

# Nursing Research Series

## *Essentials of Science: Methods, Appraisal and Utilization*



**Nursing Research Series**

*Essentials of Science:  
Methods, Appraisal and Utilization*



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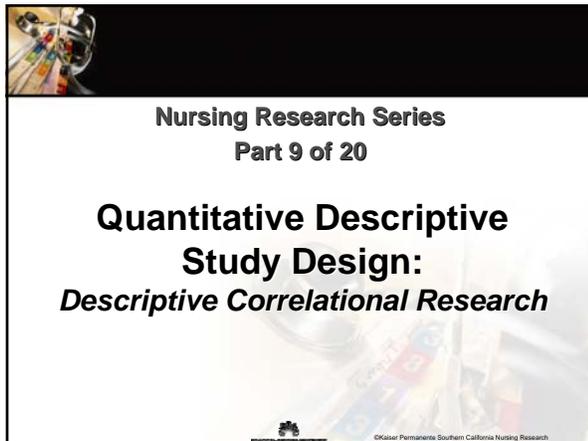
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**Nursing Research Series**  
Part 9 of 20

**Quantitative Descriptive  
Study Design:**  
*Descriptive Correlational Research*



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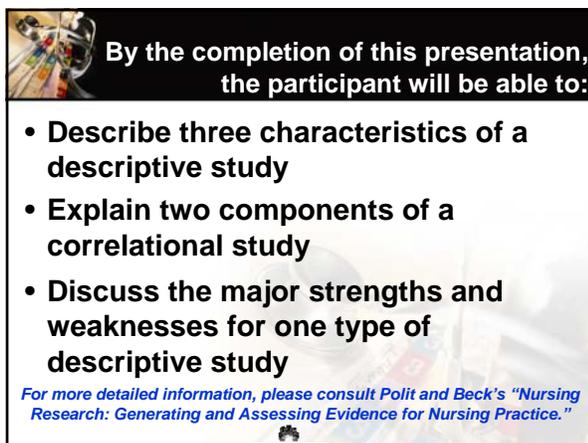
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**By the completion of this presentation,  
the participant will be able to:**

- Describe three characteristics of a descriptive study
- Explain two components of a correlational study
- Discuss the major strengths and weaknesses for one type of descriptive study

For more detailed information, please consult Polit and Beck's "Nursing Research: Generating and Assessing Evidence for Nursing Practice."



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# Nursing Research Series

## *Essentials of Science: Methods, Appraisal and Utilization*



### Research Design Blueprint

- Action plan for conducting research study
  - Techniques and procedures
  - Reduces researcher bias
  - Controls for extraneous variables
  - Controls for other sources of variances
- Produces credible, high quality research findings
  - Clear and detailed
    - Understand study aim & purpose
    - How research was conducted
    - Evaluate the research process
    - Reproduce research study

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### Robust Research Design

Considers the following:

- Environment
- Equivalence
- Treatment
- Measurement
- Extraneous variables
- Data analysis




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### Research Design

APPROACH	TYPES	DESIGN
QUALITATIVE (discovers)	PHENOMENOLOGICAL GROUNDED THEORY ETHNOGRAPHIC HISTORICAL PHILOSOPHICAL	See Module 8
QUALITATIVE or QUANTITATIVE (describes)	CORRELATIONAL DESCRIPTIVE	Nonexperimental (Observational)
QUANTITATIVE (explains; cause & effect)	EXPERIMENTAL QUASIEXPERIMENTAL	Experimental

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# Nursing Research Series

## *Essentials of Science: Methods, Appraisal and Utilization*

### QUANTITATIVE RESEARCH CHARACTERISTICS

**PHILOSOPHY** → **TECHNIQUES**

- Hard Science
- Concise and limited focus
- Reductionistic
- Objective
- Logistic and Deductive Reasoning

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### QUANTITATIVE RESEARCH CHARACTERISTICS

**PHILOSOPHY** → **TECHNIQUES**

- New Knowledge
- Tests Theory
- Explains & Predicts
- Uses Instruments
- Numbers
- Statistical Analysis
- Generalization

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### TERMINOLOGY

RESEARCH APPROACH	SOCIAL SCIENCE TERM	MEDICAL RESEARCH TERM
QUANTITATIVE	EXPERIMENTAL	Randomized Control Trial; Randomized Clinical Trial (RCT)
	QUASIEXPERIMENTAL	Controlled Trial; Controlled Trial without randomization
	NONEXPERIMENTAL: DESCRIPTIVE CORRELATIONAL RETROSPECTIVE PROSPECTIVE	Observational Studies Case-Series Case-Control Cross-Sectional Cohort Prevalence Incidence

