevant literature. This should be followed by a discussion of strengths, weaknesses, and anomalies of the study. The discussion is an opportunity to describe certain points that may not be so obvious in the results such as clinical significance of a certain finding. The discussion usually ends with a statement of contribution of this study and suggestion for the future research.

Conclusion: This is a statement of the findings from the study and must be supported by appropriate data. This is brief, stated in the present tense and indicates how this work contributes to the overall field of study.

References: These are the sources from which review of literature has been performed. Most medical journals use Vancouver style and also must conform with the Uniform Requirements for Manuscripts Submitted to Biomedical Journals as mentioned by the International Committee of Medical Journal Editors.^[10] Sample references are provided to help authors. Index Medicus is a list of the indexed journals, their names and abbreviations and can be used for verification.

PLAGIARISM

Many authors, especially the relatively inexperienced ones tend to borrow sentences, complete paragraphs, and even results from someone else's work and present them as their own. This amounts to dishonesty. It may be inadvertent occasionally. Detection of this has been made easier by the availability of computer software. Many online softwares are available for free but may not be very sensitive. The authors need to ensure that the plagiarism check is a good one.

OTHER TYPES OF ARTICLES

Case reports are a useful way of reporting rare cases where research is difficult. It may include a new technique, a rare adverse reaction, a rare disease, or unusual presentation that cannot be reproduced for ethical reasons. Case reports must include a statement that consent of the patient/relatives has been taken. Case series includes more than one case with similar presentations or management. Review articles focus on a particular topic, are generally lengthier, with more extensive

review of literature and must be up-to-date. Surveys and editorial can also be informative.

PEER REVIEW

All articles submitted to the journal are initially sent to reviewers for peer review. It is an important process, wherein experts in the field review the article and give valuable feedback. A reviewer must carefully read through the article for relevance, authenticity, and accuracy. They must maintain confidentiality and not use the content of the article in any other way. They must provide constructive criticism to the authors to improve the article. They can provide their comments on the core content, grammatical errors, and statistical methods. They should do this within a reasonable time. If they lack the expertise in the field or do not have the time to review, they must inform the editor promptly. If an article is recommended for rejection, the reasons to do so must be given to the authors, with suggestions they can use to improve in their next submission.^[11]

In conclusion, writing a scientific article is an important method of dissemination of knowledge. Even if it is compulsion driving the publication, the authors must follow the guidelines, maintain accuracy, and remain honest. The reviewer must also evaluate each section of the article thoroughly and provide constructive criticism. All of these are essential components of good scientific publication.

Anitha Nileshwar

Department of Anesthesiology, Kasturba Medical College, Manipal, Karnataka, India

Address for correspondence: Dr. Anitha Nileshwar,
Department of Anesthesiology, Kasturba Medical College,
Manipal - 576 104, Karnataka, India.
E-mail: anitharshenoy@gmail.com

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