

SHORT REVIEW

**Emergency
Medicine**

The appropriate use of references in a scientific research paper

David McD Taylor

Director of Emergency Medicine Research, Emergency Department, Royal Melbourne Hospital, Parkville, Victoria, Australia

Abstract

References have an important and varied role in any scientific paper. Unfortunately, many authors do not appreciate this importance and errors within reference lists are frequently encountered. Most reference errors involve spelling, numerical and punctuation mistakes, although the use of too many, too few or even inappropriate references is often seen. The consequences of reference errors include difficulty in reference retrieval, limitation for the reader to read more widely, failure to credit the cited authors, and inaccuracies in citation indexes. This paper discusses the value of accurate reference lists and provides guidelines for their preparation.

Key words: *documentation, manuscript, publication, reference, research.*

Introduction

The major purpose of a scientific research paper is to communicate the findings of the authors' research. In isolation, however, these findings may appear meaningless. As all scientific research is founded upon the work of earlier researchers, their work must be incorporated into the paper in order to place the authors' new findings into proper context. Hence, a description of appropriate published research in the field is critical to the soundness and credibility of the paper.¹

Unfortunately, the referencing of scientific papers is often poorly done.^{2–6} Many authors regard the references as something relatively unimportant to the main text, yet inaccuracy may ruin its validity.⁷ The reference section should not be considered as a minor chore to be left until the last moment.

References that are inappropriate, inaccurate, or in the wrong format are not just a technical issue but may be sufficient reason for an editor to return the paper for revision even prior to peer review.¹

This article describes the purpose of references in a scientific paper and the commonly used referencing systems. It also summarizes the commonly made mistakes and, the consequences of those mistakes, and suggests techniques for their avoidance. It is hoped that this information will assist authors in the preparation of their papers and improve the standard and accuracy of their final publications.

The purpose of references

The various roles for references have been classified by Eunson⁸ (Table 1). This summary indicates that

Correspondence: Associate Professor David McD Taylor, Director of Emergency Medicine Research, Emergency Department, Royal Melbourne Hospital, Grattan Street, Parkville, Vic. 3050, Australia; Email: david.taylor@mh.org.au

David McD Taylor MD MPH DRCOG FACEM, Director of Emergency Medicine Research, Royal Melbourne Hospital.

Table 1. Summary of the roles of references⁸

Support of an argument by referencing an authoritative piece of writing and/or research
Development of parallel or branching opinions without disturbing the flow of the main text
Provision of details in order to check the genuineness and quality of the references cited
Shortening of the paper by referring readers elsewhere for details.

references assist in validating a paper, improve its readability, and direct the interested reader to other appropriate material.

References may be used as the ultimate authority upon which to base arguments. Alternatively, they may be a temporary authority whose validity you intend to challenge or they may be considered as obviously wrong. Herein lies the essence of comparison and contrast between the authors' findings and those of others. Consistency with the findings of others may assist in validation of the authors' findings and may provide support for a developing theory. However, inconsistency may challenge existing theory and indicate a direction for further research.

The choice of references

The use and citation of references should reflect their important role in scientific writing. Statements like 'There is general agreement that ...' or 'The literature suggests that ...' must be referenced. As a general rule, every categorical statement or fact reported must be supported in some way. This support may come from the authors' own results, the results of others, or an authoritative statement based on the results of others.⁷ Unfortunately, many authors fail to adequately reference such statements or facts, a mistake which is frequently detected during the peer review process and usually results in revision of the manuscript.⁶

When reporting the findings of other researchers, authors should reference the original research publications. This will require an extensive literature review, accessing the original relevant papers and careful scrutiny of the findings. It is poor practice to cite references after skimming through the abstract and not the entire paper. As an abstract is a brief summary of the entire paper, its content may not

accurately reflect the finer details reported within the main text. Hence, citing references without scrutiny of the entire paper may lead to misrepresentation of the paper's actual findings.

In some circumstances, there may be hundreds of publications on the topic of the authors' research. This may make the selection of appropriate references difficult. References should be restricted to those that have a direct bearing on the research being reported.¹ It is inappropriate and usually unnecessary to cite more than three or four references to support statements in the text. However, the choice of these references must be made with care. The authors should critically evaluate each potential reference and select only those with sound methodology and/or those recognized as landmark contributions to the topic. Even then the selection may be difficult. In this case, it may be appropriate to cite a high quality systematic review article that has already summarized the available literature. If a review is cited, it is important to acknowledge it in the text as a review paper. Otherwise, the casual reader may misinterpret the review article as being a definitive original research paper. Furthermore, the conclusions drawn in a review article may not be an accurate reflection of the original findings of the research. Systematic reviews themselves need to be critically evaluated and not necessarily taken as the definitive word on the topic.

