

Study design

This issue of *Research Bites* looks at study design. Various designs are available depending on the kind of question/s being asked. For example, descriptive questions do not require a randomised controlled trial (RCT), but studies to evaluate a new treatment would benefit from a RCT. Resources are another factor. Cohort and RCT can take a long time to complete and are very expensive. Furthermore, RCT may not be ethically feasible.

Descriptive and analytical studies

One way of classifying study design is to divide them into descriptive studies that describe a situation or analytical studies that try to explain a situation by formulating and testing hypotheses (see Table 1).

Non-experimental and experimental studies

Studies can also be categorised as non-experimental (or observational) with no intervention or experimental where the researcher intervenes, e.g. by introducing a new treatment (see Table 1).

Main study designs (O'Donnel & Watt, 2003; Peat, 2001)

Randomised controlled trials (RCT)

- RCT are the best way to assess whether an intervention is effective.
- They are the "gold standard" of clinical trials with very strict rules on how they are conducted.

Intervention trials

- These are experimental studies designed to test cause-effect hypothesis of a researcher-led intervention.

Longitudinal studies

- These are surveys of frequency of disease, risk factors or other characteristics in a defined population *over a period of time*.
- Two types are cohort and case-control studies.

Useful resources

- Peat, J., 2001, *Health Science Research: a handbook of quantitative methods*, Allen & Unwin, Sydney.
- <http://trochim.human.cornell.edu/kb> Bill Trochim's Centre for Social Research Methods
- O'Donnel, K. & Watt, G., 2003, Developing the Research Question in TayRen Research Methodology Collection at <http://www.dundee.ac.uk/generalpractice/tayren>

Table 1: Types of studies (adapted from O'Donnel & Watt, 2003)

Type of study	Descriptive	Analytical
<u>Experimental</u>		
RCT	✗	✓
Intervention trial	✗	✓
<u>Non-experimental (or observational)</u>		
Longitudinal	✓	✓
Cohort	✓	✓
Case-control	✓	✓
Cross-sectional	✓	✓
Case series	✓	✗
Case study	✓	✗

Cohort studies

- It is usually *prospective* or forward-looking.
- A cohort is a group of individuals with a shared characteristic studied over time.

Case-control studies

- This is *retrospective* or backward looking.
- They try to relate an effect or outcome to a probable cause.
- Individuals with a disease (cases) are compared to those without the disease (controls) to determine if they differ in their past exposure to a postulated causal factor.
- They are used to establish links between the exposure or risk factors and disease.

Cross-sectional studies

- These are the most common study design and are surveys of frequency of disease, risk factors or other characteristics in a defined population *at a given period of time*.
- They can be descriptive or analytical and can provide evidence of an association, but not causation.

Case study or series

- They describe interesting and unusual cases - one (study) or several (series).

WARNING! A well-designed study makes analysis easier and yields meaningful results. **If in doubt when designing a study, seek professional advice!**

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