



## The Art of Critically Reviewing a Medical Article

LD Mishra<sup>1</sup>, Ankit Agarwal<sup>2</sup>

1. MD, PhD, Professor & Head, Division of Neuroanaesthesia

2. MD, PDCC (Critical Care) Senior Resident

Institute of Medical Sciences

Banaras Hindu University

Varanasi-221005

**Correspondence:** Dr Ankit Agarwal ([drankit80@gmail.com](mailto:drankit80@gmail.com))

**Dr LD Mishra**, MD, PhD (Neuroanaesthesiology), is working as Professor of Anaesthesiology & Head, Division of Neuroanaesthesia, Institute of Medical Sciences, Banaras Hindu University, Varanasi. He is a visiting fellow to AIIMS & INSA exchange Fellowship to Polish Academy of Sciences. He has many publications in the International and National journals. He has recently been elected Vice-President, Indian Society of Anaesthesiologists. As Member G.C., ISA, he has served as Coordinator for updating Anaesthesia curricula for MBBS, PG, & Post PG courses.



Annually about 6 million articles related to the field of medicine are published worldwide. However, only 15% of these are of any use. Unfortunately, the quality of journal also does not always assure of all good articles as sometimes even prestigious journal articles are far from being satisfactory<sup>1</sup>. Average quality score of randomized controlled trials (RCTs) is < 50%. Critical appraisal of an article is looking at a published article in an organized and structured manner to evaluate its validity and authenticity. The person doing appraisal should also find the article's strengths and weaknesses. Doing critical appraisals is required by mostly teachers, clinicians, researchers and students who need to remain updated and competent in their respective fields. It is an essential tool for practicing evidence based medicine (EBM) and an invaluable component of post graduate (PG) curriculum.

Critical appraisal is not without any reason. Medical knowledge and practice are changing at a fast pace. One requires to be updated continuously to be abreast with the changing needs of patients and society. Without critically appraising an article, a clinician would not know whether the new information contained in the article is correct and whether it is incorporable in day to day practice<sup>2</sup>. Even the patient's access to medical knowledge is increasing tremendously and physicians are directly responsible for interpretation. The members of the public receive both for and against advice about their illnesses from newspapers, radio, television channels and internet. Physicians must be able to substantiate and add information and when required, clear doubts.



For Journal Club presentations articles are generally chosen by trainees in concurrence with a teacher-cum-moderator<sup>3</sup>. The selection should be based upon either its application in day to day practice or any novel approach or innovation. Thus knowledge of vicarious article types is essential. The common types of articles are; 1) Randomized controlled trials, 2) Cohort study, 3) Case control study/reports, and 4) Review articles/meta analyses. A randomized clinical trial is an experiment performed to assess the safety and efficacy of treatment. A Cohort study collects information on study population at one point of time and then again at a later stage to measure the outcome. A Case control study is based on current disease status, by collecting history based information on diseased and non-diseased subjects.

There are certain rules about presentation that must be adhered to. The article (at least summary) has to be circulated in advance to all participants. Sufficient information about the topic has to be gathered by the presenter and he should refer all cross references to validate the presented information. Another important, often undermined aspect is that the article should not be read from beginning to end to the audience. On the contrary, the salient points should be appraised and discussed by all participants<sup>4</sup>. Also the duration of presentation should not exceed 45 minutes including the time for discussion.

While undertaking a critical appraisal of an article, it must be divided into following subsections;

1. Title with Authors - which must be short, interesting and innovative. The place and period of study may also be indicated.
  - Inclusion of reputed authors from reputed institutes increases the authenticity of the article.
2. Abstract - represents a concise, accurate and factual mini-version of the paper. Its format may vary according to the type of article and individual journal. For original articles a structured abstract will be required. Authors are expected to ensure that the abstracts accurately reflect the contents of the paper. Reading abstract should give a true insight into the article to the reviewer.
3. Keywords - should be chosen preferably from the Medical Subject Headings (MeSH) list and re-checked against established indexing systems eg MEDLINE/PubMed etc<sup>5</sup>.
4. Introduction - emphasizing the problem and the reason/s of undertaking the research work should also clearly define the aims of the study and step a hypothesis being used or the procedure being evaluated.
5. Material & methods - should lay stress on what was done, and how it was done.
6. Results - i.e. what was interpreted from various observations.



