OT Research: We got this!

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Program in Occupational Therapy
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Session Objectives

By the end of this session, attendees will:

1) Appreciate the need and impact of studying our outcomes
2) Frame a research question in PICO format
3) Possess the resources necessary to outreach to local OT researchers to support you in answering your question in a way that affords the greatest confidence and application of your findings
4) Understand the importance of using outcome measures with good psychometrics
5) Appreciate the importance of standardized selection and reporting of outcomes and protocolization of intervention approach
6) Be aware of local academic-practitioner research partnerships, partner roles/responsibilities, and the pragmatics of these studies
7) Be empowered to pursue answering and seek support to answer practice questions
Agenda

- 1:55-2:05: Introductions
- 2:05-2:20: Interactive lecture
- 2:20-2:40: Paired PICO writing
- 2:40-3:10: Interactive lecture
- 3:10-3:25: Plan your study
- 3:25-3:55: Panelist and Q&A

Introduction: Speaker

Corey McGee, OT
- Husband, dad, son, brother, soccer enthusiast, Smule Sing! addict
- MS, Occupational Therapy, 2000
- PhD, Rehabilitation Science, 2014, Rehabilitation Science, biomechanics emphasis
- 10 Years clinical experience:
  - Upper limb rehabilitation (i.e., hand therapy)
  - Burn rehabilitation
  - Adult and pediatric neurorehabilitation – inpatient and outpatient
  - Hospital based acute care- MICU, SICU, BICU
- Advise hand therapy residents, MSOT research students, PhD students
- Conduct research on persons with hand OA and distal radius fractures, assessment tool development and testing
- Currently instruct courses in upper limb rehabilitation/orthotics, worker rehabilitation/habilitation
Guest Panelist

Jennifer Skye, MS, OTR/L

- MS in OT, 2010 – UW Mad.
- Generalist Outpatient OT, 2011-2016
- Drexel Upper quarter cert., 2014
- Fairview/UMN Hand Therapy resident,’16-’17
- Occupational (Hand) Therapist, Mhealth, 2017-present

Being an OT is doing research

The OT process:
- Occupational profile/Evaluation tell you the problem
- Our question: what will be best for this client?
- We select an approach to the problem that is evidence-based (experience or literature)
- We evaluate our outcomes
Need and impact of studying our outcomes

- Environment of scrutiny and ‘chest thumping’
  - Referral sources
  - Payers
  - Separate from “Like” Disciplines
    - Health Coaches
    - O&P
    - ATC
    - PT
- Healthcare reform and need for advocacy (e.g., CMS 6012-P)
- Proof’s in the pudding and our cupboards are in need of filling

So you have a question?

Use the PICO format to frame it:

P: What is the **PROBLEM** or **POPULATION**?
I: What **INTERVENTION** (or assessment tool) are you curious to know more about?
C: What are you **COMPARING** to? I.e., often the standard
O: What is the **OUTCOME** of interest?

Could start with a free service to explore the Question, locate evidence, but not necessarily access: [https://www.tripdatabase.com/#pico](https://www.tripdatabase.com/#pico)
## PICO Expanded

<table>
<thead>
<tr>
<th>PICO Expanded</th>
<th>Intervention*</th>
<th>Etiology</th>
<th>Assessment *</th>
<th>Prevention *</th>
<th>Prognosis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>P</strong> – Population/Disease</td>
<td>Characteristics of a population (age, gender, ethnicity, etc.) with a specific condition or set of circumstances. Ex. African-American males with type 2 diabetes.</td>
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<tr>
<td><strong>I/E</strong> – Intervention OR Exposure</td>
<td>Specific drug or procedural intervention e.g., type, intensity, frequency, duration</td>
<td>Exposure to certain conditions or risk behaviour</td>
<td>Specific diagnostic tool or procedure</td>
<td>Specific drug or procedural intervention e.g., type, intensity, frequency, duration</td>
<td></td>
</tr>
<tr>
<td><strong>C</strong> – Comparator</td>
<td>Alternative drug or procedural intervention e.g., type, intensity, frequency, duration</td>
<td>Absence of certain conditions or risk behaviour</td>
<td>Alternative diagnostic tool or procedure</td>
<td>Alternative drug or procedural intervention e.g., type, intensity, frequency, duration</td>
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</tr>
<tr>
<td><strong>O</strong> – Outcome</td>
<td>Outcome of interest. Eg. Occupational performance</td>
<td>Development of disease/condition</td>
<td>Reliability, validity, responsiveness, sensitivity, specificity</td>
<td>Outcome of interest. Eg. Numbers of falls</td>
<td>Occurrence or absence of new condition</td>
</tr>
<tr>
<td><strong>T</strong> – Time Frame</td>
<td>The time it takes to demonstrate an outcome OR the period in which patients are observed. Ex. The six-months following childbirth.</td>
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### PICO Example

