Research: Quantitative, Qualitative, and Critical Appraisal Basics
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- Purposes for PATH Intl. Presentation, Thursday, 11/10/11, 3-5:30 p.m.
  1. Learn more about qualitative and quantitative research methodologies.
  2. Learn how to critically appraise a quantitative research article.

- Completion of this session will provide the participant basic information to:
  - Ask more questions about research
  - Participate in a research team
  - Gain insight into the research process
  - Begin to evaluate research reports for use in practice
  - This session will not prepare someone to conduct research.

- What is research?

- What are the uses of research?

- Research Methodologies
  - Qualitative
    - Words
  - Quantitative
    - Numbers

- Report on your lived experience
  - My experience with research has been...

Steps of the QUALitative Process
- Identify the Phenomenon
  - Focus on the topic
- Research Question/Study Purpose
  - May have broad opening question
    - Specific questions may emerge during interviews
    - Purpose indicates the focus of the study and reflects type of study to be conducted
    (Burns & Grove)
- Literature
  - Function in qualitative is to make a case for why study needs to be done
  - Researcher may not review up front
  - Location in an article
    - Beginning or end
Design (Method)
- Phenomenological
- Grounded Theory
- Ethnography
- Case Study

Sample
- Purposive sampling
  - Opportunistic sample
  - Convenience sample
- Goal is to represent the experience, not the population

Data Collection
- Interviews
- Observations
- Documents
- Artifacts

Legal-Ethical Considerations
- Institutional Review Board
- Protection of human subjects
  - Naturalistic setting
  - Difficult to inform participant of all threats
  - Researcher is the instrument

Data Analysis
- Words are the data
- Transcribe all interviews
- Themes emerge
- Statistics used to describe the sample

Results
- Researcher’s interpretation of participants’ information
- Validate with participants

Discussion and Recommendation
- Interpretation of meaning

References

Quantitative Methodology & Critical Appraisal
- Review the steps in quantitative research
- Learn & apply critical appraisal to a quantitative research article
- What is critical appraisal?
- Why complete a critical appraisal?
- Focus on comprehension step (with some mention of strengths/weaknesses and logical links)

Topic
- What is the topic of the article we are using?

Problem
Definition (Burns & Grove)
- A situation in need of solution, improvement, or alteration.
- Often begins with, “Few studies...” or “Little is known...”
Purpose

What is the purpose of the research study?

Does the purpose statement contain the

- Population?
- Variables studied?

Review of Literature

Are gaps or conflicts in knowledge of the problem identified?

Are the references cited by the author current?

Framework

Definition (Burns & Grove)

- An abstract, logical structure of meaning.
- Guides the development of the study and allows linking the study findings to nursing’s body of knowledge

Is a framework explicitly identified? (strength)

What concepts are identified?

Are relationships among concepts identified?

Are variables placed in a framework? (weakness?)

What are the conceptual definitions of the variables?

What are the operational definitions of the variables?

Questions, Objectives, or Hypotheses

Are these used to direct the study?

What type of variables is being studied?

- Research variables
- Independent/Dependent variables

Link to framework, purpose, and problem?

Time for Application

Research Design

Definition (Burns & Grove)

- Blueprint for conducting a study
- Maximizes control over factors that could interfere with the validity of findings.

Examples

- Descriptive
- Correlational
- Comparative
- Quasi-experimental

Identify type of design

What is the rationale for the design classification?

Does the design flow from

- problem?
- framework?
- literature review?
- questions, objectives, or hypotheses?
Design: Internal Validity
Definition (Burns & Grove)
- Extent that effects detected in a study are a true reflection of reality rather than being the result of the effects of extraneous variables.

Critical Appraisal
- What is controlled in the study?
- What are the limitations of the study?

Design: External Validity
Definition (Burns & Grove)
- Extent to which study findings can be generalized beyond the sample used in the study.

Critical Appraisal
- What are the limits of generalizability of the findings beyond this sample to the population?

Sample
Definition (Burns & Grove)
- Subset of the population selected for a study.

Sampling Method Definition (Burns & Grove)
- Strategies used to obtain a sample, including probability and nonprobability (e.g., convenience sample) sample techniques.

How was the sample selected?
What type of sampling method is used?
- Is it appropriate to the design?
Does the sample reflect the population as identified in the problem or purpose statement?
Is the sample size appropriate?

Instruments
Definition
- Used to measure the variable(s).

Types
- Physiological
- Observational
- Interviews
- Questionnaires
- Available data and records

Instruments: Validity
Definition (Burns & Grove)
- Determination of the extent to which an instrument actually reflects the abstract construct (or concept) being examined.
- Called accuracy related to physiological measures. (Burns & Grove)

Instruments: Validity
What type of validity is reported for each instrument?
Does the validity of each instrument seem adequate?

Instruments: Reliability
Definition (Burns & Grove)
- Extent to which an instrument consistently measures the concept of interest.
- Called precision related to physiological measures. (Burns & Grove)
- Instruments: Reliability
What type of reliability is reported for each instrument?
What level of reliability in this sample is reported?
  - Is it acceptable?

