Non- Pharmacologic Interventions for the Treatment of Neonatal Abstinence Syndrome

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Neonatal Abstinence Syndrome

- A condition that develops in the infant as the result of abrupt removal of exposure to addictive substances
- Characterized by central nervous system hyperexcitability & autonomic instability in newborns withdrawing from utero opioid exposure

Withdrawal symptom

- Develop in 55% - 94% of exposed infants
- Effect of drug(s) on body is influenced by
  - Type of drug
  - Amount and frequency of use
  - Genetic susceptibility of the fetus/neonate
  - Combination of drugs
  - Trimester in which drug is used
- Begin within 24 hours of birth (heroin) to 72 - 96 hours (methadone)

Ohio NAS Statistics (ODH, 2016)

	2004	2014
Total No. Patients with NAS	199	1875
Average LOS (Days)	13.7	15.6
% with Medicaid as the Payor	76	91
Average Charges	26,465	56,111
Total Charges	5,266,503	105,207,950

Local Data

	NAS Admissions 2015	NAS Admissions 2016	NAS Admissions 2017
Main NICU	55	50	54
Local NICUs	138	121	102

Review of Literature

- Even though more research has been done about pharmacologic therapy, there is no standardized practice in care of infant with NAS
- Most of the non-pharmacologic interventions have been studied in other neonatal populations but not in the NAS population
- Overall there are weaknesses in the literature surrounding non-pharmacologic interventions

Theoretical Framework

FOCUS-PDSA

Find a problem to improve - NAS
Organize an effort to work on improving - Formed interdisciplinary NAS workgroup
Clarify current knowledge of the process – Reviewed evidence in literature
Understand process variation and performance capability - Clarified interventions
Select changes aimed at performance improvement – Created non-pharmacologic intervention bundle
Plan – Developed non-pharmacologic interventions
Do – Implemented interventions
Study – Collected data on interventions used
Act – Make adjustments and revisions to interventions

Non-Pharmacologic Interventions

- Minimize environmental stimuli
- Swaddling
- Comforting techniques
- Music therapy
- Hyper-caloric feedings
- Time with a cuddler
- Family caregiving (rooming in)
- Respond to infant's signals
- Appropriate positioning
- Kangaroo care
- Infant massage

Methodology

- Design: Retrospective QI project, 2 group design
- Sample: Convenience sampling of all patients admitted with diagnosis of NAS
- Exclusion: Premature infants (< 37 weeks)
- IRB Approval
- Setting: Infants admitted to neonatal unit in a large northeastern Ohio free-standing pediatric hospital & its affiliated units
- Consent: Not needed due to chart review

Data Collection

- Demographic data to include maternal drug history
- Highest modified Finnegan score during treatment
- Non-pharmacologic interventions documented
- Pharmacologic treatment
  - Medications
  - Length of treatment
  - Maximum dose
  - Length of stay

Data Analysis

- Independent t test was done to compare pre-implementation of non-pharmacologic interventions to post-implementation
  - Length of pharmacologic treatment
  - Length of hospital stay
- Mean
  - Demographic data
  - Gestational age
  - Age at admission
- Frequency of use of each non-pharmacologic intervention

Timeline

- Implementation: 9/27/16
- Initiate data collection: January 2017
  - Pre-implementation data will be collected on patients admitted & discharged 10/1/2015 – 7/31/16
  - Post-implementation data will be collected on patients admitted & discharged 10/1/16 – 7/31/17

NAS Data Collection Tool
Study # _____

Demographics

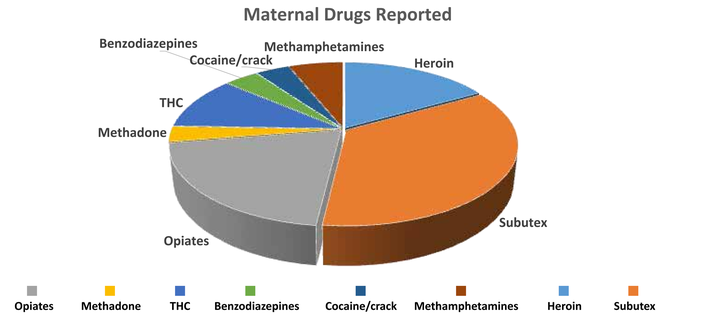
Date of Birth _____Gest. Age _____ BW _____
Age at Admission _____ Unit: Akron Children's AGMC Summa
Gender: Male Female
Maternal drug use: _____

