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The Care and Management of a Newborn with Neonatal Abstinence Syndrome

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HONORS CAPSTONE ABSTRACT

Over the past decade, there has been a significant increase in street drug and opioid use across the world. Throughout the United States, at least one newborn is affected by Neonatal Abstinence Syndrome (NAS) every fifteen minutes (Schierholz et al., 2021). NAS occurs when the newborn experiences withdrawal symptoms due to the mother’s drug use while pregnant.

The purpose of this study is to investigate and analyze which care and management factors/lifestyle choices create the greatest outcomes for newborns born with Neonatal Abstinence Syndrome. A literature review was conducted with research articles and journals within the time frame of 2009-2021 from Northern Illinois University’s database titled, Cumulative Index to Nursing and Allied Health (CINAHL). The key words searched were, “Neonatal Abstinence Syndrome,” and “Management/Care.” Both primary and secondary sources were used. The focus of this study will be comparing skin-to-skin contact/ “baby wearing”, breastfeeding, and pharmacologic interventions for the treatment of NAS.

Throughout the research, it has been found that the greatest outcome of a newborn with Neonatal Abstinence Syndrome is achieved when the newborn is breastfed. The research concluded infants who are breastfed are less likely to need pharmacologic treatment and have shorter hospital stays. Although, if necessary, infants may need pharmacologic treatment, it is not the first line of defense in NAS. Skin-to-skin contact and “baby wearing” are also important, but when compared to other factors it is insignificant.

Nurses are an integral part in educating mothers and families and caring for newborns with NAS. Therefore, to adequately provide care for individuals affected by NAS they must understand how to care for and manage the symptoms of a newborn born with NAS.
What is Neonatal Abstinence Syndrome?

Neonatal Abstinence Syndrome (NAS) is when infant experiences withdraw symptoms from drugs they were exposed to in the womb from the mother. The most common illicit drugs causing NAS are opioids, but other drugs that can potentially cause NAS are barbiturates, benzodiazepines, and nicotine. NAS can cause complications in an infant such as, low birth weight, jaundice, seizures, sudden infant death syndrome (SIDS), and some long-term effects (Neonatal abstinence Syndrome (nas), 2019). When an infant is experiencing NAS the nurse or provider may notice the infant experiencing affects on the neurologic, respiratory, and gastrointestinal systems. Clinical manifestations of NAS vary for each infant and are based on several factors including, the amount and type of drug exposure, the time of last maternal drug use, and the drug’s half-life. Some common signs and symptoms seen in infants are a high-pitched cry, hyperirritability, seizures, tachycardia, and excessive weight loss.

Diagnosing an infant with NAS starts before the newborn is born. If the mother is receiving prenatal care, the provider must acquire an accurate history of the mother’s drug use including, the last time the mother consumed any drugs and collect any evidence of the mother if she appears to be in withdrawal. If the mother did not receive prenatal care, these questions still need to be asked while the patient is in labor and during the mother and baby’s stay at the hospital. As recommended by the American Academy of Pediatrics, hospitals and facilities that use a scoring tool to diagnosis and provide treatment for newborns with NAS have improved outcomes significantly. The Finnegan NAS scoring system is the most common scoring tool used to guide treatment. The nurse will evaluate the infant every 1 to 4 hours, based on their age and score them based on severity of symptoms they are presenting (See Appendix A). Pharmacologic treatment is recommended for any infant who receives a score ≥ 8 on three consecutive evaluations (See Appendix B) (Schierholz et al., 2021).

Review of Literature

Skin-to-Skin/ “Baby Wearing”

Williams et al. (2016) conducted a study on “baby wearing” in a NICU in the Southwest United States on how to prevent distress in infants with NAS. It was also used to assess whether infant carrying or “baby
wearing“ may have calming benefits similarly to other nonpharmacologic NAS treatments such as, skin-to-skin contact. The infants were placed in a carrier daily for a minimum of one-hour. There were two controlled groups in this study. Group 1 were infants diagnosed with NAS and were not receiving pharmacologic interventions and group 2 were infants that were receiving pharmacologic interventions. The heart rate was measured of infant as well as the adult holding the infant in the NICU. The mother, father, or family member was the first choice in “baby wearing,” but when immediate family was unavailable a nurse would be the wearer of the infant. At regular intervals the heartrates were measured, pre-babywearing (no touching), mid-babywearing (20 minutes into being worn in a carrier), and post-babywearing (5 minutes later). Across a 30-minute period, heart rates of infants worn by parents decreased by 15 beats per minute (bpm) compared with 5.5 bpm for infants worn by an unfamiliar adult, and those of the parent decreased by 7 bpm and nearly 3 bpm of the unfamiliar adult (See Appendix C) (Williams et al., 2016).

Breastfeeding

Short et al. (2016) conducted a retrospective cohort study of 3,725 neonates with NAS to assess breastfeeding status vs. length of hospitalization. Infants were selected to participate based on their NAS international classification of disease score. 44.5% of newborns were breastfed at the time of discharge of those studied. Breastfeeding was associated with 10-day hospitalization (interquartile range 5-19) while infants who were non-breast fed experienced an average of a 12-day hospital stay (interquartile range 5-22). An Inverse relationship between breastfeeding and length of stay (B=-0.085, P=0.008) remained significant after adjusting for birth year, hospital, neonatal intensive care admission, type of delivery, birth weight, infant comorbidities, maternal age, race, and marital status (B=-0.060, P=0.05).

Similarly, Dryden et al. (2009) conducted a Retrospective study evaluating the relationship between breastfeeding and pharmacological intervention in infants with NAS. Recent mothers with a history of drug abuse on methadone maintenance therapy (MMT) and their newborns were included in this study (n=450). 27.7% initiated breastfeeding while in the hospital and 45.5% of infants received pharmacological treatment for NAS. What was concluded in the study showed that infants that were breastfed for ≥ 72 hours (n=99) while in
the hospital for NAS were less likely to require pharmacological treatment for their symptoms (OR=0.55, 95% CI, 0.34 - 0.88; P=0.13).

Pharmacologic

Zimmermann et al., (2020) conducted a multicenter, double-blind, parallel-group study in 7 NICU units in Switzerland. The main objective was to document the effect of three drugs (oral morphine solution, chlorpromazine, phenobarbital) on the length of treatment based on the infant’s modified Finnegan score. All infants with reported maternal opioid consumption and NAS were assessed with a Finnegan score every 8 hours. If an infant scored once above 14 or two consecutive scores above 9, and the parents had given written consent, the infant was randomly assigned to group A (morphine), B (chlorpromazine), or C (phenobarbital), and the pharmacologic therapy began (See Appendix D). The results of the study were as follows, median length of medical treatment in the morphine group was 22 days (95% CI from 18 to 33), 25 days in the chlorpromazine group (95% CI from 21 to 34), and in the phenobarbital group 32 (95% CI from 27 to 38) days (p = 0.12). Hospitalization time in the adjusted analysis was 5% longer in the chlorpromazine group than in the morphine group (ETR 1.05, p = 0.61) and 13% longer in the phenobarbital group than in the morphine group (ETR 1.13, p = 0.21) In the morphine group, only one out of 33 infants (3%) needed a second drug, but in the chlorpromazine group, the equivalent figure was 24 out of 44 (55%), and in the phenobarbital group, 13 infants out of 43 (30%) (Fisher’s exact test, p < 0.0001).

Nursing Implications

Nurses are a vital role in caring for infants, mothers, and families affected by Neonatal Abstinence Syndrome. Nurses must participate in prenatal screening as well as, beginning early interventions. Nurses are responsible for providing comprehensive care for both the mother and infant, establishing trust, empathizing with the mother to promote maternal-infant bonding, and understand substance use disorder and treatment strategies to ensure positive outcomes among patients (Schierholz et al., 2021).

Before a nurse cares for a mother or infant affected by NAS, they must examine their own bias about substance use disorder that may hinder the nurse’s ability to care for those affected. Most substance use
disorders are linked to past trauma, the nurse must provide care that is cognizant of that trauma. This approach decreases the chance of bias and aids in the ability to provide complete care. If a nurse assumes the patient has experienced a previous trauma, it allows for an understanding of why the mother may seem absent or frustrated while providing care to their newborn. This also allows the nurse to address challenges and provide resources to the mother, so the mother can provide optimal care for the newborn. Nurses must also create a respectful and compassionate environment for the mother to establish a trusting relationship with the patient to help the mother of the newborn learn and understand the management of a newborn with NAS. The nurse is also responsible for providing education to the mother and family of a newborn with NAS this education includes, how to properly care for the infant, how to manage and observe signs of withdrawal in the infant and provide education and resources that will be helpful to the mother affected by a substance use disorder.

Nurses are also responsible for caring for the infant with NAS. The care the nurse provides is a crucial part in the outcome of the newborn with NAS. The first step the nurse must take is performing a patient assessment on the newborn and provide a score using a standardized NAS tool such as, the Finnegan system, as soon as possible. After a score is concluded, interventions must begin immediately. If indicated, begin with nonpharmacologic inventions first such as, promoting restful sleep in the infant, provide a dark and quiet room, hold the infant skin-to-skin, and promoting breastfeeding the infant. If pharmacologic treatment is ordered by the provider, the nurse must monitor the effects of the medication on the infant and provide treatment education to the infant’s mother and family (Schierholz et al., 2021).

**Challenges in Nursing**

Due to the significant increase in drug use and increase in infants born with NAS, healthcare is faced with many challenges. These challenges are in all aspects of care including appropriate evaluation, diagnosis, and treatment.

Increased incidence of NAS has improved awareness of this syndrome but inversely has created the challenge of increased nursing demand. The nurse must provide care to the infant as well as the mother who has a history of substance use disorder and may need more 1:1 care that may complicate the care of a newborn. To
promote optimal care of both the newborn and the mother, appropriate nursing staff and availability to resources for families are essential in overcoming this challenge.

As mentioned previously, care of a newborn with NAS highly varies this makes it extremely difficult to create a standard of care for NAS. Lack of standardization is associated with longer hospital stays, separation of the newborn and mother, and poor development for the infant, long-term. This creates greater stress on nurses and the families of the newborn because without standardization outcomes are less predictable. This also increases the cost demand of the patient. Without standardization, the infant and mother could be undergoing unnecessary testing which may hinder their wellbeing and cause longer hospital stays (Schierholz et al., 2021).

When caring for a mother with substance use disorder it can be very complex. Along with substance use disorder, there is often underlying trauma, mental illness, economic violence, housing instability, and more. Each of these factors play a significant role in the ability to cease the use of substances while pregnant and postpartum which may complicate the mother’s ability to care for the infant. Training and education for healthcare workers needs to be implemented for learning to care for these individuals. A newborn recovering from NAS has better outcomes when the mother is positively attached to the newborn and responds to their needs as seen through this study.

Another challenge nurses and healthcare professionals face is creating a NICU environment appropriate for newborns recovering from NAS. NICU’s are most often loud and chaotic which may exacerbate NAS symptoms in a newborn. To heal, newborns with NAS need a very calm, quiet area. Many NICU’s also do not allow mothers to stay with their newborns at all hours of the day which can also hinder the outcome of the newborn and prolong their hospital stay.

Social implications are can also cause delayed healing in infants with NAS. To address the social needs of the newborn and mother, collaboration between healthcare members is of upmost importance. Many community-based programs have set framework to promote the mother and newborn to receive the best care. This begins with prevention, prenatal care, and drug treatment for the mother. These programs continue after discharge and help transition the mother to living at home with an infant. These programs create a need for
collaboration between providers, nurses, social workers, and occupational therapists. Interventions from state child protective services may be necessary if the mother is unable to care for the newborn effectively to protect the newborn from harm, but as seen through this study the best treatment for NAS is the mother of the child. This separation could cause increase hospitalization for the infant (Schierholz et al., 2021).

**Conclusion**

Throughout the research, it has been found that the greatest outcome of a newborn with Neonatal Abstinence Syndrome is achieved when the newborn is breastfed. The research concluded infants who are breastfed are less likely to need pharmacologic treatment and have shorter hospital stays. Although, if necessary, infants may need pharmacologic treatment, it is not the first line of defense in NAS. Skin-to-skin contact is also important, but when compared to other factors it is unsignificant. To provide the best patient care, nurses need to be educated on the most effective way to care for an infant with NAS. Nurses must also be able to educate the mother and families of infants with NAS to ensure the infant is going to receive the best care. If NAS is not properly treated the infant could experience further complications. To minimize the need for hospitalizations in the infant’s life optimal care/management is of upmost importance.

**Neonatal abstinence Syndrome (NAS).** March of Dimes. (2019).

New framework to curb births of babies born dependent to drugs. NICHQ. (2017, September 20).


Appendix A: Finnegan Scoring System for NAS

<table>
<thead>
<tr>
<th>DATE</th>
<th>SCORE</th>
<th>TIME</th>
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<tr>
<td>High pitched cry: inconstant &gt;15 sec.</td>
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<td>OR intermittently for &lt;5 min.</td>
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<td>High pitched cry: inconstant &gt;15 sec.</td>
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<td>AND intermittently for ≥5 min.</td>
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<td>Sleeps &lt;1 hour after feeding</td>
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<td>Sleeps &lt;2 hours after feeding</td>
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<td>Sleeps &lt;3 hours after feeding</td>
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<td>Hyperactive Moro</td>
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<td>Markedly hyperactive Moro</td>
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<td>Mild tremors: disturbed</td>
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<td>Moderate–severe tremors: disturbed</td>
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<td>Mild tremors: undisturbed</td>
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<td>Moderate–severe tremors: undisturbed</td>
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<td>Increased muscle tone</td>
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<td>Excoriation (indicate specific area):</td>
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<td>Generalized seizure</td>
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<td>Fever ≥37.2°C (99°F)</td>
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<td>Frequent yawning (≥4 in an interval)</td>
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<td>Sweating</td>
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<td>Nasal stuffiness</td>
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<td>Sneezing (≥4 in an interval)</td>
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<td>Tachypnea (rate &gt;60/min.)</td>
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<td>Poor feeding</td>
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<td>Vomiting (or regurgitation)</td>
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<td>Loose stools</td>
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<td>≤90% of birth weight</td>
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<td>Excessive irritability</td>
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<td>Total score</td>
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(North Carolina Pregnancy & Opioid Exposure Project, 2019)
Appendix B: Treatment Flowsheet for NAS

(North Carolina Pregnancy & Opioid Exposure Project, 2019)
Appendix C: Williams Study Results

(Williams et al., 2016)
Appendix D: Zimmermann Study Therapy Algorithm

Fig. 1 Therapy algorithm. Medications are started, increased, decreased, or stopped depending on a modified Finnegan score. If symptoms were not controlled by the predefined maximal dose of the first allocated drug, a second drug was added following the same algorithm as the first drug.

(Zimmermann et al., 2020)