7. Discussion - portraying the meaning of various results and comparing these vis-à-vis other similar studies published in relevant literature and what else could have been done.
8. Conclusions - should summarize in 2-3 sentences the conclusions made on the basis of the findings.
9. References – should follow standard protocol as given below.

A PG student must record a note at each step in terms of strengths and weaknesses for assessing the completeness or deficiency of each step. The introduction must describe the nature & magnitude of problem including a brief relevant literature with 2-4 references. The aim of study and a working hypothesis should be vividly described. The material & method section should emphasize the selection criteria, sample size and controls. The technical details, methods of elimination of errors or bias, the units of measurement, dependable and non-dependable variables, reproducibility, parameters tested and statistical tools used must be described. The information should be sufficient for anybody to reproduce results. The results should include precise presentation of recorded data using tables, graphs etc together with results of statistical analysis. The discussion should account for authors major as well as subsidiary results. It must explain the results in light of other similar studies. All explanations must have a scientific background explaining how they alter the current opinion. While concluding one must try to answer two questions 1. Whether the conclusions are rational and based on results of study? 2. Whether they are justified by all authors. One must also describe the limitations and scope for future research.

Lastly, a 150-250 words summary must represent the entire study in brief including the methodology and conclusions in brief. A Vancouver or Harvard style of writing references must be followed and they must be from standard and recent journals or books. References must not be too many or too few. A final evaluation must answer whether

- the work is original
- is scientifically valid & reliable
- is clinically relevant
- its strong points
- its weak points and their rectification if possible
- is it suitable for presentation?

### **Concept of Fast Track Appraisal:**

Many clinicians do not have sufficient time to spend critiquing articles or else the clinician/researcher may like to initially do fast appraisals of many articles, before choosing



to read an article in details. Thus a brief and efficient screening method should allow them to assess the article quickly<sup>6</sup>. Fast Track Appraisal is based on three steps

1. Initial validity and relevance
2. Intent of the article, and
3. Validity based on its intent.

**Step I** Relates to checking for initial validity and relevance: First of all, one must find out whether the article deserves time needed to review. For this the following questionnaire must be considered:

- Is the article from a peer reviewed journal?
- Is the environment of study similar to critiques so that the results, if valid, would apply to his patients/ working conditions too?
- If applied, will the given information improve the overall outcome?
- Is the technique/ modality described available?
- Is the study sponsored by a commercial organization?

A 'NO' to any of these questions except the last should prompt the clinician to spend further time on the article.

**Step II** Intent of the article: If the clinician proceeds from step I, he should find why the study was performed and what questions the authors were addressing? The four major clinical categories in an article of original research are (a) Therapy, (b) Diagnosis, (c) Causation, and (d) Prognosis. The intent can be determined by reading the abstract and if necessary proceeding to introduction; usually the last paragraph in introduction reveals the purpose of study.

**Step III** Validity based on its intent: After the article has successfully passed the first two steps, the reviewer/clinician should assess its validity and applicability in his practice setting. Each of the four clinical categories of research has their preferred study designs and critical items to ensure their validity. It is quite essential to take into consideration a few mandatory points in each category to determine its validity.

**Summary:** One should begin the Fast Track Appraisal with checking for title, and the quickly read the entire abstract, at the same time surveying bold headings, tables, graphs & illustrations. The first/ first two sentences of each paragraph must be read to grasp the organization of the article. This should follow with the methodology adapted, with a background of the intent of the article. With some practice and salient noting, one can perform a critical appraisal of an article within a few minutes. It is important to realize that very few articles would be perfect.



### References:

1. Altman DG. The Scandal of poor medical research. We need less research, better research, and search done for the right reasons. *BMJ* 1994; 308: 283-84.
2. User Guides to Medical Literature. *JAMA* 1993; 270: 2093-97.
3. Bordage G. Considerations on preparing a paper for publication. *Teaching & Learning in Med*, 1989,1(1):47-52.
4. Department of clinical epidemiology and biostatistics, Mc master University guidelines. How to read clinical journals, why to read them, and how to start reading them critically. *Can Med Assoc J* 1981; 124:555-58.
5. Peh WCG, Ng KH. Effective Medical Writing. *Singapore Med J* 2008; 49(9):664-65.
6. Greenhalgh T. How to read a paper-Getting your bearings (deciding what the paper is about) *BMJ* 1997;315:243-46.