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# Nursing Research Series

## Essentials of Science: Methods, Appraisal and Utilization



### Nonexperimental Quantitative Research

#### Descriptive Design

- Describes phenomena in real life situations that does not manipulate variables
- Examines characteristics of a single sample in order to generalize to a single population
- Describes, groups, and classifies concepts
- Generates new knowledge when little or no knowledge is available
- Develops models & theories

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### Descriptive Research Design

#### Case Study

- In-depth analysis and systematic description of one patient or one group of similar patients
- No manipulation of variables
- Common in nursing 40-50 years ago, but are now less frequent
- Can be used:
  - as evidence to support or invalidate theories
  - to generate new hypotheses for testing
  - to demonstrate effectiveness of therapeutic techniques

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### Descriptive Research Design

#### Case Study: Advantages

- Wealth of detail
- Wide variety of information
- Clues & ideas for further research
- Understand a topic, concept, issue in general in order to study it in greater detail



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# Nursing Research Series

## Essentials of Science: Methods, Appraisal and Utilization



### Descriptive Research Design

#### Case Study: Disadvantages

- Hard to
  - control
  - do well and easy to do badly
  - tell if it has been done badly
- Conclusions only apply to the one case
  - Does not create conclusions beyond the one case.
- Subjective: Researcher decides
  - What to look for or ignore
  - What to record or not record
  - What is important or not
  - What clues to follow or drop
- One is often unable to determine if researcher examined
  - the most important topic, clues
  - what was eliminated or not
- Disadvantages explain why case studies are now out of vogue

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### Descriptive Research Design

#### Case-Series Design

- Simple descriptive account of interesting characteristics seen in a group of people
  - Short time period
  - Important descriptive role as a precursor to designing other research studies to:
    - Evaluate causes
    - Explanations of observations
  - Acknowledges observed characteristic bias

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### Descriptive Research Design

#### Cross-Sectional Design

- Also called Survey, Prevalence, Incidence, Epidemiologic Studies
- Analyze data collected on a group at one time period
  - Subject and information obtained in a short time frame
- “What is happening”
- Diagnose or stage a disease
- Usefulness of new or current diagnostic procedures
- Establishing norms
- Gain insight into a topic or learn people’s perceptions (surveys)

*Most common research design in nursing*

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# Nursing Research Series

## Essentials of Science: Methods, Appraisal and Utilization



### Nonexperimental Quantitative Research

#### Descriptive Correlational Design

- First: Describes variables
- Second: Examines relationships amongst these variables
  - Does not infer cause-and-effect relationships
- Facilitates the identification of many interrelationships in a particular situation
  - Situation may have occurred or is currently occurring
  - No attempt to control or manipulate the situation

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### Nonexperimental Quantitative Research

#### Correlational Design

- Primary purpose is the examination of relationships
  - Examine relationships between 2 or more variables
- No manipulation of variables
- Determine if a relationship exists between variables
  - None, weak, moderate, or strong
- Determine type of relationship between variables
  - Positive relationship or negative relationship

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### Correlational Research Design

#### Case-Control Design

- Retrospective in nature
  - Presents phenomenon linked to past phenomenon: “What has happened?”
  - Looking back in time to detect causes or risk factors for the presence or absence of an outcome
- Example: Case-Control Studies
  - Cigarette smoking → lung cancer
  - People with lung cancer = cases
  - People without lung cancer = controls
    - Differences between groups = smoking

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# Nursing Research Series

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### Correlational Research Design

#### One Group Designs: Single Group

- Descriptive design re: no random selection of subjects
  - Convenience or volunteer sample
- Examine characteristics of a single group
- Natural setting
- Measurements made about the group
- Subjects serve as own control
  - Measure group X1, X2, or more
  - Still one group

**EXAMPLE:**

- Satisfaction surveys one group over 12 month time period
- Use the resulting descriptions to draw conclusions about that groups' satisfaction scores

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### Correlational Research Design

#### One Group Designs: Time Dimension

<u>Interrupted Time Series</u>	<u>Longitudinal Time Series</u>
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- Involves more than one pre and post test measurement
  - Equal number of measurements before and after the intervention
  - The time periods must be constant and equal
- Follows one group to examine and measure changes in same subjects over an extended time period

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### Correlational Research Design

#### One Group Designs: Time Dimension

<u>Strengths</u>	<u>Weaknesses</u>
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- Allows examination of sequences and patterns of change over both
  - single time period
  - Interrupted time periods
- Multiple measurements over an extended period
- Subject drop out
  - Threatens instruments validity & reliability
- Distorted data
  - Subject keeps a copy of the survey and duplicated responses
- Hawthorne effect

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# Nursing Research Series

## Essentials of Science: Methods, Appraisal and Utilization



### Correlational Research Design

#### One Group Design: Summary



- Correlational
- No random assignment
- Characteristics of single sample
- Pre test/post test
- Time series or multi-variant
- Longitudinal