Hence, the practical questions in selecting references include whether they are landmark contributions and whether they are the correct balance between being comprehensive and being relevant.¹ Finally, the authors must ensure that all recent publications of relevance have been sought.¹ Failure to search the literature once more immediately prior to submission of a paper, may lead to the oversight of a highly relevant recent publication and the likelihood of the manuscript then needing revision.

Many biomedical journals publish the maximum numbers of references that they will allow. As an example, the *Medical Journal of Australia* sets a limit of up to 15, 25 and 50 references for notable cases, research articles and systematic reviews, respectively. These numbers are usually included in the journal's 'Instructions to Authors', a document that should be accessed and carefully followed by all authors prior to manuscript submission. The 'Instructions to Authors' for a wide range of journals may now be accessed on one Internet web site.⁹

Table 2. Summary of reference advice published in the 'Uniform requirements for manuscripts submitted to Biomedical Journals'^{10,11}

Number all references in the order in which they are first mentioned in the text
Identify references in the text, tables and legends by Arabic numerals in parentheses
References cited only in tables or in legends to figures should be numbered in the sequence established by the first identification in the text of the particular table or figure
Adhere to the recommended reference style and journal name abbreviations of the National Library of Medicine in Index Medicus. ¹³
Avoid using abstracts as references
References to papers accepted but not yet published should be designated as 'in press'; authors should obtain permission to cite such papers
Information from manuscripts submitted but not yet accepted should be cited in the text as 'unpublished observations' with written permission from the source
Avoid citing a personal communication unless it provides essential information not available from a public source. If used, the name of the person and the date of the communication should be cited in parentheses in the text
All references must be verified for accuracy against the original documents

Methods of referencing

The Vancouver style is the most common method of referencing.^{1,8,10} In 1978, a small group of editors of general medical journals met in Vancouver and established guidelines for the format of manuscripts submitted to their journals. The group expanded and evolved into the International Committee of Medical Journal Editors (ICMJE) and has published the extremely useful 'Uniform Requirements for Manuscripts submitted to Biomedical Journals'.^{10,11} The important advice regarding references in this document is summarized in (Table 2). This document also provides examples of the correct referencing styles for a wide range of published material including journal articles, books, book chapters, websites and reports.

While the 'Uniform Requirements' provide general guidelines for referencing, journals often differ in their house style. For example, some journals require the reference number to be in parentheses (*Journal of Emergency Medicine*) while others require superscripts (*Emergency Medicine*). Also, some journals

require the issue number to be included (*SPUMS Journal*) and others require the volume number (*Emergency Medicine*) or authors names to be in bold font (*Pharmacotherapy*). It is strongly recommended that authors modify their references in accordance with the house style of their targeted journal, prior to manuscript submission.

A less commonly used reference style is the Author-Date System (i.e. Harvard system). In this system, the name of the author followed by the date is the form of referencing used in the text. Furthermore, the authors' works are listed alphabetically in the reference list at the end of the paper.^{8,12} An example of this format would be: Dyson J. 1993. Shocking behaviour of young stars in Orion. *Nature* (363), 21–22.

There is often confusion regarding the use of abbreviations in references. Journal name abbreviations should be those used by the National Library of Medicine in Index Medicus.TM A list of these abbreviations is available online.¹³ For other abbreviations, the general rule is to follow the abbreviated form with a full point if the final letter is not the same as the final letter in the full form.¹² Some examples of this include: ed. (edition, editor), eds (editors), p. (page), pp. (pages), 3rd ed. (third edition), vol. (volume) and vols (volumes).

Quotations, plagiarism and paraphrasing

General rules exist regarding the way information in references is actually presented in a scientific paper. Quotations are exact replicas of another person's words. An author may wish to use a direct quote if those words are particularly expressive and/or they would be difficult to summarize.⁸ However, quotations must always be acknowledged as such using quotation marks and, of course, the original reference must be cited afterwards in the text.

Plagiarism is stealing someone else's words and passing them off as your own. Such a practice is unacceptable and must be avoided at all times.⁸ On occasions, sloppy research technique leading to confusion of the notes you have taken from various sources with your own thoughts, can lead to accidental plagiarism. To avoid this mistake, methods should be employed that highlight other peoples' words (e.g. bold or italics) until the draft is edited and the other authors then correctly cited.⁸

Paraphrasing is putting someone else's words into your own words. Synonyms and rephrasing are often

used to move away from the original wording. It is important that the style of the paper flows consistently and that your writing sounds like you and not someone else. While limited paraphrasing might be acceptable, it still requires a formal reference to the original source.

