

BSC206: INTRODUCTION TO RESEARCH METHODOLOGY AND EVIDENCE BASED PRACTICE | EXTRACTS OF NOTES FOR SAMPLE

List 8 barriers to evidence-based medicine.

- It requires a difference mindset
- It requires new skills in searching for and appraising the literature
- Many aspects of medicine have no evidence
- We can't all agree on the evidence
- New evidence sometimes disproves old evidence
- Protocols stifle innovation
- "It's really just common sense..." – it's expected that people are already diagnosing based on evidence
- It creates an illusion that patients fit into discrete categories

List 2 fundamental principles of evidence-based practice.

- Evidence is never enough: Individual patient values, cost/benefit analysis
- Not all evidence is equal: Hierarchy of evidence, dependent upon the type of question being asked

What is a conceptual definition?

A conceptual definition is a dictionary definition which covers a broad base of the term and is widely accepted but may not fit exactly what you are studying.

What is an operational definition?

An operational definition defines a variable according to its unique meaning in the study.

Provide an example of an independent variable operational definition.

Walking program= 10 weeks of daily walking sessions of 60 minutes at a target intensity of 50% HRM, as supervised by an exercise physiologist.

Provide an example of a dependent variable operational definition.

Low back pain= low back pain intensity as measured on the numeric pain rating scale (Smith et al., 2009) as measured at the beginning of each treatment session.

What is a research hypothesis?

A research hypothesis states the researcher's expectation of results. The hypothesis is either directional or non-directional meaning it does or does not prediction the direction of change. Research hypothesis is also known as alternative hypothesis.

What is a non-directional hypothesis?

A non-directional hypothesis is a research hypothesis (or alternative hypothesis) that does not indicate the expected direction of the relationship between variables.

What is a directional hypothesis?

A directional hypothesis describes the relationship between variables in terms of a difference and assigns a direction to that difference.

What is a simple hypothesis?

A simple hypothesis includes one independent variable and one dependent variable.

What is a complex hypothesis?

A complex hypothesis contains more than one independent or dependent variable. Complex hypotheses are non-directional because of the potential difficulty in clarifying multiple relationships. They are efficient for expressing expected research outcomes in a research report, but they cannot

be tested. For analysis purposes, they must be broken down into several simple hypotheses. Several hypotheses can be addressed in one study.

Provide an example of a non-directional research hypothesis.

There will be a difference in perceived learning between students enrolled in online or on-campus courses.

Provide an example of a directional research hypothesis.

Students enrolled in on-campus courses will exhibit higher levels of perceived learning as compared to students enrolled in online courses.

What is a statistical hypothesis?

A statistical hypothesis, also known as a null hypothesis, is interested in finding empirical statistics. It is a statement of no difference or no relationship between variables.

Provide an example of a statistical hypothesis.

There will be no difference in perceived learning between students enrolled in online classes and those enrolled in on-campus courses.

What are nominal scales?

Nominal scales are a level of measurement for classification variables. The assignment of value (number) is based on mutually exclusive and exhaustive categories with no inherent rank order.

Provide 4 examples of nominal scales.

- Gender
- religion
- age
- country of citizenship

What are arbitrary values?

Arbitrary means based on or subject to individual discretion or preference. In statistics, everything must be measurable including categories. Thus when collecting data about your sample group, you could assign the number 1 to represent male participants and the number 2 to represent female participants. The numbers 1 and 2 are arbitrary because they don't have any value other than categorical.

What are ordinal scales?

Ordinal scales are a level of measurement in which scores are ranks with unequal intervals.

Provide 4 examples of ordinal scales.

- Stages of disease with stage 1 being mild, stage 2 being moderate and stage 3 being severe.
- Socioeconomic status with category 1 being low SES, 2 being middle SES and 3 being high SES.
- Education with the order being primary school, high school, university and postgraduate.
- Level of disability with the order being minimal, mild, moderate, severe.

What are interval scales?

Interval scales are a level of measurement in which values have equal intervals but there is no true zero point.

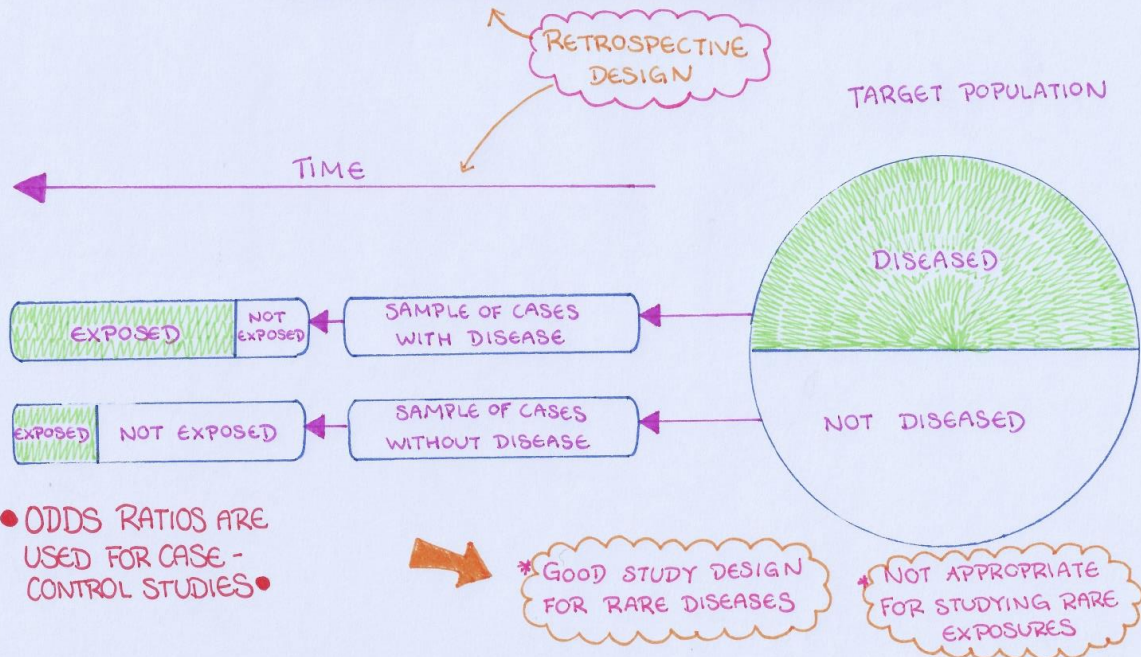
Provide 2 examples of interval variable categories.

- IQ scores
- Temperature (0° does not imply the absence of temperature)

What is the Global Rating of Change (GRC) scale?

The GRC is a 15 point scale that allows the patient to rate their change in condition from 1-7 in either the worse or better direction or rate 0 for no change.

L4. CASE - CONTROL STUDY DESIGN



L7. MEANING OF EACH STATISTICAL CONCLUSION

Conclusions are made based on mean differences, α level of 0.05 (5% acceptable error) and p value (probability that α level has occurred).

- p value $\leq \alpha$ level = reject H_0
- p value $> \alpha$ level = accept H_0 .

		REALITY	
		Difference exists in population	Difference does not exist in population
RESEARCH FINDING	Reject H_0 (difference)	Correct $1 - \beta$ "Power"	Type I error $\alpha = 0.05$
	Accept H_0 (No difference)	Type II error $\beta = 0.20$	Correct $= 1 - \alpha$

2/4 times conclusions are wrong

Type I error occurs when the study finds a difference but in reality no difference exists.

Type II error occurs when the study finds no difference but in reality the difference does exist.