



Critical Appraisal of Research Reports

Dr Lale Say

Department of Reproductive Health and Research

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What is critical appraisal?

The fair assessment of research reports
in terms of

- their contribution to scientific knowledge
- the validity of their results
- the extent of the generalisability of their results



Why is critical appraisal important?

Review of more than 4200 published medical reports in about 30 journals (many of them prestigious e.g. BMJ, JAMA, NEJM, Lancet) in terms of scientific adequacy of study designs, data collection and statistical methods (*Williamson, 1986*)

- only 20% of 4235 research reports met the validity criteria
- ~80% of those inadequately designed and analysed had reported positive findings whereas ~25% of those with adequate designs reported positive results



Why is critical appraisal important?

- evaluates what the reported research has and has not shown
- generates healthy scepticism for biomedical knowledge - being in print does not mean that research is good or useful
- helps transfer of relevant knowledge into practice, by converting unrefined mass of published research into usable format



Basic questions

- Are the results valid?
- What are the results?
- Can I apply the results to my practice?



Standard format of a research paper

- Abstract
- Introduction
- Methods
- Results
- Discussion



Abstract

- Structured abstract
- Is the study properly designed and analysed?
- Are the results important and worth knowing about?



Introduction

- Is the research question clearly described?
- Is the study important to answer this question?
- Is the relevant background described?
 - what is already known and not-known on the topic?
 - how this study differ from the previous similar studies?
- Is the literature search adequate?

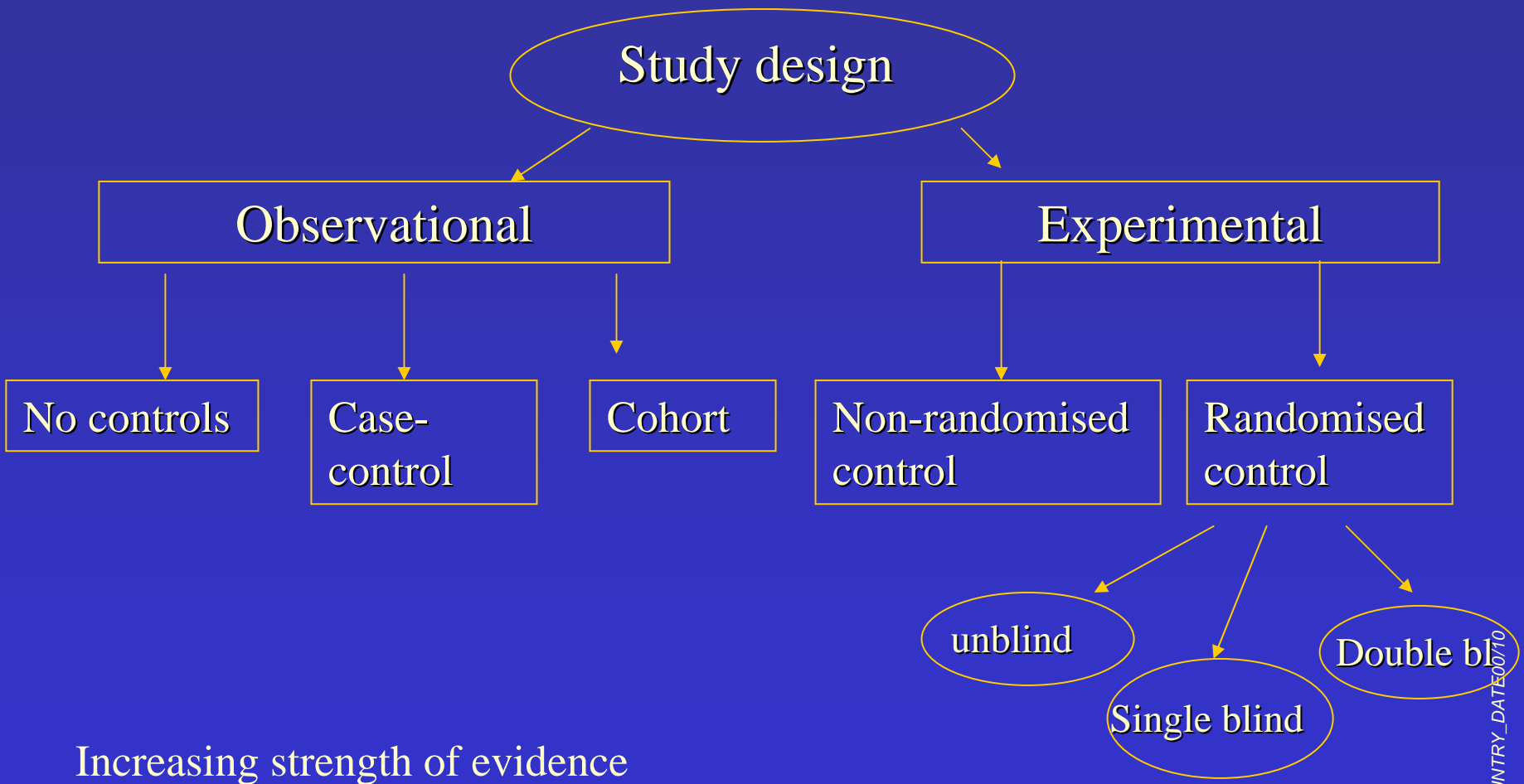


Methods

- Is the study design appropriate for the question studied?



Levels of evidence for cause and effect relationship



Increasing strength of evidence





Methods

- How were the participants selected?
- Justification of sample size?
- Is randomisation/blinding appropriate?
- Prospective or retrospective data collection?
- Any effort to ensure good response rate or minimise the amount of missing data?



Methods

- Are the outcomes of interest are defined and measured adequately?
- Are the statistical methods appropriate?
- Ethical approval?



Results

- Are the characteristics of the participants described? Are they representative of the population to which findings are applied?
- Are the analyses appropriate?
- Any data dredging – many statistical tests/comparisons?
- Are main results are presented with confidence intervals?



Discussion

- Limitations / biases of the study
- Clinical vs statistical significance
- Are the conclusions appropriate?
- Are the conclusions based on data – do the authors extrapolate beyond data?
- Implications for practice/future research?



References

- Are the citations presented in a standard format?



Authorship

- Is the list of contributors reasonable – twenty authors for a small study?
- Conflict of interest – any financial / administrative relationships with institutions related to the outcome of interest



Summary

- Critical appraisal of research reports is vital to be able to interpret properly and decide to use the results - being in publication does not mean the results of a study are valid /useful
- Basic understanding of study designs and statistical principles are needed for critical appraisal of research