References errors

Every article, book, thesis document or manuscript that has been used to prepare the paper should be included in the list of references.¹² These references must be accurately cited. The names and initials must be spelt accurately, all the data must be correct, and citations in the text must correspond exactly with those in the reference list. Unfortunately, inaccuracy in reference lists is a problem that has been widely reported in the medical literature. Some journals have errors in up to 60% of all reference citations.^{5,14} Although the nature of the errors reportedly varies, the most common are those made in the names of the authors, title, journal, volume, year and page numbers.^{3-5,14} Finally, error rates vary from journal to journal, with lower rates witnessed among journals that employ their own in-house reference checking procedures.⁴

References must also supply correct information and be specific. The reader must be able to find exactly what he/she is looking for in the cited reference. One common mistake is to cite papers that are devoid of the original information, but have used the original information of others to develop their own arguments. This mistake may be quite misleading to the reader.

Photocopy machines and electronic referencing systems have made the task of accurate referencing much easier. As mentioned above, complete copies (photocopy, reprint, original journal) of all references cited should be obtained. In this way, references are immediately at hand to check the accuracy of the citation as well as the appropriateness of the reference itself.⁷

The consequences of reference errors may be considerable. It is likely that most people who have sought an article from a library archive have been, at one time or another, frustrated by an incorrect citation. Even a single figure error may lead to an inability to retrieve the article.

Unfortunately, the cost of citation errors involves more than delays in finding the cited material. Errors

also obstruct another purpose of a reference list, which is to give cited authors credit for their work. Also, promotion committees may judge the impact of a faculty member's research by noting how frequently that person's work has been cited.² Name errors also interfere with the retrieval of additional material written by the cited authors. Hence, this additional material, which may have been of great use to the reader wishing to explore the topic in greater depth, becomes less accessible.

Finally, reference errors impact upon citation indexes, as reference lists are the primary source of information used in their compilation. Hence, errors in references, particularly in the first cited author's name, diminish the usefulness of these indexes.

Conclusion

References are often viewed as an unimportant part of a scientific research paper. As a result, error rates in reference lists may be high and references may be inappropriate. These mistakes detract from the validity of the paper, may require manuscript revision prior to peer review (or even outright rejection), cause difficulty in reference retrieval and may not appropriately credit original researchers. Authors are encouraged to follow the guidelines that are available for the preparation of accurate reference lists in order to achieve the highest quality of clinical research practice.

Accepted 15 January 2002

References

1. Halsey MJ. References. In: Hall, GM, ed. *How to Write a Paper*, 2nd edn. London: BMJ Books; 1998.
2. Taylor MK. The practical effects of errors in reference lists in nursing research journals. *Nursing Res.* 1998; **47**: 300-3.
3. O'Connor AE. A review of the accuracy of references in the journal. *Emerg. Med.* 2002; (in press).
4. Siebers R, Holt S. Accuracy of references in five leading medical journals (letter). *Lancet* 2000; **356**: 1445.
5. Ngan Kee WD, Roach VJ, Lau TK. How accurate are references in the Australian and New Zealand Journal of Surgery? *Aust. N.Z. J. Surg.* 1997; **67**: 417-9.
6. Taylor DMCD, Brown AFT. Analysis of the study design and manuscript deficiencies in research articles, submitted to Emergency Medicine. *Emerg. Med.* 2001; **13**: 444-50.
7. Lindsay D. *A Guide to Scientific Writing*. Melbourne: Longman Cheshire, 1984.

8. Eunson B. *Writing and Presenting Reports*, 1st edn. Singapore: John Wiley and Sons, 1994.
9. Raymond H. Instructions to authors in the health sciences. Mulford Library, Medical College of Ohio. 2001 [Cited 26 November 2001] Available from URL: <http://www.mco.edu/lib/instr/libinsta.html>
10. Davidson F, Smith R, Squires BP *et al*. Uniform requirements for manuscripts, submitted to biomedical journals. *JAMA* 1997; **277**: 927–34.
11. EMJA. Uniform requirements for manuscripts, submitted to biomedical journals. EMJA 2001 [Cited 13 Dec 2001] Available from URL: <http://www.mja.com.au/public/information/uniform.html>
12. Anderson, J, Poole, M. *Thesis and Assignment Writing*, 2nd edn. Hong Kong: John Wiley and Sons, 1994.
13. Anonymous. National Library of Medicine Website. National Library of Medicine 2001 [Cited 13 Dec 2001] Available from URL: <http://www.nlm.nih.gov>
14. Lok CKW, Chan MTV, Martinson IM. Risk factors for citation errors in peer-reviewed nursing journals. *J. Adv. Nurs.* 2001; **34**: 223–9.