**P.** Women with DRF/casting are prone to CRPS and disability  
**I.** Early intervention during casting including mirror therapy and imagery  
**C.** Elevation, hand, elbow, and shoulder AROM  
**O.** Reduction in CRPS development, pain, motor dysfunction, and occupational performance limitations

*Note: *PICO stands for **P**opulation, **I**ntervention, **C**omparator, and **O**utcome. It is a framework used in evidence-based practice to identify a research question.
Responsiveness/Prognosis:

- Do/does ___[I]___ performed on ___[P]___ lead to ___[O]___ over ___[T]___ compared with ___[C]___?
- E.g.) Do regular text message reminders performed on patients recently diagnosed with diabetes lead to a lower occurrence of forgotten insulin doses over the first six months of treatment compared with no reminders?

Source: http://hslmcmaster.libguides.com/c.php?g=306765&p=2044787

Intervention

- In ___[P]___, do/does ___[I]___ result in ___[O]___ when compared with ___[C]___ over ___[T]___?
- E.g.) In nursing home residents with osteoporosis, do hip protectors result in fewer injuries from slips, trips, and falls when compared with standard osteoporosis drug therapy over the course of their stay?

Source: http://hslmcmaster.libguides.com/c.php?g=306765&p=2044787
PICO Templates cont.

• **Prevention**
  - In \( [P] \), do/does \( [I] \) result in \( [O] \) when compared with \( [C] \) over \( [T] \)?
  - E.g.) In emergency room visitors, do hand sanitizing stations result in fewer in-hospital infections when compared with no hand sanitizing stations over a year-long pilot period?


Paired Exercise

• Find someone with a similar practice area
• Follow the PICO(T) format to develop 1-2 research questions
• 20 minutes
Exploring the Question: 1

• Track down the best evidence to guide what you do.
  – Use a Medical Librarian!!!
  – Search online for data-based articles and systematic literature reviews using Medline, CINAHL, etc., using key words.

• Evaluate the impact (level of evidence) of the literature

Exploring the Question: 2

Appraise the evidence.

• McMaster Quantitative Appraisal form
  – [Link to McMaster Quantitative Appraisal form]
  – [Link to Guidelines for Critical Review Form Quantitative Studies]

• Glasgow Qualitative Appraisal
  – [Link to Glasgow Qualitative Appraisal]

• Levels of Evidence Tables – builds you confidence in research findings
Exploring the Question: 3

• So, you now know:
  – Your question has previously been answered – GOOD NEWS! or
  – Your question is unanswered and has merit – GOOD NEWS!
• Next step is to answer it
Exploring the Question: 4

Make it happen:

• Get the skills to implement the intervention if training is needed
• Define the intervention including when and how it will be used
• Select and use an appropriate outcome measure that will measure change
• Evaluate your findings

Designing and implementing
Question determines…

- Research Design
  - Prospective vs. Retrospective
  - Quantitative vs. Qualitative
  - Descriptive vs. Experimental
  - RCT vs. Quasi-experimental
  - If controlled, the type of trial
- Methods
  - Intervention types and procedures
  - Assessment types and procedures

When designing and implementing, two important factors we care about

1) **External validity** - how easy it is to apply the findings to the real OT world

2) **Internal validity** - how hard we work at ensuring confidence in the research findings
External Validity

• For most OT practitioners, not a problem!
• Things that help:
  – Selecting a group that represents the population of interest
  – Selecting assessment and interventions procedures that are feasible/real world
  – Conducting research in real world contexts

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1488890/

Internal Validity

• We want to be confident that changes are due to our interventions and not bias, confounders, or error
• However, by controlling these things, we can be in direct conflict with external validity
  – E.g., having the same therapist treating and evaluating all study clients good for IV but likely not very “real world”
• Is a balancing act
Internal Validity cont.

• How can we enhance?
  1) Consistency, consistency, consistency
     • Protocolize (intervention and assessment)
       – what, when, who, how
       – Decision trees – can’t always make cookie-cutter but can
     • Manualize
       – Put this all in writing
     • Train all participating therapists, others
       – i.e., front desk if scheduling, MDs who are referring, etc.
     • Consistent therapists across time doing the evaluating and intervening

Internal Validity cont.

2) Control for confounders. When possible:
   – Limit comorbid factors (make homogenous)
   – Limit co-interventions
   – Ensure comparison groups are similar at baseline

3) Avoid taking the same measurement multiple times – consider using when you might expect to see change (see lit.)
Internal Validity Cont.

4) Randomize
5) Blinded interventionalists (not possible)
6) Blinded evaluators when doing intervention comparisons
7) Equal group sizes – block randomization
8) Pick the right assessment tool
9) *Treatment fidelity – did they get and do what they were supposed to?

Internal validity cont.

• When not possible to control some threats to IV (i.e., we can’t not treat people because they are taking ibuprofen or have diabetes), there are statistical approaches to take
• ***Even with retrospective (chart) research, we can enhance internal validity through following step 1 above***
Helping Internal Validity: the right assessment

• Might be the most feasible step towards enhancing internal validity for OT practitioners

Steps to selecting a clinical or research tool

1. Identify clinical or research question (PICO)
2. Know your target population (PICO)
3. Determine what constructs are you wanting to measure (PICO)
   – Impairment of Health (Body Structures or Body Functions)?
   – Activity Limitation/Participation?
   – Environment/person factors?
Tool selection (cont.)

OTs rarely only address physical impairment…..

• **Activity limitation**- educating a client on how to modify activity to successfully engage in desired occupations
• **Participation**- being able to participate in social engagements when incorporating task modification and pain management strategies.
  – In most instances, we would like our clinical and research tools to be responsive to these items
• We sometimes address **impairment** in (fine motor, cognition, ROM, grip, pain)

Tool selection (cont.)

4. Ask yourself:
   – Do we want objective **benchmarks** for goal setting?
     • Do you wish to compare your client’s results to those **without** a given diagnosis (i.e., norms), activity limitation, etc.?
     • Conversely, do you want to know the **outcomes of past patients** who have received the intervention(s) of interest?
   – Would we like to be comparing to the outcomes of **external** clinics?
   – Would we like to **enhance continuity** of care and communication with referral sources?
   – Would we like to do **retrospective outcomes** studies and **program evaluation**?
Tool selection (cont.)

If you answered yes to any of those questions, then consider a standardized PRO

Next steps:

5. Locate tools which measure these constructs within the population(s) of interest
6. Research their psychometrics

***Note:*** we care about these things in observation-based tools too

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### Tool selection (cont.)

7. Locate tools/properties via literature reviews

**Hand arthritis**
- Poole, J L. (2011).

**Upper Extremity Trauma**

**Shoulder, elbow, Wrist, and Hand**
- Smith, Calfée, Baumgarten, et al. (2012).

**Shoulder only**

**Pain, Quality of Life, General health, Activity and Participation**
Tool selection (cont.)

8. Locating the tool: Online PRO repositories

https://eprovide.mapi-trust.org/

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Tool selection (cont.)

