

Evaluation of the Literature: Evidence Assessment Tools for Clinicians

Giovanpaolo Pini Prato^a, Umberto Pagliaro^b, Jacopo Buti^{c,*}, Roberto Rotundo^d, and Michael G. Newman^e

^aDepartment of Surgery and Translational Medicine, University of Florence, Italy

^bPrivate Practice, Florence, Italy

^cSchool of Dentistry, The University of Manchester, UK

^dPeriodontal Unit, Eastman Dental Institute, University College of London, UK

^eSection of Periodontics, UCLA School of Dentistry, Los Angeles, CA, USA

ABSTRACT

The progressive improvement in the quality of scientific articles has led to an increase in difficulty in reading and interpreting them so that now clinical knowledge and experience must be complemented by methodological, statistical and computer skills. The aim of this article is to offer practitioners the tools, the simplest keys, that will allow them to understand and critically judge the results of scientific studies.

The “peer-review” process of a clinical article submitted to a journal is described and the Science Citation Index and the Impact Factor are presented to the reader as essential instruments to evaluate a specific article’s impact and the impact of a given journal on the scientific world, respectively. An article should be evaluated on the basis of some key issues which include, at least, an assessment of methodological aspects, a critical analysis of the statistical component and a proper understanding of the clinical impact of the study outcomes.

The standard approach for evaluating the quality of individual studies is based on a hierarchical grading system of research design which represents an essential tool to identify the strength of the evidence of an article. Many different biases may affect the reliability of study results. Randomized Control Trials (RCTs) and Systematic Reviews (SRs) are able to minimize the number of biases and thus are at the highest level of the scale of evidence representing the final steps of a treatment’s “career.”

Finally, moving from research to clinical practice, attention on the clinical impact of study’s outcomes is of paramount importance as the literature contains studies (including RCTs) that present statistically significant results but which, from the clinical standpoint, are only relatively or not at all significant. Clinical Practice Guidelines represent a useful tool for practitioners assisting

*Corresponding author. Via R. Giuliani, 144/A, 50141, Firenze, Italy.
Tel.: +39 (0)55 4360106; fax: +39 (0)55 4223717; E-mail: jacopo.but@manchester.ac.uk, ruijack@libero.it.

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the decision-making process when choosing the most appropriate treatment for their patients.

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INTRODUCTION

The last years of the twentieth century witnessed extraordinary advances in scientific medical knowledge and an increasing number of publications on research and studies.

The rapidly increasing production of scientific data, the almost real-time availability of information online, the possibility for direct exchange during congresses, meetings and courses have fostered the creation and proliferation of almost countless tools for disseminating knowledge, including scientific journals and reviews.

The progressive improvement in the quality of scientific articles has led to an increased difficulty in reading and interpreting them, so that now clinical knowledge and experience must be complemented by methodological, statistical and computer skills. These issues have generated a gap between the increasingly high level of scientific research and the practitioners who, in many cases, cannot keep pace with the availability and assessment of the new scientific proposals. But, now more than ever, in this era of the philosophy of evidence-based medicine in which the patient's requests, the operator's skill and the appropriateness of the treatment must be supported by accredited scientific proof (evidence). The practitioner who has to decide on how to treat a patient is duty-bound to keep up-to-date with current advances in medical research has to use the essential tools from the deontological, ethical and forensic standpoints.

The aim of this article is to offer practitioners the tools, the simplest keys, that will allow them to understand and critically judge the results of scientific studies, to evaluate the effectiveness of one treatment approach with respect to another and, above all, to verify the results of sound and controlled studies against information from uncontrolled studies or data published in journals without any peer review process.

“Scientific knowledge is a body of statements of varying degrees of certainty – some most unsure, some nearly sure, none absolutely certain.”

Richard P. Feynman, (Nobel Prize for Physics).¹

THE CLINICAL ARTICLE

Types of Articles

Evidence about clinical topics consists of the results of studies published in descriptive and scientific articles. Sci-

entific articles may be reviews of the literature and original research.

The reviews summarize the information obtained from previously published articles on a given topic. *Narrative reviews* are based on an arbitrary selection of articles on a given topic, which are evaluated and summarized without any predefined strategy. *Systematic Reviews*, on the other hand, call for articles selected on the basis of inclusion and exclusion criteria. The selected studies are then critically evaluated and the results summarized according to a predefined protocol. When it is possible to scientifically compare clinical data obtained from the review of the literature, a statistical analysis called meta-analysis is used.

Original articles are based on observations and experiments; they have a standard format (Introduction, Materials and Methods, Results, Discussion, Conclusion); they may be case report-series or controlled or randomized studies.

The Peer Review Process

An author who wants to publish a study must send the article to the journal's editor who then submits it to reviewers often including a statistical reviewer. This process is known as “peer review” and its purpose is to assess the scope of the study, the correctness of the materials and methods used (internal validity), the congruity of the results as well as whether or not the article is pertinent to the journal and its readership (external validity). The article may be accepted by the reviewers as is, or returned to the author(s) with requests for modifications prior to publication, or it may be considered unsuitable for publication and rejected (Fig 1).

Some journals do not have a peer review process and therefore they have less scientific value. The existence of peer review is an important requisite for guaranteeing that a journal is included in the most important scientific literature databases. Indeed, one measure of scientific value is a judgement by the Institute for Scientific Information (ISI),² which comprises committees of experts who enter and maintain in the databases only those journals that meet well-defined international standards.

Science Citation Index

Once a scientific article has been published in an international journal, it will be evaluated and perhaps cited by other authors. A specific article's impact on the scientific world can be assessed by the Science Citation Index

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