Data Collection
What type(s) of data collection method(s) is/are used in the study?
Are the data collection procedures similar for all subjects?

Legal-Ethical Considerations
Were the rights of human subjects protected?
  - How?
What indications are given that informed consent of the subjects was ensured?

Analysis of Data & Results
Includes description of the sample and the results (numerical values) of statistical analysis techniques.

Critical Appraisal
  - What are the characteristics of the sample?
  - What is the level of significance set for the study?
What statistical analysis techniques were performed?
  - Description
  - Relationships
  - Differences
Assess tables and/or figures
  - Do they supplement and economize the text?
  - Do they have precise titles and headings?
  - Do they repeat the text?

Time for Application

Discussion and Conclusion
If hypothesis(es) testing was done, was/were the hypotheses supported or not supported?
Are the results interpreted in the context of
  - problem/purpose?
  - questions/objectives/hypotheses?
  - framework/literature reviewed?

Implications & Recommendations
What relevance for nurses does the investigator identify, if any?
What are the recommendations for future research?

Presentation
Is the article easy to understand?
Is the writing of the article
  - Clear?
  - Grammatically correct?
  - Concise?
  - Well organized?
Overall
What is the “take home message” from the article?
Does the information/research advance the science?

Time for Application

Questions

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Worksheet for Critical Appraisal of a Quantitative Research Article
Dr. Susan M. Rugari
November 10, 2011

Problem and Purpose

1. What is the problem of the research study?
2. What is the purpose of the research study?
3. Does the purpose statement contain the population and variables studied? Identify each.

Review of Literature

1. Are gaps or conflicts in knowledge of the problem identified?
2. Are the references cited by the author current?

Framework

1. Is a framework explicitly identified?
2. What concepts are identified?
3. Are relationships among concepts identified?
4. Are variables placed in a framework?
5. What are the conceptual definitions of the variables?
6. What are the operational definitions of the variables?

Research Question(s), Objective(s) or Hypothesis(es)

1. Are research questions, objectives, or hypotheses used to direct the study? Identify.
2. What type of variable is being studied? (research or independent/dependent)
3. Are the questions, objectives, or hypotheses logically linked to the framework, purpose statement, and problem?

Research Design

1. What type of design is used in the study?
2. What is the rationale for the design classification?
3. Does the design seem to flow from the proposed problem, framework, literature review, and questions, objectives, or hypotheses?

Internal validity

1. What is controlled in the study?
2. What are the limitations of the study?

External validity

1. What are the limits to generalizability of the findings beyond this sample to the population?
Sample
1. How was the sample selected?
2. What type of sampling method is used in the study? Is it appropriate to the design?
3. Does the sample reflect the population as identified in the problem or purpose statement?
4. Is the sample size appropriate? How is it substantiated?

Instruments
1. Physiological measurement
   a. Is a rationale given for why a particular instrument or method was selected? If so, what is it?
2. Observational methods
   a. How were the observers trained to minimize bias?
   b. Is there any reason to believe that the presence of the observers affected the behavior of the subjects?
3. Interviews
   a. How were the interviewers trained to minimize bias?
   b. Is there evidence of any interview bias? If so, what is it?
4. Questionnaires
   a. What is the type and/or format of the questionnaires(s) (e.g., Likert, open-ended)?
5. Available data and records
   a. Are the records that were used appropriate to the problem being studied?

Validity and Reliability
1. What type of validity is reported for each instrument?
2. Does the validity of each instrument seem adequate? Why?
3. What type of reliability is reported for each instrument?
4. What level of reliability in this sample is reported? Is it acceptable?

Data Collection
1. What type(s) of data collection methods(s) is/are used in the study?
2. Are the data collection procedures similar for all subjects?

Legal-ethical Issues
1. How have the rights of subjects been protected?
2. What indications are given that informed consent of the subjects has been ensured?

Analysis of Data and Results
1. What are the characteristics of the sample?
2. Does the author report the level of significance set for the study? If so, what is it?
3. What statistical analysis techniques (e.g., mean, t-test, ANOVA, correlation, etc.) were performed?
4. If tables or figures are used, do they meet the following standards?
   a. They supplement and economize the text.
   b. They have precise titles and headings.
Discussion, Conclusions, Implications, and Recommendations

1. If hypothesis(es) testing was done, was/were the hypothesis(es) supported or not supported?
2. Are the results interpreted in the context of the problem/purpose, questions/objectives/hypothesis, and framework/literature reviewed?
3. What relevance for nurses does the investigator identify, if any?
4. What recommendations for future research are stated or implied?

Application and Utilization for Nurses

1. What risks/benefits are involved for patients if the research findings would be used in practice?
2. Is direct application of the research findings feasible in terms of time, effort, money, and legal/ethical risks?
3. How and under what circumstances are the findings applicable to nursing practice?
4. Would it be possible to replicate this study?

Presentation

1. Is the article easy to understand?
2. Is the writing of the article clear, grammatically correct, concise, and well organized?

Overall

1. What is the “take home message” from the article?
2. Does the information/research advance the science?

Adapted from:

