Advocate Illinois Masonic Medical Center

Psychometric Properties of SMART Feeding Tool: An Interprofessional Research Study

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Objectives

- Learner will summarize the impact of feeding difficulties on the neonatal patient population
- Learner will list one strength and one weakness of an infant feeding tool described in current literature
- Learner will describe two ways an assessment tool, like the SMART tool, can impact feeding practice in the neonatal intensive care unit.

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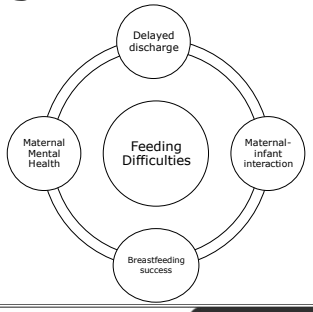
Relevance & Significance

*Approximately **42% of children <4 years old,** with a history of prematurity, receive a diagnosis of feeding difficulties*



Pados, 2021

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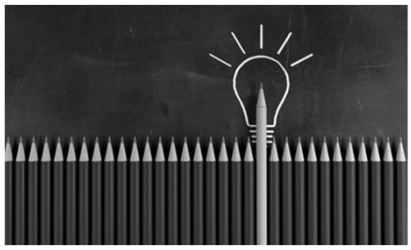
No standard tool

- Subjective assessment of readiness & skills
- Inconsistent communication
- Volume-focused culture



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Current Feeding Assessment Tools

Bickell, 2017

Tool	NOMAS	LATCH	IDFS [11]	EFS	NEOA [9]	SMART
PI	Palmer	Jensen	Waitzman	Thoyre	Pineda	Mishra
Year	1983	1994	2014	2018	2020	2022
Tool Characteristics						
Factors or Subscales	Jaw and Tongue Movement	Latch, Audible swallow, Type of nipple, Comfort, Hold	Readiness Quality	Respiratory Oral Motor Swallow Engagement Physiologic	I. Pre-Feeding Behaviors II. Oral Feeding III. Observation end of Feeding	State Motor Autonomic Regulation Total Oral Skill
Items	27	5	2	19	19	10
Intended User	Clinician Specialized Training	Clinician or Mother	Clinician Specialized Training	Clinician Specialized Training	Clinician	Clinician Specialized Training or Parent
Feeding Method	Breast or Bottle	Breast	Breast or Bottle	Breast or Bottle	Breast or Bottle	Breast or Bottle
Score	0-13	0-10	1-5	-	6-90	25-100
Psychometric Testing						
Validity	Spearman	Content validity	Delphi	IDFS-Q GA PMA	NOMAS t-Test Chi-square	NEOA Spearman Sensitivity/Specificity PPV/NPV CVR/CVI
Reliability	Inter-rater Test-retest Cronbach α	-	-	Inter-rater Cronbach α Factor Analysis	Inter-rater Interclass Fleiss κ	Inter-rater Test-retest Cohen's Kappa

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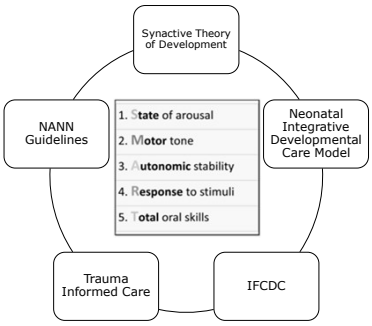
Basis for the SMART Tool



Als, 1982
Altimier & Phillps, 2016
Browne, Jaeger & Kenner, 2020
NANN, 2013

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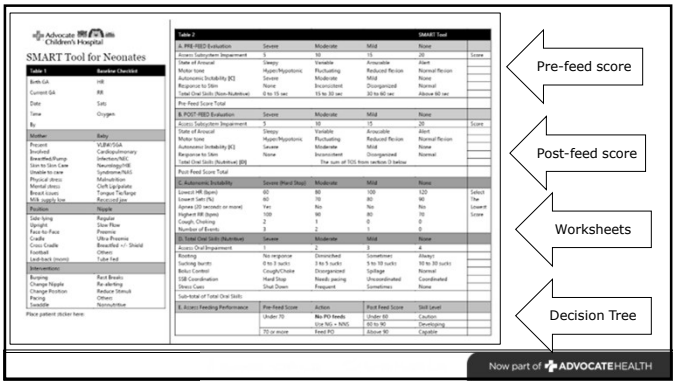

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Purpose

The purpose of this study was to test the psychometric properties of a novel infant feeding assessment tool: SMART Tool

Goals of the study were to establish that the SMART Tool is:

1. Valid: *Measuring what it proposes to measure*
2. Reliable: *Produces a consistent result*

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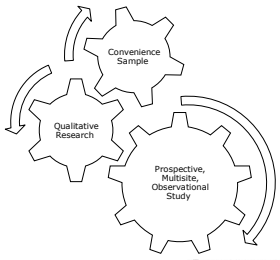
Study Design



Validity	Reliability
• SMART	• Inter-rater
• NEOA	• Intra-rater

4 Level III NICUs

76 Patients Recruited

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Results: Validity

	Standard Positive	Standard Negative	
Test Positive	True Positive (TP)	False Positive (FP)	Positive Predictive = TP/(TP+FP)
Test Negative	False Negative (FN)	True Negative (TN)	Negative Predictive = TN/(FN+TN)
	Sensitivity= TP/(TP+FN)	Specificity = TN/(FP+TN)	

SMART Capable (Test)	NEOA Normal (Standard)			Test	Calculate	Percent	Result
	Yes	No	Total	Sensitivity	32/42	76 %	Pass
Yes	32	9	41	Specificity	43/52	82 %	Pass
No	10	43	53	PPV	32/41	78 %	Pass
Total	42	52	94	NPV	43/53	81 %	Pass

Analysis: Using Spearman's Rho to measure strength between 2 variables:
- Moderate to strong positive correlation (r = 0.706)
- Statistically significant at p<0.0001 (high confidence)

Result: SMART tool is valid to capture true mature & non-mature categories when compared to NEOA tool.

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Results: Reliability

Test	Feed Event	Observe	Agree %	Result
Inter Rater	Pre vs Pre	10	80	Pass
Inter Rater	Post vs Post	10	100	Pass
Test	**Feed Event**	**Observe**	**Agree %**	**Result**
Test Retest	Pre vs Pre	12	50	Pass
Test Retest	Post vs Post	10	80	Pass

Analysis
- Agreement: Strong agreement (Cohens Kappa: K≥0.6)
- Difference: Not Significant (p>0.05)

Result: SMART Tool is Reliable and gives similar results in similar situations.

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Implications for Practice

Statistical Analysis

SMART Tool

Interprofessional Practice

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Implementation

WINS

- SMART Modules 1-5(2 hours)
  - *Increased learner knowledge & confidence*
- 137 learners (and counting!)
- LIVE at 2 sites
- SMART EPIC build

NEXT STEPS

- Go-live at Children's Hospital (2 sites) 2Q24
- SMART Hand-off
- Continue audits
- Publish results

OPPORTUNITIES

- Family Engagement
- Patient Outcomes

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