8. Locating the tool: Online PRO repositories

http://www.iscmr.org/content/welcome-cam-health-outcomes-database
Tool selection (cont.)

Two more:

- Patient-Reported Outcomes Measurement Group
  - http://phi.uhce.ox.ac.uk/
- **Rehabilitation Measures:**
  - https://www.sralab.org/rehabilitation-measures

9. Research psychometrics

A. Reliability: testing the reproducibility

1. Test retest
   i. Analyses reproducibility of results when tool is repeatedly administered over a period of time during when no change is occurring
   ii. ICC vs. Kappa in addition to SEM are preferred tests
   iii. ICC tells you how much a subject’s score will vary across raters (linearity and variance)
      a. <0.40 indicates poor reproducibility
      b. ≥0.40 but <.75 indicates fair to good reproducibility
      c. > 0.75 shows excellent reproducibility  [Rosner (2005)]
   iv. SEM: how much a score is likely to vary with repeated measurements of the same subject.
      i. SEM = SD x √(1-ICC)

2. Intra-rater
   a. Reproducibility of measures by one tester at a given point
      i. ICC vs. Kappa/SEM
Tool selection (cont.)

A. Reliability (cont.)

1. Inter-rater
   i. Reproducibility of result across two or more raters when rating the same
      a. ICC vs. Kappa and SEM are preferred test statistics

2. Internal consistency
   i. measures the similarity of the individual items within the instrument
   ii. Especially important for PRO! Influences reliability
      a. Cronbach’s alpha of >0.70 supports that PRO items are assessing a single construct. Values >0.95 can indicate that the tool contains too many items that are measuring the same construct. (Nunnally JC., 1978).

Tool selection (cont.)

B. Validity: whether an instrument truly measures what it aims to measure.

1. Criterion validity: refers to the correlation of a measure with a ‘gold standard
   i. Test statistic: Correlation coefficient
      A. .0-.25 No relationship
      B. .25-.50 Fair
      C. .50-.75 Moderate to Good
      D. .75+ Good to Excellent (Portney and Watkins, 2000, 4.494)

2. Content and construct validity are also critical for PRO
   i. Content validity is a qualitative assessment, performed by experts, of whether the instrument contains items relevant to its intended purpose
   ii. Construct validity involves the investigation of logical relationships between the new instrument and theoretical constructs
      i. Convergent validity- correlation values of should not be <0.40 (Stewart & Ware, 1992)
C. **Responsiveness**: the ability of an instrument to detect change when change occurs.
   1. Sensitive to ceiling and floor effects
   2. **Minimum detectable change (MDC)**
      i. Scores have error associated with them
      ii. Don’t want changes in measurements across time to be a result of error
      iii. \[ \text{MDC} = 1.64 \times \sqrt{2 \times \text{SEM}} \]
   3. **Clinically Important Difference (CID or MCID)**
      i. An outcome measure value established by comparing the change in scores in patients who are improved versus those who have not improved following an intervention

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**Example: Types of Patient Reported upper extremity outcomes**

1. Participation and Satisfaction
   - COPM, SF-36
2. Generic Health Measures
   - Careful! Think Responsiveness (e.g., proximal phalanx fracture)
3. Disease Specific Measures
   - Careful! (e.g., using a carpal tunnel measure for a client with RA)
4. Upper extremity region-specific
   - Careful! (e.g., Wrist specific tool for a person with a Distal radius and radial neck fracture
5. Pain
   - NRS, VAS, and multidimensional
Implementation of PRO

1. Seek administrative support early in process
   - Time for training
   - Cost for purchasing (if necessary)
2. All pertinent parties of Clinical/research team should discuss and plan.
   - This will help to ensure investment when implementing
3. Establish protocols
   A. All persons with “x” diagnosis, partake in “y” instrument(s)
      - CTS diagnosis  Carpal tunnel severity scale
      - All conditions of the traumatic conditions of wrist and hand  PRWHE
      - Etc.

Implementation PRO (cont.)

