Nuts and Bolts for Getting Started with Mixed Methods Research

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Disclosures

• Dr. Shiyanbola has nothing to disclose.

• Dr. Guetterman discloses that his spouse is employed by Aetna. They also hold Aetna shares.
CPE Information

- Target Audience: Pharmacists
- ACPE#: 0202-0000-19-036-L04-P
- Activity Type: Knowledge-based
Learning Objectives

At the completion of this knowledge-based activity, participants will be able to:

• Describe mixed methods research and its importance to pharmacy and healthcare services.

• Discuss the essential components of a rigorous mixed methods research design and its application to pharmacy and health services research studies.

• Identify the required expertise, skills, and resources for writing a grant proposal that involves mixed methods research.
Outline

• Presentation (20 min)
  • What is mixed methods?
  • Why is it important in pharmacy?
  • What are the components of a rigorous design?
  • What skills and resources are needed?
  • Q&A

• Work on mixed methods research questions, design (40 min)

• Debrief (30 min)
Assessment Questions

1. In mixed methods research, the types of data needed are:
   A. Primary and Secondary data
   B. Qualitative and quantitative data
   C. Quantitative data
   D. Survey and interview data
Assessment Questions

2. Which of the following is NOT required for a rigorous mixed methods research design?
   A. Integration of qualitative and quantitative methods
   B. Content analysis
   C. A mixed methods aim
   D. A mixed methods diagram
3. Which of the following is **NOT** required for writing a mixed methods grant proposal?

A. Team member with expertise in mixed methods
B. Team member with qualitative methods skills
C. A rationale for using mixed methods
D. Multiple principal investigators
What is Mixed Methods?
NIH definition of mixed methods research (Cresswell et al., 2011)

• Focuses on research questions that call for real-life contextual understandings, multi-level perspectives, and cultural influences;

• Employs rigorous quantitative research assessing magnitude and frequency of constructs and rigorous qualitative research exploring the meaning and understanding of constructs;

• Uses multiple methods (e.g., intervention trials and in-depth interviews);

• Intentionally integrates or combines these methods to draw on the strengths of each; and

• Frames the investigation within philosophical and theoretical foundations.
Why mix methods?

• More evidence for studying your research problem

• Offers new insights and you gain new knowledge \((1 + 1 = 3)\)

• Practical because the researcher is free to use all possible methods to address the problem

• Researcher develops broader skillsets

(Johnson et al., 2007)
Reasons to use mixed methods

• View problems from multiple perspectives.
• To contextualize information, to take a macro picture of a system and add in information about individuals.
• To merge quantitative and qualitative data to develop a more complete understanding of a problem.
• To develop a complementary picture; to compare, validate, or triangulate results.
• To have one database build on another.
• To determine the best participants with which to follow up or to explain the mechanism behind the quantitative results.

(Plano Clark, 2010)
Types of mixed methods designs

• Basic Designs
  • Convergent Design
  • Explanatory Sequential Design
  • Exploratory Sequential Design

• Advanced Designs
  • Intervention Design
**Exploratory Sequential Design**

<table>
<thead>
<tr>
<th>Phase 1 (Aim 1)</th>
<th>Qualitative Data Collection</th>
<th>Qualitative Data Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Phase 2 (Aim 2)</strong></td>
<td>Qual findings inform QUAN survey</td>
<td></td>
</tr>
<tr>
<td><strong>Phase 3 (Aim 3)</strong></td>
<td>QUANTITATIVE Data collection</td>
<td>QUANTITATIVE Data Analysis</td>
</tr>
</tbody>
</table>

### Procedures

| Focus groups re African American beliefs about type 2 diabetes (n=48) |
| Nvivo coding and theme development |
| Develop phrase codes from coded text |
| Write new survey items |
| Adapt existing survey items |
| Cognitive interviewing (n=10) |
| Survey of African Americans with type 2 diabetes (n=250) |
| Psychometric testing |
| Scale reliability |
| Principal component analysis |
| Correlation analysis |
| Hypothesis testing (Multiple linear regressions) |
| Discuss extent to which qualitative findings were integrated |
| Evidence for reliability and validity |

| Products |
| Transcripts |
| Key themes relevant to beliefs about type 2 diabetes including its sociocultural and psychological influences |
| Adapted Illness Perception Questionnaire |
| Numerical survey item scores |
| Evidence of content and criterion-related validity |
| Cronbach’s alpha |
| Factor loadings |
| Measures of fit |
| Correlations |
| Culturally adapted and validated instrument to measure African Americans’ illness beliefs about type 2 diabetes |

*Qual-Qualitative
QUAN-Quantitative*
### Intervention mixed methods design

**Experimental/Control Group Selection and Assignment**
- Procedures:
  - Adults with diabetes, n=50
  - Collect pre-test data
  - Measures:
    - Health literacy
    - Self-efficacy
    - Patient Beliefs
    - Medication Adherence
  - Descriptive analysis

