Critically Appraised Papers and Topics Part 2: How to Read and Interpret a CAP

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IN ORDER TO appropriately benefit from a Critically Appraised Paper (CAP) or Critically Appraised Topic (CAT), one must first be able to accurately interpret its components. Although both the CAP and CAT are very similar tools for critically appraising the literature, the CAT includes a few distinguishing features. Also, the clinical bottom line described in a CAT entails a synthesis of information gathered from each respective study. Because multiple studies are reviewed in a CAT, the clinical bottom line may be more credible, as clinically relevant evidence has been collected from several sources. The purpose of this report is to learn how to read and interpret a CAP.

The CAP begins with a clinical question that serves as a reference to assess the worth of the paper as to a particular population to which the intervention, assessment, or diagnosis will be applied. In the case of this report, we would like to determine whether treatment by means of joint mobilizations will alleviate mechanical low back pain in young athletic women. The specific population (women) is identified as well as the type of intervention to be applied (grade 1 and 2 posteroanterior lumbar joint mobilizations). The development of a precise, rather than general, clinical question will expedite the process of gathering relevant literature to determine the most appropriate treatment for a specific patient.

While it is written after the analysis of the research paper(s) of interest, the “clinical bottom line” is a summary of how the study relates to the clinical question. In essence, this statement highlights what the results of the study accomplish and whether or not use of the given intervention in clinical practice might be worthwhile. In order to address a clinical bottom line, study design and internal, external, and statistical validity must be analyzed to accurately determine how the clinically applicable question can be answered. One must keep in mind that the clinical bottom line may not be applicable to practice settings and populations outside of those referenced within a given study. Thus, the clinical bottom line may primarily serve as the best available evidence under other clinical circumstances.

In the body of a typical critical appraisal will be a summary of the study design, type of sample utilized, procedures followed within the study, outcome measures administered, and the final results. To summarize the study design, a series of letters is shown, referred to as design notation. In the example CAP in Figure 1, RCT denotes that the type of study being appraised is a...
“Randomized Controlled Trial.” Additionally, symbols are used to offer a visual representation of an intervention being implemented and any period of time used for observation or outcome measurement. Specifically, X is used to represent the experimental intervention, also referred to as level of the independent variable. Additionally, an O is used to represent a time of observation or measurement of the dependent variable. These diagrams also allow the reader to determine the number of independent treatment groups.

In the case of this example, two rows of symbols equates to two independent treatment groups. The R indicates that all subjects have been randomly assigned to groups. The three pairs of Os in each treatment group indicate that outcome measures were obtained prior to treatment, immediately after treatment, and at 24 hours after treatment. Outcome measures used include the McGill Pain Questionnaire for pain during activities of daily living, a Visual Analog Scale for pain during range of motion, and the Nicholas Manual Muscle Tester handheld dynamometer, which measures muscle force generation. The X represented on the top row indicates that only one group received grade 1 and 2 postero-anterior joint mobilizations, while the other served as the control group and received no treatment.

Beneath the study design in the summary of key evidence is a synopsis of the sample gathered for the study. In this case, n simply illustrates that a total of 19 subjects were included. Subsequently, a brief description of the sample was given, including sex, mean age, and why the subjects were included in the study. This particular sample was comprised of male athletes who had been diagnosed with mechanical low back pain. Next, the procedure briefly describes the steps taken to collect data and which outcome measures were used to determine any treatment effects. An overview of the results obtained is shown last.

Following the summary of key evidence is an appraisal of the content within the study, which specifically analyzes internal validity, external validity, and validity of statistical results. Listed with each type of validity are the threats and strengths included within the study. Assessment of internal validity helps the reader to determine whether the experimental treatment caused the observed change in the dependent variable, or if other extraneous factors may have been responsible for the change. In this particular example, the degree of internal validity ensures whether the mechanical low back pain (the dependent variable) was, in fact, alleviated by the joint mobilizations (the independent variable) or by some other unknown factor. External validity relates to how applicable the results of the study are to the larger population. With both types of validity, there may be several threats that, when considered together, have the potential to detract from the legitimacy of the study, and hence the clinical application of the study results. The last type of validity addressed in this appraisal is the validity of the statistical results on which the conclusions were based. Ultimately, if the number and significance of threats toward the validity outweigh the strengths of the study, the results of the study for practical use are highly questionable.

Also addressed in the CAP is the research study’s level of evidence, which is a method of categorizing a study based on the quality of the study design and the consistency of its results among other studies. This particular study was ranked to have a level of evidence: 1b, which is consistent with a randomized controlled trial. Once the study design, type of sample, study procedures, results, and validity are closely examined, the author of the critical appraisal may construct a one-sentence summary of the feasibility of applying the study results to a broader spectrum of patients. Specifically, although this example used only male subjects, the authors proposed that since low back pain is a common ailment throughout much of the population, grade 1 and 2 posteroanterior joint mobilizations may be a worthwhile adjunct treatment option for women with the same history of pain.

**Conclusion**

While Critically Appraised Papers can be a convenient mechanism to summarize information from a study of interest, the appraisal may not necessarily be taken at face value. All factors influencing a specific treatment approach must be considered for the best interest of the individual patient. Also, a Critically Appraised Topic, which reviews multiple research studies pertaining to a given subject, may provide more accurate information to be applied clinically. Regardless of the nature of the appraisal, the reader must understand its components to determine whether the information provided is legitimate and may be useful to the health care professional to optimize patient care.