Establishing Intervention Fidelity in Neonatal Practice: Lead the Way

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Objectives

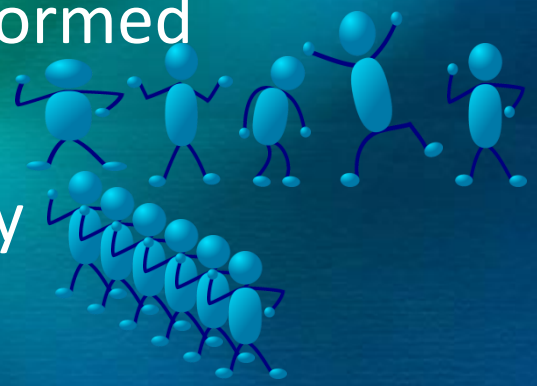
- Define Intervention Fidelity
- Discuss the importance of establishing intervention fidelity in nursing research
- Identify the essential steps in creating a tool to measure intervention fidelity
- Describe how to test Intervention Fidelity

What is Intervention Fidelity?

- The competent and reliable delivery of an intervention or treatment by the interventionist .[1,2]

  It means that…

  - ✓ An intervention can be clearly and accurately taught
  - ✓ It can be consistently performed
    - Interuser reliability
    - Test-retest reliability
  - ✓ We can believe it's effect in a RCT



Importance of Fidelity

- Fidelity of the intervention is foundational to the internal validity of an outcome study [1-3]
- Integral to both the interpretation and generalization of research findings (internal & external validity)
- VITAL before translating "evidence" into practice

Intervention (cause) → ***Delivery*** → ***Outcome (effect)*** → **"EVIDENCE"? → PRACTICE?**

Implications for Internal Validity

The internal validity of an outcome study is dependent on the systematic and reliable delivery of the independent treatment variable. [3,5]

Significant Results

May be due to an effective treatment

or

unknown variables added to the treatment?

Non-significant Results

May be due to an ineffective treatment

or

a treatment that was inadequately administered?

Without fidelity of the intervention used…

we can't know!

Implications for Internal Validity

- Ensure that treatment "dose" (treatment intensity- measured by number, frequency, length of contact) is the same for each subject within a particular treatment condition
- Ensure that treatment "dose" is the same across interventions that include multiple behaviors and across treatment and control/comparison groups
- Lack of standardization within and between providers, and variation in treatment intensity and content across participants

↘ inflates error variance ↘ decreases power

Implications for External Validity

- Benefits of High Fidelity
  - Standardized training program established
  - Replication of treatment in other studies
  - Generalization of treatment to applied settings
  - Dissemination
- Costs of Low Fidelity
  - Rejection of effective interventions
  - Acceptance of ineffective interventions

Lead the Way……

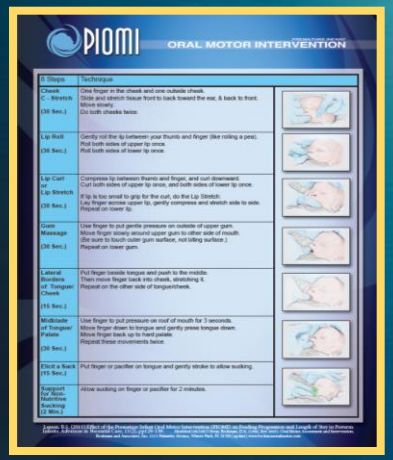
- Establishing fidelity is a KEY methodological strategy to enhance validity and reliability of behavioral interventions
- Nursing literature has historically been very limited in assessing intervention fidelity [2,4]
- There is very little guidance on how fidelity of an intervention or treatment should be established
- Advanced Practice RNs are at the frontline of accessing, critiquing and applying research findings
- Neonatal interventions should be assessed for fidelity before evidence of their efficacy can be translated to practice

How to Test for Intervention Fidelity

Case Example

The Premature Infant Oral Motor Intervention (PIOMI) [5]

- A 5 minute oral motor intervention to provide assisted movement to activate muscle contraction and provide movement against resistance to build strength
- Cheeks, lips, gums, tongue and palate are stimulated per specific protocol with finger stroking for 3 minutes
- Ends with non-nutritive sucking for 2 minutes
- OUTCOME: improves feeding (shorter transition from tube to bottle)



How to Test for Intervention Fidelity

Training Tool

- Standardize the training for the intervention
- Design a tool to measure key elements/behaviors of the intervention
- Test the tool for its own reliability before it is used to rate the behaviors
- Use the tool to establish reliable delivery of the intervention
  - Interuser and test-retest reliabilities

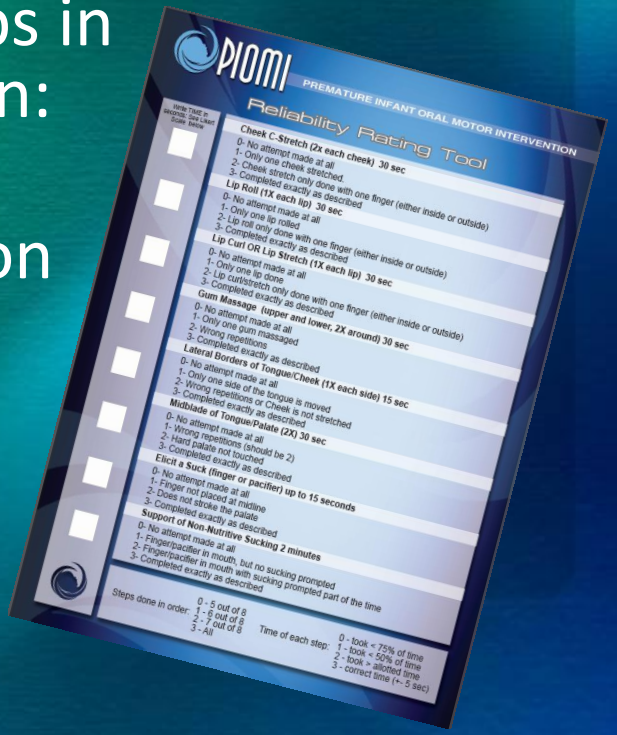
Training is Critical

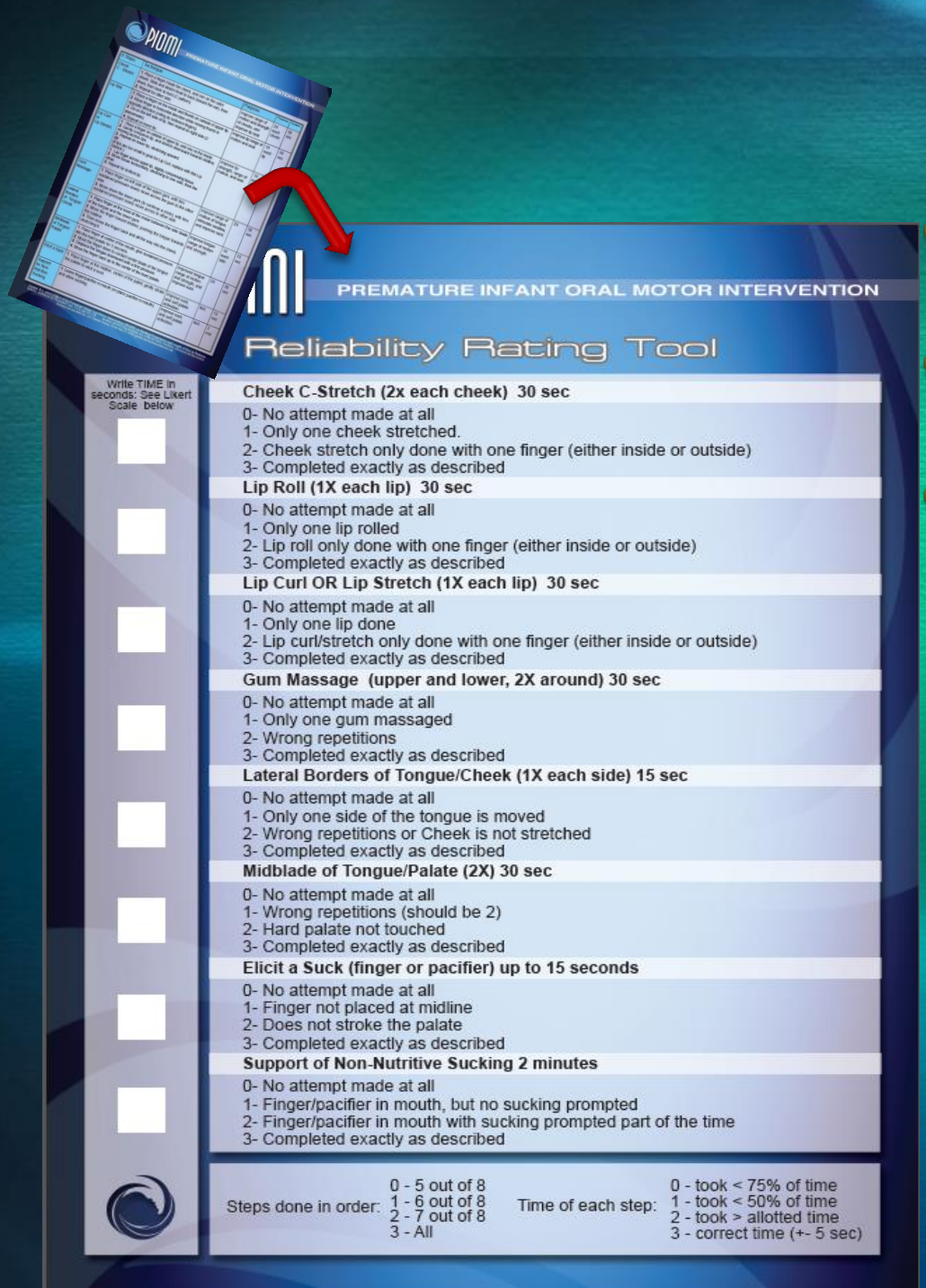
- Providers must be properly trained to deliver the intervention
- Standardized Training Program:
  - Time frame – single 2 hour session
  - Didactic
    - Written instructions
    - Video demonstration
  - Hands-on practice
  - Return demonstration
  - Evaluate the training

Developing a Tool to Test Fidelity

- Scoring rubrics are often used when testing behaviors
- Stein and colleagues[1] identified steps in creating a tool to test an intervention:

1. Identify essential, observable behaviors specific to the intervention
2. Construct a rating scale for each behavior
3. Train raters to use the tool
4. Pilot test the tool
   a) Determining its *interrater* reliability
   b) If raters reliabilities are good, raters can use the tool to rate others





3 Essential Behaviors

- Performing the 8 steps in the correct ORDER
- Performing each step using correct TECHNIQUE
- Performing each step for the correct amount of TIME

Rating Scale for Each One

- Dichotomous too vague
- Likert Scale 0-3
  - Increases specificity
  - Decreases variability
- Score the tool
  - Each behavior
  - Overall score

Train the Raters

- We trained two raters, and tested interrater reliability on the tool
- Percent Agreement: most widely used statistic for interrater reliabiity[6-8]
- Percent agreement used for nominal data
- Standard desirable percent agreement is:
  - 70% for new instrument
  - 90% the goal

The tool demonstrated a 98% interrater reliability

A sound measure to test for intervention fidelity

Test Intervention Fidelity

- Determining **interuser reliability**
  - Rating multiple users performing the PIOMI (on different infants) over two separate performances
  - Average scores from the two performances for each user
  - Compare averaged scores among all users for percent agreement

- Determining **test-retest reliability**
  - Rating of the same user performing the PIOMI (on different infants) over two separate performances
  - Compare scores between that users two performances for percent agreement

Results

Table 1

Reliability

	Correct Order□	Correct Technique□	Correct Time□	Total Reliability□
Interrater	100.00%	97.20%	95.52%	**97.57%**
Interuser				**97.59%**
RN A and RN B	100.00%	95.83%	93.33%	96.39%
RN A and RN C	100.00%	97.87%	97.87%	98.58%
RN B and RN C	100.00%	97.92%	95.45%	97.79%
Test-retest				**97.58%**
RN A	100.00%	100.00%	95.65%	98.55%
RN B	100.00%	100.00%	95.35%	98.45%
RN C	100.00%	100.00%	87.23%	95.74%

□ Percent agreement

- Exceeded the 70% standard, and the 90% goal
- With the stated training, the intervention can be systematically and reliably delivered
- The PIOMI has established intervention fidelity

Using scores to revise training

- Calculations were also done on the 8 individual steps
- Areas with the weaker reliabilities prompted me to adjust the training on those areas
  - New training DVD professionally produced
    - Filmed a real preterm infant to demonstrate each step
    - Included a "practice" segment to practice along with me
    - Demonstration of the "fisted hand" for practice

Table 2

Elements with Weakest Reliabilities

	Interrater Reliability□	Interuser Reliability□	Test-retest Reliability□
Correct Technique			
Cheek C-Stretch	94.44%	91.67%-100.00%	83.33%-100.00%
Lip Curl	94.12%	75.00%-100.00%	80.00%-100.00%
Midblade of Tongue	88.89%	83.33%-100.00%	100.00%
Correct Time	86.67%-100.00%	66.67%-100.00%	60.00%-100.00%

□Percent agreement

Implications for Research and Practice

- Evidence is built for this intervention's fidelity
  - Continue testing it in future studies
- Increases integrity of the research on the PIOMI
- A good fidelity measurement tool makes it easier to accurately and specifically describe the intervention in the literature for further studies
- The tool can also be used for initial training
- And then periodically to asses maintenance of the skill over time

Implications for Research and Practice

- Provides confirmation that the manipulation of the independent variable in the study occurred as planned
  - So we can believe that the “effects” were the result of the “cause” the way we described it

"Testing the fidelity of a new intervention is essential to build evidence that an intervention can be properly taught and consistently performed before translating evidence-based interventions into practice." [5]

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