**Pre-test**
- Products:
  - Results in tables
  - Database with measures

**Intervention**
- Procedures:
  - Assignment to either Intervention or Usual care
  - Conduct intervention trial for 6-sessions
  - Audio recorded pharmacist-patient conversations

**Activities**
- Products:
  - Transcripts
  - Quotes, codes, themes

**Post-test**
- Procedures:
  - Collect post-test data at end of 6-sessions, 3 and 6 months
  - Regression analysis

**Qualitative Study After Intervention**
- Procedures:
  - Participants from intervention, n=15
  - One-on-one semi-structured interviews
  - Qualitative content analysis

**Overall Results and Interpretations**
- Procedures:
  - Discuss intervention feasibility and acceptability
  - Discuss themes in context of intervention and outcomes

- Products:
  - Manuscripts
  - Data supporting grant proposal
Components of rigorous mixed methods research

• Writing a mixed methods research question or aim
• Identifying a mixed methods design of your procedures
• Including a procedural diagram of your design
• Incorporating philosophies and theories into mixed methods studies
• Conducting both strands using rigorous methods of data collection and analysis
• Integrating the qualitative and quantitative strands using a specific procedure
• Using joint displays to present the quantitative and qualitative results together
• Recognizing and acknowledging threats to validity in the mixed methods design
• Discussing value added by mixed methods relative to a single method approach
Writing a mixed methods research question or aim

Convergent Design Example

- The purpose of this convergent mixed methods study was to [overall content aim of the study] by collecting both quantitative and qualitative data. We will use [quantitative instrument] to test [quantitative hypothesis/hypotheses] for [participants] at [site]. We will conduct [qualitative data collection] to explore [central phenomenon] for [participants] at [site] to compare the results from the quantitative and qualitative data collection and analysis.

(Creswell, 2015)
Identifying a mixed methods design of your procedures

Methods

Design

We firmly believe that research methodology should be driven by research questions rather than by an a priori stance regarding superiority of research method. Therefore, we adhere to pragmatism as our philosophical stance [13]. We used a mixed methods research approach in which both quantitative and qualitative data are gathered and integrated, resulting in interpretations that are grounded in the combined strengths of both data sets [14]. Specifically, we employed a mixed methods intervention design in which qualitative data (i.e., semi-structured exit interviews) were embedded within an RCT [15]. The purpose of the interviews was to (a) bring greater understanding of cancer patients’ experience of music interventions and (b) give participants the opportunity to share in

(Bradt et al., 2015)
Including a procedural diagram of your design

**Convergent Design**

- Quantitative Data Collection and Analysis
- Qualitative Data Collection and Analysis

**Explanatory Sequential Design**

- Quantitative Data Collection and Analysis
- Determine Quantitative Results to Explain

**Exploratory Sequential Design**

- Qualitative Data Collection and Analysis
- Use Results to Form Variables, Instruments, Interventions

**Quantitative Results**

- Merge Results for Comparison
- Interpret or Explain Convergence or Divergence

**Qualitative Results**

- Interpret How Qualitative Results Explain Quantitative
- Interpret How Quantitative Results Provide New Results, Instruments
Incorporating philosophies and theories into mixed methods studies

We situate the use of music for symptom management within a biopsychosocial framework. On a neurophysiological level, listening to music may reduce anxiety through suppressive action on the sympathetic nervous system [10]. Additionally, its pain-reducing and mood-enhancing effects have been attributed to amygdala mediation [11, 12]. Cognitively, music helps patients focus their attention away from stressful events to something pleasant and soothing. Moreover, music listening may activate imagery, offering a temporarily escape from the reality of cancer diagnosis and treatment. Importantly, music provides patients with an aesthetic experience that can offer comfort and peace during times of distress. Psychosocially, interactive music making within a therapeutic relationship provides a deeply humanizing and validating experience for the patient. These experiences offer opportunities to explore and process emotions in a creative process unique from other therapeutic disciplines and facilitate meaning making through music-evoked reflections [7].

Methods
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Conducting both strands using rigorous methods of data collection and analysis

