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Critical Analysis of Clinical Research Articles: A Guide for Evaluation

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Abstract

Critical evaluation is used to identify the strengths and weaknesses of an article, in order to evaluate the usefulness and validity of research results. The components of the critical appraisal are the appropriateness of the study design for the research question and a thorough evaluation of important methodological characteristics of this study, the adequacy of the used statistical methods and their subsequent interpretation, potential conflicts of interest and the relevance of research for clinical practice. This review steps for review and also helps in identifying high-quality studies that can guide clinical practice safely and evidence-based.

Keywords: Critical appraisal; Clinical practice; Decision making; Evidence-based practice.

Introduction

Health professionals need to apply the results of scientific research according to the individual circumstances of the patients, this should be able to select and evaluate the scientific literature that is relevant to their field, should understand the implications of the research for patients individual, stimulate own preferences of patients and develop an appropriate management plan based on the combination of this information [1-8].

The selection and critical appraisal of the literature to assess the validity and relevance of a research paper is presented in Table 1[7-27].

Local	Questions
Title	Is the title clear, accurate and concise, avoiding unnecessary words and without abbreviations?
Abstract	Does the abstract contain what was done, how it was done, the results and their implications?
Definition of The Study Theme	Has the problem been properly defined? Is problem linked to article already published on the subject? Is the research goal described and correctly defined?
Research Design	Is the study controlled? What is the hypothesis? Is the hypothesis clearly defined? What is the kind of study? Is the type of study appropriate to achieve the objective of the investigation? Are there inherent limitations in the employed method that may have affected the results? Is the method correctly applied? Were the ethical aspects properly conducted?
Sample	Is the target group appropriate to achieve the objective? How was done the sample selection? Was the sample selected at random? Was it somehow flawed? In the case of experimental study or clinical trial, was there randomization? Was the sample size discussed? Was the sample size enough for the purposes of this study?
Gauging of Information	Are the used indicators and procedures the most appropriates? Have the variables been properly set? Is the effect evaluation objective and proper in relation to the study goals? Is the response variable properly used to measure the effect? Are there preparation (pre-test) and data collection instruments (questionnaires, appliances)?

	Was there training of collectors and examiners? What is the reliability of the information? May the observation process have affected the outcome? In the case of experimental study, was there adherence to treatment and did the study use double-blind technique?
Statistical Analysis	Do the authors correctly showed the sample calculation? Were the employed statistical techniques adequate to the problem? Were they used in the right way? Were the confidence intervals calculated and the accuracy of the results informed?
Internal Consistency of Results	Were figures and tables added up correctly? Are the totals in a table the same as the totals in another table? If they are different, are there explanations for the differences?
Interpretation of Results	Is there coherence between the methods of the original protocol and end methods actually used? May the differences be simply due to "chance" - type I error - or false positive results? What was the alpha used? If there were no statistically significant differences, can a Type II error (false negative) be present? What was the employed beta? What was the study power (1-beta)? Where there multiple comparisons (i.e., multiple hypotheses) to test various effects? If so, has the alpha for each hypothesis been a priori fixed? Can the differences be attributed to a selection bias (i.e., the one that occurs in the sample composition or the constitution of study groups)? Was there loss of results in the follow-up? What was the non-response rate? In the case of experimental study, Hawthorne or placebo effects could explain the results? Was there co-intervention or contamination? Can the differences be attributed to measurement bias (i.e., the one which focuses on how to obtain the data)? Can the differences be attributed to confounding bias (i.e., the ones that can be explained by other factors such as age, gender or other confounding variable), due to differences in the composition of the groups? In other words, were the techniques to control the confounding variables properly used? Are the results discussed and compared with those of previous studies? Can the results be generalized to different populations in relation to the population here studied? For what kind of populations would you apply the results? Does the study change your practice?
Conclusions	Are the conclusions justified when compared to the presented results? Are there conclusions not based on study data? Have the authors commented about the study limitations? Have the authors identified possible defects, estimated their magnitude and pointed out their likely implications? Are the findings relevant to the problem and to the study objectives?
Style	Is the style clear and direct, without unnecessary repetition? Are the use of technical terms and the language in general correct?
Bibliographic References	Are they current and timely? Are they presented in the right way?
Conflicts of Interest	Are there any conflicts of interest?

Use of this guide may assist in the evaluation of the studies and their incorporation into clinical practice.

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