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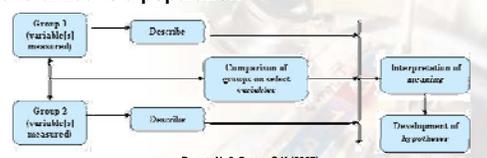
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### Nonexperimental Quantitative Research

#### Comparative Descriptive Design

- Describes variables & examines differences in 2 or more groups
  - Occurs naturally in a setting
  - No manipulation of variables
- Results obtained from the final analysis are frequently not generalized to a population



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            graph LR
            G1[Group 1 (variable) measured] --> D1[Describe]
            G2[Group 2 (variable) measured] --> D2[Describe]
            D1 --> C[Comparison of groups on select variables]
            D2 --> C
            C --> I[Interpretation of association]
            C --> A[Development of Appraisal]
            
```

Burns, N. & Grove, S.K (2007).

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### Correlational Research Design

#### Multiple Group Designs

<ul style="list-style-type: none"> <li>• Group comparative designs                             <ul style="list-style-type: none"> <li>- Simple 2 group design</li> <li>- Post-test design</li> <li>- Pre/Post Test Design</li> <li>- Time Series Design</li> </ul> </li> </ul>	<h4 style="margin: 0;">ADVANTAGES</h4> <ul style="list-style-type: none"> <li>• Comparison of group on dependent variables</li> <li>• Examines differences <i>between</i> groups</li> <li>• Examines differences <i>within</i> groups                                     <ul style="list-style-type: none"> <li>- Are they coherent groups?</li> <li>- Are there true differences between groups?</li> <li>- Did change occur re: multiple variables within groups?</li> </ul> </li> </ul>
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### Correlational Research Design

**Multiple Group Designs:**

**Multiple Group Time Series**

Memory loss in the Elderly

- Multiple independent variables
- One dependent variable
  - measured as multiple pre & post tests
- Constant & equal time periods
- Groups: (1) Ginkgo Bilbo (2) Plavix, & (3) No medication (control)
- Measure via memory test (Pre-test)
- Low dose & high dose of medications
- Measure via memory test (Post-test)
- Repeat
- Which group demonstrates the best memory scores

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### Correlational Research Design

**Multiple Group Designs:**

**Multiple Group Time Series**

- Compare 2 or > groups on natural phenomenon
- Sometimes called descriptive studies
- Sometimes called inferential studies
- Concerns are raised when comparing naturally occurring phenomenon in multiple groups
  - May be better addressed by using quasi-experimental procedures that are inferential, as opposed to correlational procedures

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### Summary & Conclusions

Descriptive Correlational Design

- Philosophical commonalities → Research techniques
- Lack of variable manipulation & variable control
  - Can result in possible bias – see Module 10!
- Partner with seasoned researchers and statisticians
  - Develop competencies needed to conduct quality research studies
  - Produce credible research findings
  - Impact patient care



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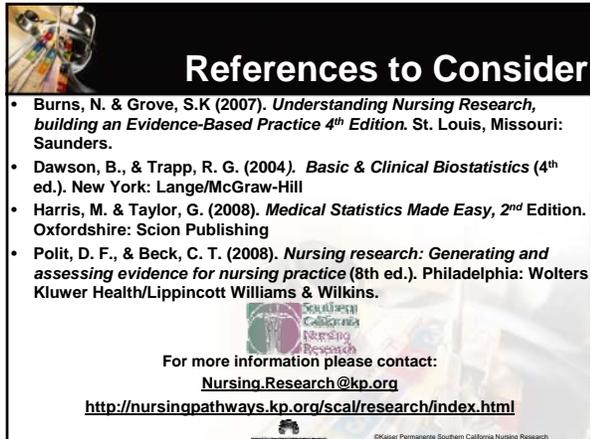
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### References to Consider

- Burns, N. & Grove, S.K (2007). *Understanding Nursing Research, building an Evidence-Based Practice 4<sup>th</sup> Edition*. St. Louis, Missouri: Saunders.
- Dawson, B., & Trapp, R. G. (2004). *Basic & Clinical Biostatistics* (4<sup>th</sup> ed.). New York: Lange/McGraw-Hill
- Harris, M. & Taylor, G. (2008). *Medical Statistics Made Easy, 2<sup>nd</sup> Edition*. Oxfordshire: Scion Publishing
- Polit, D. F., & Beck, C. T. (2008). *Nursing research: Generating and assessing evidence for nursing practice* (8th ed.). Philadelphia: Wolters Kluwer Health/Lippincott Williams & Wilkins.

For more information please contact:  
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<http://nursingpathways.kp.org/scal/research/index.html>

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