Hierarchy of evidence

Aim of this factsheet
What is the hierarchy of evidence and why is it important to consider for research.

Introduction
The hierarchy of evidence is a weighting of evidence given to the design of a quantitative study. Those studies that fall at the top of the hierarchy are considered to be ‘gold standard’; studies that have used these designs provide the ‘best’ evidence for the researched area. This does not mean that those lower down the hierarchy are necessarily inferior, as sometimes it is not possible to undertake a systematic review or randomised controlled trial. For example, it would be unethical to experimentally test whether smoking causes lung cancer using a randomised controlled trial, you can only observe whether being exposed to tobacco causes lung cancer (using a cohort or case-control design). Consideration should always be given to the quality of the study conducted; just because something is labelled as being at the top of the hierarchy doesn’t mean it is entitled to be there if the conduct of the research was poor.

The hierarchy from a top down approach

Systematic reviews – These combine evidence from relevant studies; this may be in a particular disease area or for a particular intervention dependent on the research question. Extracted data from all of the included studies are combined to build up a broader picture of the evidence. Usually randomised controlled trials are used but observational studies may be incorporated too. The quality of each of the studies included is assessed systematically within the review and may be weighted accordingly. Numerical data from the studies may be combined using a statistical method known as meta-analysis, where appropriate.

Randomised controlled trial (RCT) – These are experimental studies comparing groups (usually two) to establish the effectiveness of specific interventions The most common design is to compare a new intervention against the current best practice. Participants in the trials are randomly assigned to the treatment groups to minimise bias (see trial design factsheet)
**Cohort studies** - These are observational studies that identify participants who are exposed to a particular risk factor. Participants are then followed forward in time (usually years) to determine if they develop the disease under investigation.

**Non-randomised trials** – These trials are run when it is not ethical or possible to incorporate randomisation into the design. There is an increased risk of biases being introduced into the research and this should be considered carefully when analysis is reported.

**Case-Control studies** – These are observational studies that identify participants with a disease. Participants are then tracked back in time (usually years), along with a matched group of control participants, to determine if they were exposed to the risk factor under investigation.

**Cross Sectional surveys** – These provide data across a population at a single point in time. This provides an indication of possible prevalence, events, behaviours and attitudes, but doesn’t give any idea of changes over time, unless repeated (and here, an important question is whether the survey is distributed to the same group or not). This data may be used in an exploratory fashion to investigate causal relationships.

**Case studies** – These studies are descriptive in nature and usually cover a particular presentation of a single case. Despite these being the weakest form of evidence in the hierarchy they can still provide very useful information particularly in the very early stages of research into an area.

**Why consider the hierarchy of evidence?**

When considering whether to conduct a piece of research it is important to be aware of what has already been covered in the area. Ethically patients should have the best evidenced treatment available. Being aware of what has already been done will also reduce research waste. Ideally, the next step of research should be to add to the next level of evidence in the hierarchy. However, this may not always be possible, obviously more than one randomised controlled trial needs to have been completed to enable a systematic review or meta-analysis to be undertaken. Therefore it may be appropriate to continue research at the current level of the hierarchy rather than to move to the next level prematurely.

It is also important to assess the quality of the evidence at each level of the given hierarchy. A poorly conducted and reported RCT may provide less evidential value than the non-randomised trial that preceded it. The GRADE (Grading of Recommendations Assessment, Development and Evaluation) working group has produced a common, sensible approach to grading quality of evidence and strength of recommendation (now used in Cochrane reviews). The ability to critically appraise the conduct of any research study is a vital skill for any researcher (see further links section).

**Time to think** – At what level of evidence should a study be conducted in the following scenarios?

- Multiple relevant RCTs of good quality have been conducted into a psycho-social intervention for Alzheimer’s but not for Lewy body dementia.
- The presentation of a case within clinic is unlike anything within the current literature
- The understanding of the progression of Parkinson’s within a specific population is needed

**Further links**


**References**


[http://www.gradeworkinggroup.org/index.htm](http://www.gradeworkinggroup.org/index.htm)