4. Use computerized systems when possible
   - Digital dynamometry/BTE can be synched with electronic medical records
5. Make certain that, if EMS synching isn’t possible, that paper copies are available
6. Surveys, when possible, are issued at reception for them to complete as intake paperwork/telephone survey (if validated as such)
7. Trial the implementation of the selected measure(s) for 1-3 months and reconvene to discuss
Helping Internal Validity: Interventions

• Treatment fidelity
  – Deliver intervention consistently within and across therapists
    • Protocolize (type, intensity, frequency, duration)
    • Manualize (scripted)
    • Train and assess
    • Checklists

• Enactment – Can they do it?
  – Observe, test

Helping Internal Validity: Interventions cont.

• Adherence (formally compliance)
  – Simplifying regimen characteristics
  – Imparting knowledge;
  – Modifying patient beliefs;
  – Patient communication;
  – Leaving the bias; and
  – Evaluating adherence.
Helping Internal Validity: Interventions cont.

- Build rapport and listen
  - Learn about barriers to adherence
- Correct language barriers
- Multimodal educational materials - 6th grade level
- KISS
- Follow up phone calls, texts, emails
- Apps that monitor activity
- Standardized logging of performance at home
- Therapy contract (not legal or binding)

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1681370/

Examples of Clinically Feasible Research

- Retrospective (EMR)
  - Intervention responsiveness (i.e., FIM, length of stay) based on number of visits, ICD-10 diagnoses, CPT codes
  - ***Case Series
- Psychometric studies (MCID of ‘x’ tool in ‘y’ population)
- Comparative effectiveness trials
What can you do to conduct OT research?

• Do your own research first (PICO)
• Get buy in from administrators
• Get buy in from referral sources
• Get to know an OT “academic”
• Develop skills
  – MHealth hand residency – mentored
  – PhD in Rehabilitation Science, U of MN
    • https://www.rehabmedicine.umn.edu/rehabilitation-science
  – U of MN Clinical research certificate
    • http://www.sph.umn.edu/academics/certificate/cr/

What can you do to support OT research?

• Volunteer, review for journals
• Support OT research foundations (AOTF, AHTF) and your professional organizations (MOTA and AOTA)
• Join research teams where you work (especially if OT is being studied)
• Consume it – subscribe to AJOT by joining AOTA
When already on a research team

• Advocate to understand what’s being studied – is OT at risk?
• Review the manuscript prior to submission
• Take an active role to assume authorship; discuss up front
• Make certain “OT” is assigned as the interventionist
• Consult an academic

This is what Happens when OT is silent…

Media Headline: “Better results with independent exercise vs. formal therapy after volar plating for distal radius fractures”
Highly Impactful OT Research

Make your PICO question valid!

- Take one of your questions and make it valid
- What can be done to make externally valid?
- What can be done to make internally valid?
Panelist Questions

1) Describe your experience conducting and participating in research prior to our collaboration (i.e. prior to your residency)
2) Describe the relationship between you, Uhealth and Corey.
2) What have been your roles and responsibilities have been as an OT researcher
3) What have been the benefits to working with an OT academic? How have we complimented one another? How have you changed?
4) What have been the barriers to conducting research and what have been the solutions?
5) What have you learned along the way?
6) Take home message for anyone interested in doing research?
7) Other?

Closing

• Doing OT Research is FUN and meaningful!
• Allows you to be a sleuth!
• Solve big problems
• Impact large groups of people
• Share knowledge to a larger audience
• Support your profession
Closing cont.

- Start a conversation at work about conducting research
  - Colleagues
  - Administration
  - MD’s
- Journal Clubs help to initiate conversations – start one and invite OT academics to the party!
- When questions arise but need help moving forward, OT academics can help!
- Start small; build infrastructure to support more
- If you’ve caught the research bug and want to do more, contact me! ;)

Read a blog about OT researcher (me) ;)

- https://www.asht.org/about/blog/get-know-hand-therapy-researcher
Questions?

Thank you for coming and participating!

Contact Corey McGee with questions@
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