NAS Treatment
Highest Finnegan score _____

Non-pharmacologic intervention	Number of times used
Minimize environmental stimuli	
Promote sleep by clustering interventions	
Turn baby away from caregiver (decrease eye contact	
Low lighting	
Curtain drawn	
Conversation low level	
Door shut	
Natural light	
Incubator covered	
Family caregiving	
Swaddling	
Respond to infant's signals	
Create plan & place at bedside	
Follow individualized plan	

Comforting techniques
Appropriate positioning _____
Gentle vertical rocking _____
Music therapy _____
Kangaroo care _____
Allow hands to mouth opportunities _____
Non-nutritive sucking _____
5 S's: shushing, swinging, swaying, swaddling, soft voice _____
Feedings
Encourage mom to breastfeed/provide breastmilk _____
Frequent small volumes of hypercaloric low lactose feeding _____
Rubbing when burping (instead of patting) _____
Provide physical boundaries _____
Time with cuddler (in minutes) _____
Skin care
Barrier cream _____
Pressure redistribution surface _____
Infant Massage (in minutes) _____
Infant massage done by: mother father cuddler Other _____

Pharmacologic treatment
Morphine Y N Highest dose: _____
Clonidine Y N Highest dose: _____
Phenobarbital Y N Highest dose: _____
Number of days on Morphine: _____
Number of days on Clonidine: _____
Number of days on Phenobarbital: _____
Number of days on pharmacologic treatment: _____
Length of stay: _____



	Pre Mean SD	Post Mean SD	
Highest Finnegan Score	12.7 3.6	13.3 4.6	p<0.05
Highest Dose Morphine (mg)	0.2 0.1	0.1 0.0	p<.0001
Length of Tx with Morphine (days)	15.4 8.5	12.0 6.1	0.069
Highest Dose of Phenobarbital (mg)	32.4 9.5	0	
Length of Tx with Phenobarbital (days)	16.0 9.7	0	
Highest Dose of Clonidine (mg)	N/A	6.2 4.3	
Length of Tx with Clonidine (days)	N/A	15.6 9.1	
Length of Pharmacologic Tx (days)	15.6 8.7	12.6 9.6	p>0.05
Length of stay (days)	15.3 9.5	14.9 9.0	p>0.05

Intervention	*f*
Promote sleep	329
Appropriate positioning	329
Rubbing when burping	322
Use of barrier cream	322
Low lighting	291
Physical boundaries	274
Non-nutritive suck	272
Swaddling	269
5 S's	255
Allow hands to mouth	233
Conversations low	234
Follow individualized plan of care	229
Family caregiving	226
Encourage breastfeeding	168
Keep room door shut	162
Natural lighting	153
Vertical rocking	141
Music therapy	101
Create individualized plan of care	99
Turn baby away (decrease eye contact)	95
Curtain drawn	85
Feed frequent low volumes	84
Infant massage	80
Incubator covered	28
Kangaroo care	28
Use of pressure redistribution surface	6

Discussion

- Significant difference in highest morphine dose (decreased in post-implementation group) and length of pharmacologic treatment with morphine
- Pharmacologic treatment has side effects and needs to be discontinued before discharge
- Non-pharmacologic interventions are not well-studied in the literature
- Most non-pharmacologic interventions were utilized
  - Kangaroo care
  - Breastfeeding
  - Cuddlers
- Finnegan score was higher in post-implementation phase

Limitations

- Small sample sizes (N = 67 pre and N = 37 post)
- Documentation Issues
  - Lack of documentation
  - Multiple areas to document (Breastfeeding and Kangaroo Care)
- Non-pharmacologic interventions were hand counted data

Conclusions

- Most non-pharmacologic interventions were utilized
- This project adds knowledge on the use of non-pharmacologic interventions in the care of infants with NAS
- These non-pharmacologic interventions are a great example of care provided by nursing that can affect length of pharmacologic treatment and length of stay