

Improving Reliability in Neonatal Abstinence Syndrome Scoring

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PROJECT BACKGROUND



Neonatal Abstinence Syndrome (NAS) is an increasingly common diagnosis among newborns in the United States, constituting 6-7% of our NICU admissions. Our team was charged with improving nurse reliability when using the Modified Finnegan Scoring Tool (the Finnegan) in order to reduce Length of Stay (LOS) and improve these infants' care. We rely heavily on the Finnegan to guide initiation, advancement, weaning and cessation of pharmacological treatment of NAS.

PROJECT DESIGN

We established a multidisciplinary team comprised of neonatal and nursery nurses, nurse educators and physicians. We surveyed bedside nurses and identified the top 5 most ambiguous scoring parameters on The Finnegan: Moro Reflex, Crying, Sleep Pattern, Tone, and Tremors.

The Modified Finnegan

SYSTEM	ITEMS AND SUBITEMS	SCORE	COMMENTS
SIGNS & SYMPTOMS	Continuous High Pitched (or other) Crying	2	Daily Weight
	Excessive Moro Reflex	2	
	Excessive Tremors	2	
	Excessive Fussing	2	
	Excessive Sucking	2	
	Excessive Vomiting	2	
	Excessive Diarrhea	2	
	Excessive Stools	2	
	Excessive Watery Stools	2	
	Excessive Sweating	2	
Excessive Mottling	2		
TONE	Low Grade Fever: 37.6-38.3°	1	
	High Grade Fever: >38.4°	2	
	Mottling	1	
	Respiratory Rate >60 at Rest	1	
	Respiratory Rate >60 w/retractions at Rest	2	
	Excessive Sucking	1	
	Poor Feeding	2	
	Crying up to 5 minutes or Difficult to Console	2	
	Crying more than 5 minutes or inconsolable	3	
	Myoclonic Jerks	3	
30 MINUTES AFTER FEEDING	Seizure or Convulsion	5	
	Hawking 3 or more times over scoring interval	1	
	Nasal Stuffiness	1	
	Nasal Stuffiness w/nasal flaring	2	
	Sneezing 3 or more times over scoring interval	2	
	Regurgitation	1	
	Projectile Vomiting	3	
	Loose Stools	2	
	Watery Stools	3	
	Total Score		
INITIALS OF SCORER			

Our team brainstormed ways to clarify these items. We formulated specific, concrete instructions to improve consistency. We reorganized scoring parameters in order to improve nursing flow, to assess these measures in a more physiological manner, and to disturb the infant less frequently.

Our New UMMHC Scoring Tool

NEONATAL ABSTINENCE SCORING TOOL	Date	Date	Date	Comments
Signs & Symptoms				
Sleeps or Content < 3 hours				
Sleeps or Content < 2 hours				
Sleeps or Content < 1 hour				
Hyperactive Moro Reflex				
Hyperactive Moro w/Myoclonic Jerks				
Mild Tremors when Undisturbed				
Moderate/Severe Tremors when Undisturbed				
Mild Tremors when Undisturbed				
Moderate/Severe Tremors when Undisturbed				
Increased Muscle Tone with Handling				
Increased Muscle Tone at Rest				
New (non-buttock) Skin Excitation				
Sweating				
Low Grade Fever: 37.6-38.3°				
High Grade Fever: >38.4°				
Mottling				
Respiratory Rate >60 at Rest				
Respiratory Rate >60 w/retractions at Rest				
Excessive Sucking				
Poor Feeding				
Crying up to 5 minutes or Difficult to Console				
Crying more than 5 minutes or inconsolable				
Myoclonic Jerks				
Seizure or Convulsion				
Hawking 3 or more times over scoring interval				
Nasal Stuffiness				
Nasal Stuffiness w/nasal flaring				
Sneezing 3 or more times over scoring interval				
Regurgitation				
Projectile Vomiting				
Loose Stools				
Watery Stools				
Total Score				
INITIALS				

We developed a bedside reference guide with pointers to increase awareness of conditions affecting withdrawal symptoms. The guide also clearly delineates how to score an infant for the most ambiguous parameters on the Finnegan.

STOP before proceeding...

- Did you adjust for the infant's corrected age (ex: 3 day old or 3 week old)?
- Did you attempt non-pharmacological interventions?
- Did you feed the infant 30 minutes prior to scoring?
- Is there any other reason the infant could be unsettled? (wet diaper, sore buttocks, bright lights, increased noise)
- Was there a disruption that caused the infant to awaken?
- Has the infant been over or under-fed? Is the baby breast feeding?

