Quantitative Research Designs

NURS 485 – The Discipline and Profession of Nursing III

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Lecture Outline

- Quantitative and qualitative research compared
- Experimental research designs
- Quasi-experimental research designs
- Descriptive research designs
- Correlational research designs
- Questions and issues for consideration when critically appraising quantitative research

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Quantitative & Qualitative Research Compared

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Qualitative	Quantitative
• **Broad questions** • **Understanding** • **Exploratory** • **Interview/observation** • **Discover frameworks** • **Textual (words)** • **Theory generating** • **Quality of informant > sample size** • **Subjective**	• **Specific Prediction** • **Survey/questionnaires** • **Existing frameworks** • **Numerical** • **Theory testing** • **Intervention testing (RCTs)** • **Sample size core issue in reliability of data** • **Objective**

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Should I do a quantitative study?

What is the problem? Identifying the problem is the first step of any research process

For any project, the problem drives the methodology

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Purposes of quantitative research

Quantitative research is used to examine:

- testing interventions and treatments
- differences between groups
- relationships between two or more variables
- descriptions of populations and phenomena
- change over time

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Types of Variables

- Independent variable: manipulated by the researcher to influence the dependent variable; may be called predictor variable
- Dependent variable: This is the variable of primary interest to the researcher; may be called outcome variable.
- Confounding variable: Extraneous third variable that influences the relationship between the independent and dependent variables
- **Propose a hypothesis about the relationship among the variables, and test it by controlling the context of the study**

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Types of Measurement

- Nominal
- Ordinal
- Ratio

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Brief intro to statistical tests

- Tests are based on what variables and what level of measurement
- Descriptive and inferential statistics

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Assessing the statistical tests

- Need to see all the variables represented in the analysis
- Need tables that report ALL these data, not just some ("cherry picking")
- If there is an analysis reported (i.e., regression), you expect to see a regression table with all the variables included
- P values

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Samples Quantitative Research

- Larger numbers
- Randomly selected
- Reflective of the population

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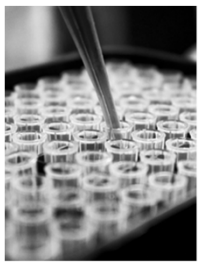
Designs in Quantitative Research

- A systematic plan to study a scientific problem
- Seek to answer explanatory questions
- It describes the basic strategies that will be employed to address the research question or hypotheses



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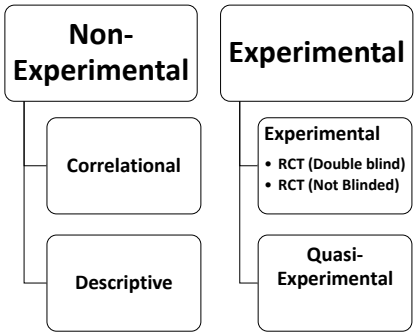
Quantitative Study Designs



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Non-Experimental Designs: Descriptive Designs

- Research that observes, describes, and documents areas of interest as they occur naturally
- Describes variables, rather than testing a predicted relationship between them
- Numeric data numeric collected through surveys, interviews, or observation

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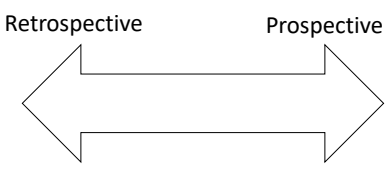
Typical Descriptive Studies



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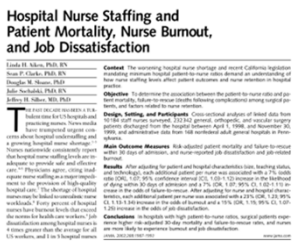
Typical Descriptive Studies

- Cross-sectional
- Compares different groups within a population of interest, data collected a single point in time.



Hospital Nurse Staffing and Patient Mortality, Nurse Burnout, and Job Dissatisfaction

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Typical Descriptive Studies

- Longitudinal
- Study the dynamics of a phenomenon over time
- Collect data from individuals/groups (a cohort) at more than one point in time over an extended period

Preventive Medicine Reports

The mental health impacts of health and human service work: Longitudinal evidence about differential exposure and susceptibility using 16 waves of cohort data

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Non-Experimental Designs: Correlational Designs

- Research that explores the inter-relationships among variables (without researcher intervention):
  - —How close to the front of class you sit and your grade?
  - —Cigarettes smoked per day and health costs?
  - —Symptoms of depression and social support?
  - —Does owning a dog impact on quality of life and well-being for people with chronic pain?

Correlational Research

Research Methodology

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Typical Correlational Studies

International Journal of Nursing Studies
Volume 51, Issue 10, October 2014, Pages 1344-1352

Comparability of nurse staffing measures in examining the relationship between RN staffing and unit-acquired pressure ulcers: A unit-level descriptive, correlational study

JiSun Choi [a], Vincent S. Staggs [b]

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https://doi.org/10.1016/j.ijnurstu.2014.02.011

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Experimental Designs: RCT

- Considered the 'highest level of evidence' because you can establish causation
- Management of context
- May be blinded or unblinded

Parachute use to prevent death and major trauma when jumping from aircraft: randomized controlled trial

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Typical RCTs

International Journal of Nursing Studies
Volume 119, July 2021, 103934

Mothers' voices and white noise on premature infants' physiological reactions in a neonatal intensive care unit: A multi-arm randomized controlled trial

Jinhua Liao [a], Guihua Liu [b], Namei Xie [c], Shuo Wang [d], Taohong Wu [e], Ying Lin [f], Rongfang Hu [f,g,*], Hong-Gu He [b,*]

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Experimental Designs: Quasi-experimental

- Occur when experimental research is unethical or impractical
- *No randomization*
- Control or comparison groups might be another site

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Typical Quasi-Experimental Studies

International Journal of Nursing Studies
Volume 123, November 2021, 104041

The effects of three consecutive 12-hour shifts on cognition, sleepiness, and domains of nursing performance in day and night shift nurses: A quasi-experimental study

Lois James [a, b, 1], Nathaniel Elkins-Brown [a, 1], A [c], Marian Wilson [a, b], Stephen M. James [a, b], Elizabeth Dotson [d], Charles D. Edwards [d], Laura Wintersteen-Arleth [d], Kevin Stevens [d], Patricia Butterfield [d]

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Critical Appraisal of Quantitative Research Designs

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Appraisal Questions

- What design has been used for the study?
- Is a design clearly stated/readily apparent?
- Is it sensible? Can it be replicated?
- Is it appropriate to the question/hypothesis/purpose?
- Was the best possible design used to address the study purpose?
- Is the study design justified?
- Are the strengths & limitations debated?

Textbook: Lansley, Kane & Barker (Chapter 7) and Appendix 6

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