<table>
<thead>
<tr>
<th>Phase</th>
<th>Purpose</th>
<th>Approach</th>
<th>Data Collection</th>
<th>Expected Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Exploratory Phase</strong></td>
<td>To define the ethical themes and goals essential to IRB review of local community content and to determine what is perceived as effective or ineffective among the variety of current practices and policies at both local and central IRBs.</td>
<td>Web-based survey of broad stakeholder pool of approximately 200 respondents, performed in tandem with interviews.</td>
<td>Multiple choice, pick group and rank, rank order, drill down and slider question types. Open ended, short answer, and essay.</td>
<td>Quantitative assessment of themes and priorities and weighted values. Identification of key domains and areas of difference to be explored in interviews.</td>
</tr>
<tr>
<td><strong>Revise Phase</strong></td>
<td>To achieve consensus on the most important domains and specific metrics of IRB performance in review of local context in general and with regard to EFIC.</td>
<td>Partially structured in-depth interviews: open and closed ended questions to solicit views and clarify domains of greatest importance from the survey with up to 25 individuals.</td>
<td>Recorded interviews 30-60 minutes duration. Collection of low-inference descriptors. Narrative summary of themes, each.</td>
<td>Qualitative description of most important stakeholder “hot-button” values and domains. In-depth understanding of current practices, their popularity, known deficiencies and modes of failure, and how and why they differ.</td>
</tr>
<tr>
<td><strong>Test Phase</strong></td>
<td>To compare review performance of local IRBs with that of a simulated ER-CIRB.</td>
<td>Modified Delphi methodology in a workshop of about 25 stakeholders. Domains from the exploratory phase are narrowed down. Best items are selected and validated.</td>
<td>Selection of preferred items without ranking, retaining top 50%. Iterative rounds of blinded ranking with feedback of mean rank and distribution until consensus or failure to converge.</td>
<td>Development of a short stakeholder-validated battery of metrics to score performance of an IRB deliberation with regard to review of local context in several domains.</td>
</tr>
</tbody>
</table>

Silbergleit (2015)
Integrating using a specific procedure

- Merging
- Connecting
- Building

Integration of data sets.

After completion of the quantitative and qualitative data analysis, the two data sets were compared to examine (dis)congruence of the findings. In addition, we created a joint display [15] of quantitative and qualitative findings to examine differential experiences of participants whose quantitative data profile indicated much greater benefits in MT than in MM or vice versa.

Results

( Bradt et al., 2015)
Using joint displays to present integrated results

<table>
<thead>
<tr>
<th>Treatment benefits</th>
<th>Change in music therapy$^a$</th>
<th>Change in music medicine$^a$</th>
<th>Patient experiences</th>
</tr>
</thead>
<tbody>
<tr>
<td>↑MT, ↓MM</td>
<td>0.65 to 1.88</td>
<td>−0.11 to 0.38</td>
<td>• Emphasize the importance of therapeutic relationship and support by therapist</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Enjoy the creative aspect of music making</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Are hopeful for the future</td>
</tr>
<tr>
<td>↑MM, ↓MT</td>
<td>−0.46 to 0.59</td>
<td>0.33 to 1.63</td>
<td>• Apprehensive about active music making</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Prefer familiarity of pre-recorded music</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Hesitant about exploring feelings related to cancer</td>
</tr>
<tr>
<td>↑MT, ↑MM</td>
<td>0.61 to 1.07</td>
<td>0.73 to 1.37</td>
<td>• Strong conviction about the power of music to support and give hope</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Use music for mental escape</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Use music for emotional exploration and value processing of emotions with therapist</td>
</tr>
<tr>
<td>↓MT, ↓MM</td>
<td>−0.67 to −1.03</td>
<td>−0.52 to −1.06</td>
<td>• Hold little hope for the future</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Music evokes sad and traumatic memories</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Feel inadequate regarding music making and singing</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Prefer aesthetics of original recordings</td>
</tr>
</tbody>
</table>

↑ great improvement, ↓ less improvement or worsening

$^a$ Range of overall z-scores (average of z-scores for mood, anxiety, relaxation, and pain)

(Bradt et al., 2015)
Recognizing and acknowledging threats to validity

• Connect to designs
• Possibilities
  • Parallel concepts
  • Units of analysis
  • Timing issues
  • Sample sizes
  • Meaningful integration
• Acknowledge and attempt to mitigate
Discussing value added by mixed methods relative to a single method approach

<table>
<thead>
<tr>
<th>Possible qualitative results</th>
<th>Possible quantitative results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Main effect of intervention</td>
</tr>
<tr>
<td></td>
<td>Confirmed</td>
</tr>
<tr>
<td>Deeper understanding of intervention outcomes (Pts, CPs, ICGs, MDs)(^a)</td>
<td>Identify mechanisms underlying improvement</td>
</tr>
<tr>
<td>Full characterization of effects on relationships between patients, CPs, ICGs, and MDs.</td>
<td>Explain role of positive relationships in greater improvement</td>
</tr>
<tr>
<td>Identification of user-perceived strengths, weaknesses, and areas for modification.</td>
<td>Identify strategies to improve intervention acceptability, effectiveness, and sustainability</td>
</tr>
</tbody>
</table>

Table 3: Expected outcomes of mixed methods analysis.

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Piette et al. (2014)
Skills and Resources Needed

- Skills in qualitative and quantitative research
- Skills in mixed methods integration
- Ability to work in teams
  - Qualitative expertise
  - Quantitative expertise
  - Mixed methods expertise
- Budget justification matches design
Closing remarks/conclusion

In mixed methods, we ought to focus our efforts explicitly on embedding and justifying our selected methods according to our research question, data needs, theoretical grounding, and research design.

References


• Silbergleit R. Central IRB review of local context in emergency research: Empirical ethics study. NIH (NIH/NIEHS 1R01HD086676-01 ); 2015.

Assessment Questions

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