~ Guide to using the Finnegan Scoring Tool ~

Sleeping or Content <input type="checkbox"/> Score 0: If >3 hours <input type="checkbox"/> Score 1: If <3 hours <input type="checkbox"/> Score 2: If <2 hours <input type="checkbox"/> Score 3: If <1 hours	Moro (at rest) <input type="checkbox"/> Score 2: If Hyperactive (extension of arms or legs lasts a few seconds +/- tremors) <input type="checkbox"/> Score 3: If Markedly Hyperactive (persistent extension of extremities + myoclonic jerks)	Tremors (only 1 score) <input type="checkbox"/> Score 1: If mild tremors of only hands/feet only when fussing or crying <input type="checkbox"/> Score 2: If moderate tremors involve arms/legs only when fussing or crying <input type="checkbox"/> Score 3: If mild tremors when undisturbed <input type="checkbox"/> Score 4: If moderate tremors when undisturbed
Tone <input type="checkbox"/> Score 1: If increased tone w/handling <input type="checkbox"/> Score 2: If increased tone at rest OR no head lag on exam	Excitation (except buttocks) <input type="checkbox"/> Score 1: If new excitation since last score	Sucking <input type="checkbox"/> Score 1: If frantic rooting/sucking or sucking blisters on hands
Feeding <input type="checkbox"/> Score 2: If un-coordinated suck/swallow in presence of rooting or sucking behavior <input type="checkbox"/> Score 3: If excessive or high pitched crying >5 min OR inconsolable	Crying <input type="checkbox"/> Score 2: If excessive or high pitched crying lasts < 5 minutes OR difficult to console <input type="checkbox"/> Score 3: If excessive or high pitched crying >5 min OR inconsolable	Myoclonic Jerks Score 3: For presence of irregular and abrupt involuntary muscle contractions

*specialty nipple use does not warrant score of 2

Nurses are reminded to...

- 1) adjust for the corrected age of the infant
- 2) attempt non-pharmacological interventions for symptom reduction: swaddling and holding, using a pacifier, playing soft music & using an infant rocking seat
- 3) ensure the infant has fed within 30 minutes
- 4) alleviate other noxious stimuli (wet diapers, bright lights, sore buttocks, loud noise)
- 5) consider if the infant has been over- or under-fed or is breastfeeding

TEACHING SESSIONS

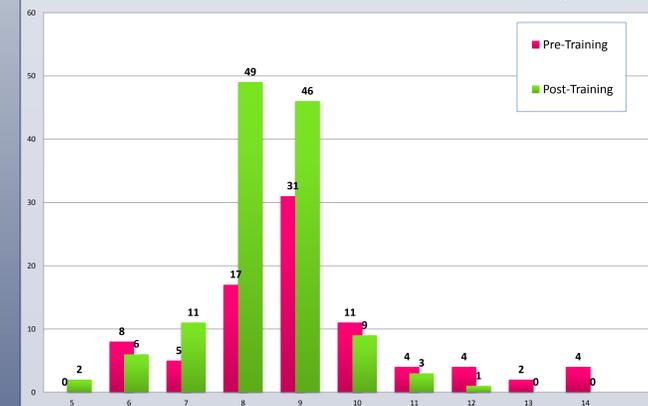
We developed a nurse training curriculum using a standardized patient video¹.

- **Pre-test:** nurses use the old Finnegan to score a standardized video-taped infant with signs and symptoms of withdrawal
- **Discussion:** share areas of confusion when scoring the standardized patient
- **Small group learning:** highlight changes made to the Finnegan & clarify areas of ambiguity
- **Post-test:** nurses use the newly modified Finnegan to score the same standardized infant
- **Feedback:** discussion about correctly scoring this infant & review points of contention

RESULTS

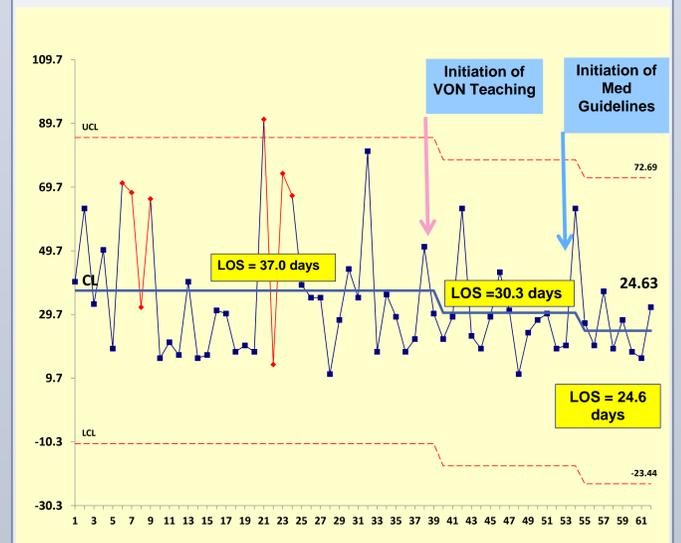
Teaching sessions were implemented from June to August. 97% of NICU nurses and 36% of well baby nurses have been educated. Among trained nurses, the mean NAS score decreased from 9 to 8.4, approaching the gold standard score of 8. The standard deviation also decreased from 1.7 to 1.3, indicating improved reliability. This difference was statistically significant by paired t-test at $p < 0.0001$.

Nurses Scores Before and After Training



Areas of particular improvement were assessment of Moro, Tremors and Tone. We have received considerable positive feedback. Nurses report that they feel more knowledgeable about conditions unrelated to NAS that may alter infants' scores and feel more confident in accurately scoring an infant.

Through a multidisciplinary approach to this problem, in concert with two other UMMHC teams, we have been able to reduce LOS from 37 days at baseline to 24.6 days at present:



FUTURE DIRECTIONS

Re-education will be performed 2 months after the initial training session to reinforce concepts and evaluate for longevity of this intervention.



RESOURCES

1. D'Apolito, K & Finnegan, L. Assessing the Signs & Symptoms of Neonatal Abstinence Using the Finnegan Scoring Tool: An Inter-Observer Reliability Program. 2nd Ed. 2010.
2. Hudak, ML & Tan, RC. The Committee on Drugs and The Committee on Fetus & Newborn. Neonatal Drug Withdrawal. Pediatrics 2012;129:e540.
3. Neonatal Handbook. Infant of the chemically dependent woman. 2010.