

## CRITICAL REVIEW OF A PAPER

### *How to Critically Review a Paper*

#### 1. Determine what a paper is about

- Why was the study done (what question did it examine)?
- Is there a clear description of the problem?
- Is the study useful and relevant?
- Was the study design appropriate to the broad field of research examined?
- What type of study was done?
  - Primary research (experiment, randomised controlled trial, cohort study, case-control study, cross sectional survey, longitudinal survey, case report etc.)?
  - Secondary research (simple overview, systematic review, meta-analysis, decision analysis, guideline development, economic analysis)?
- Was the study ethical?
  - Are there any ethical objections to the design or reporting of the study
- Is there a review of the literature?
- Is the writing style easily understood?
- Is the paper well laid out and easy to follow

#### 2. Paper methodology

- The design of the study is consistent with the aims
  - Observational studies - qualitative, by interviewing
  - Observational studies - quantitative, obtain baseline values
  - Retrospective studies - information from past events
  - Prospective studies - following events as they happen
  - Experimental Studies - e.g. randomized control trial
- Was the design of the study sensible?
- Was the study original?
- Who is the study about?
- The sample of the study is representative of the population as a whole
- How were subjects recruited?
- Are controls needed in the study?
  - If a cohort, case-control, or other non-randomized comparative study were the controls appropriate?
- Who was included in and who was excluded from the study?
- The methods of selecting cases and controls is defined well
- Were the subjects studied in "real life" circumstances?
- What intervention or other maneuver was being considered?
- Details of the study such as numbers, time intervals, statistical test used are clear and appropriate
- The questionnaire and proformas are appropriate and relevant to the study
- Was the study adequately controlled?
- If a "randomized trial" was randomization truly random?
- Were the groups comparable in all-important aspects except for the variable being studied?
- What outcome were measured and how?
- Was assessment of outcome (or, in a case-control study, allocation of caseness) "blind"?
- Are there sources of bias in the setting of the subjects?
- Have confounding influences and multiple influences been removed
- Was the study large enough and continued for long enough, and was follow-up complete enough, to make the results credible?

### 3. Statistical aspects of a paper

- Have the authors set the scene correctly?
  - Have they determined whether their groups are comparable and, if necessary, adjusted for baseline differences?
  - What sort of data have they got and have they used appropriate statistical tests?
  - If the statistical tests in the paper are obscure why have the authors chosen to use them?
  - Have the data been analyzed according to the original study protocol?
- Paired data, tails, and outliers:
  - Have the appropriate tests been used e.g. t-test for distributions, chi square tests for dichotomous values
  - Were paired tests performed on paired data?
  - Was a two tailed test performed whenever the effect of an intervention could conceivably be a negative one?
  - Were outliers analyzed with both common sense and appropriate statistical adjustments?
- Correlation, regression and causation:
  - Has correlation been distinguished from regression and has the correlation coefficient (r value) been calculated and interpreted correctly?
  - Have assumptions been made about the nature and direction of causality?
- Probability and confidence and degree of significance been interpreted correctly:
  - Have P values been calculated and interpreted appropriately?
  - Have confidence intervals been calculated and do the authors' conclusions reflect them?

### 4. Result aspects of a paper

- Missing data such as drop outs, non-responders are accounted for
- Details of the results such as the numbers, statistics, are accurate and clear
- If statistics are appropriate to the study, then they were well used
- The sample size is of a significant amount
- Are the results clearly presented
- Have the bar charts, tables appropriately used

### 5. Discussion aspects of a paper

- The study is discussed critically
- The results are discussed with reference to other important literature
- The discussion and conclusions do not speculate too far beyond what has been shown in the study.