

Figures, tables, and references: integral but sometimes neglected components of scientific articles

Üstün Aydıngöz

Editor (uaydingo@hacettepe.edu.tr), Diagnostic and Interventional Radiology, Hoşdere Cad., Güzelkent Sok., Çankaya Evleri F/2, 06540 Ankara, Turkey.

Figures, tables, and references are among the most important—yet also usually under-appreciated—components of a scientific article. It is through these items that a manuscript gains added—and sometimes essential—appeal and perspective. There are some well established guidelines for the preparation of these components of an article (1). However, in many instances these guidelines are either overlooked or they need supplemental information. I do not intend to go over each and every one of the established guidelines regarding figures, tables, and references here. I will, however, try to mention some of the key points that are commonly overlooked in the preparation of these important aspects of a scientific article.

Figures

First and foremost of all, figures must be relevant. An appropriately selected figure conveys important data regarding the points mentioned in the manuscript. Not infrequently, it is through the help of a figure (i. e., an image, drawing, or a graph) that a key point is best conceived in the minds of readers. Especially for articles like reviews and pictorial essays, figures also have a didactic role and each figure should be carefully selected to achieve the highest educational impact.

Needless to say, each figure or figure part should be numbered. This is true for both hard-copy and on-line submissions. Figures or figure parts not numbered or misnumbered cause confusion and significant delays in the processing of an article. Figure parts should not carry designation letters (i. e., a, b, c, ...) placed on them, however. These are placed inside the figure part by the production staff of our journal. For the purpose of style consistency throughout our journal, Arial should be the font of choice in the annotations on a figure, be it an image or a drawing or a graph. Figures should be numbered consecutively according to the order in which they have been first cited in the text. If a figure has been published, the original source has to be acknowledged—in the caption (i. e., legend) for our journal—and the authors should submit written permission from the copyright holder to reproduce the material (1). Permission is required irrespective of authorship or publisher except for documents in the public domain (1).

Arrows and arrowheads should be properly sized. They should be easily discerned by the reader yet should not extensively cover adjacent structures (open arrows are useful in this regard). These should point to the correct place on a figure. When symbols, arrows, numbers, or letters are used to identify parts of the illustrations, each one must be clearly identified and explained in the caption. The internal scale has to be explained or clearly conceivable and the method of staining in photomicrographs must be identified (1).

Cropping an image is important for both keeping the anonymity of

patients and achieving high esthetic standards for the journal where the article is intended to be published. Proper cropping helps in focusing the attention of readers to the point(s) conveyed by the image primarily by eliminating areas that distract attention. Such cropping should be made by the journal production staff if not already performed properly by the author(s).

If photographs of people are used, either the subjects must not be identifiable or their pictures must be accompanied by written permission to use the photograph (1). Informed consent for this purpose requires that a patient who is identifiable be shown the manuscript to be published (1). Identifying details should be omitted if they are not essential. Complete anonymity is difficult to achieve, however, and informed consent should be obtained if there is any doubt. For example, masking the eye region in photographs of patients is inadequate protection of anonymity (1).

Radiology is a field dominated by images and images in radiology journals have extra importance. Quality of images can be improved in a number of ways. There are some excellent articles explaining the use of Adobe Photoshop® (Adobe Systems, Mountain View, California, USA) computer software in the processing of images (2-7).

Captions are arguably the most misrepresented or underutilized components of figures. Captions have to be written in such a way that a reader can understand the key points intended to be conveyed to her/him by the authors without reading the manuscript itself. A figure caption should include the projection name of an x-ray, the plane of a cross-sectional image, window setting of a CT section, and sequence name of an MR image. An example is: *"Posteroanterior chest x-ray shows that ..."*. For cross-sectional images where planar information is available, this piece of information should be given first: *"Transverse CT section with mediastinal window setting reveals ..."* or *"Sagittal T1-weighted fat-suppressed post-contrast MR image shows..."*. A common mistake is the omission of the name of the modality—and of the imaging plane—itsself: *"T1-weighted image shows*

..." (the fact that this is an MR image and has a pre-determined plane should be conveyed here). Three-dimensional CT images and MR angiography figures should carry the relevant technical information (i. e., volume-rendering or shaded surface display, time-of-flight or phase contrast).

Tables

When properly used, tables capture information concisely, and display it efficiently. Including data in tables rather than text frequently makes it possible to reduce the length of the text (1).

Each table should have a number and a title. One exception to numbering the tables is the use of a single table throughout the article. In this case, it should be labeled as Table (with a title, of course), not Table 1, and referred to as such within the manuscript: *"... are presented in Table."* When multiple tables are used they should be numbered consecutively in the order they are cited in the text.

Vertical lines should not be used in the tables. Explanatory data should be given in footnotes. Small letters (a, b, c, ...) should be used for referenced footnotes for our journal. All abbreviations in the table should be explained in a line separate from the referenced footnotes in the footnotes section.

Referencing

References are meant to disclose the authors' sources during the conception and/or implementation and/or analysis of their study, thereby facilitating the referral of the readers to relevant background information. Not infrequently, however, authors take the writing of references rather lightly and mistakes are common in references. A recent study evaluating reference writing errors on the part of authors revealed that over half of all references included in manuscripts submitted to five major international radiology journals contained at least one error and that the majority were avoidable, resulting from failure to follow the journal's instructions to authors (8). Authors have to make every effort to ensure that the references are both correct and in compliance with the journal's style.

There are many types of sources (e. g., newspaper articles, audiovisual materials, CD-ROMs) other than scientific journal articles and books that can be listed as references. Samples of reference citation formats can be accessed through the U. S. National Library of Medicine website (9).

All references must be referred to within the article, and the reference list should not contain any item that is not referred to in the article.

When multiple sources are used as references to a statement, referencing should be clear, not vague, within the manuscript (e. g., when more than one study are referred to within a sentence, referencing should also cover every one of them and if necessary referencing should be made at different places within the sentence). With the possible exception of very old articles and books that could not be reached by the authors, original sources, instead of references citing them, should be referenced. When there are references to more than one article of a principal author, extra caution should be taken to avoid misnumbering the relevant reference within the manuscript.

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