

**Nurse's Attitudes towards the Effectiveness of the Finnegan NASS**  
**Rachel Jones, SN & Deborah Steward, PhD, RN**

Undergraduate Honors Thesis

Presented in Fullfillment of the Requirements for the Degree  
Bachelor of Science with Distinction in the College  
of Nursing at The Ohio State University

Rachel A. Jones

June 1, 2011

Thesis Committee:  
Steward, Deborah, PhD, Advisor

Copyright by

Rachel Jones

2011

Illicit drug usage among pregnant mothers is a significant problem. The consequence is that their infants are at risk for the development of neonatal abstinence syndrome (NAS) because of intrauterine exposure. NAS is defined as a cluster of signs and symptoms exhibited by newborn infants as they undergo withdrawal. The Finnegan Neonatal Abstinence Scoring System (NASS) allows the nurse to score the signs and symptoms exhibited by the infant who is experiencing NAS. Areas scored include the central nervous, gastrointestinal, and respiratory/vasomotor systems. The infant's score guides healthcare providers in the initiation, management, and titration of pharmacologic intervention. Proper treatment of NAS allows infants to achieve growth-promoting rest and earlier hospital discharge. Criticisms of the NASS include the subjective nature of the assessment and a lack of consideration of environmental influences on the infant's behavior. The purpose of this study was to examine the perceptions of nurses from a large postpartum unit in Central Ohio who routinely complete the NASS. The nurses were asked to complete an anonymous survey comprised of nine open-ended questions. Components of the survey included overall view of the scoring system, outside influences on the scoring, and the perceived subjectivity of the scoring. Content analysis was used to analyze the survey data. Preliminary analyses indicate that nurses do not believe they were adequately trained to use the NASS. The nurses report that the NASS does not effectively capture the infant's clinical situation making these infants difficult to care for. Nurses employ multiple strategies to care for these infants. Lastly, environmental factors are not taken into consideration when completing the NASS. Further education is necessary to ensure correct usage of the NASS in clinical practice as well as use of the most effective non-pharmacologic strategies. This will ensure that the infants with NAS are receiving appropriate care.

## Introduction

Exposure to drugs in utero can result in the development of Neonatal Abstinence Syndrome (NAS) in the newborn infant. NAS continues to be a significant problem in the United States and around the world because of the large numbers of pregnant women who use illicit drugs or misuse prescription drugs. In 2009, the National Survey on Drug Use and Health reported that 4.5% of pregnant women between the ages of 15 and 44 years old had used illicit drugs during their pregnancy (NSDUH, 2010). It is reported that 55% to 94% of infants born to pregnant women using illicit drugs will exhibit symptoms of withdrawal (Burgos & Burke, 2009; D'Apolito, 2009).

Effective management of NAS, including pharmacologic therapies, requires accurate assessment of withdrawal symptoms exhibited by the infant. The Finnegan Neonatal Abstinence Scoring System (NASS) was the first tool developed to assess and quantify symptoms of NAS (Finnegan, 1975) and is still widely used in current practice (O'Grady, Hopewell, & White, 2009). Researchers have demonstrated that 96.5% of neonatal units rely on a scoring system, such as the Finnegan NASS, to decide when to initiate, intensify, and/or titrate pharmacologic treatment for an infant with NAS (O'Grady et al.).

It is standard practice across neonatal units for the Finnegan NASS to be completed by the nursing staff at regularly scheduled intervals. The Finnegan NASS is comprised of items directed at assessment of the neurologic, gastrointestinal, and respiratory/vasomotor systems. Given the responsibility of the nursing staff for accurate assessment of NAS, there is a lack of research focusing on the nurses' perceptions of the usefulness of the Finnegan NASS. Anecdotal evidence suggests that nurses perceive that interpretation of the individual items to be scored results in variability in scoring. In addition, there is some concern that the subjective nature of the scoring

system could result in an inaccurate assessment of the infant's symptoms and impact the care the infant receives for NAS. The purpose of this study is to determine postpartum nurses' perceptions of the Finnegan NASS and its usefulness in guiding the care of newborn infants experiencing NAS. Understanding how postpartum nurses perceive and score the Finnegan NASS is a critical first step in ensuring that this vulnerable population of infants receives appropriate care.

## **Background**

As stated above, 4.5% of pregnant women use illicit drugs during their pregnancy. The rate of illicit drug use during pregnancy is most likely higher in urban cities (Sarkar & Donn, 2006, Beauman, 2005). These numbers do not include the growing number of pregnant women who use prescription medications for chronic pain or mental health issues (Burgos & Burke, 2009). Thus the numbers of infants who are at risk for the development of NAS is significant and requires accurate assessment of exhibited symptoms.

Neonatal abstinence syndrome is a term used to identify newborn infants experiencing symptoms of drug withdrawal following intrauterine exposure (O'Grady et al., 2009). Infants experiencing NAS require prolonged hospitalization due to symptom management as well as management of any co-morbidities (Baxter, Nerhood, & Chaffin, 2009; Saiki, Lee, Hannam, & Greenough, 2010). The symptoms of NAS vary widely based on the drug used by the mother. However, the severity of the withdrawal symptoms does not always correlate with the dose or duration of the exposure (Burgos & Burke, 2009; Jansson, 2008). Symptoms of withdrawal include irritability, high-pitched cry, tremors, hypertonicity, poor feeding, vomiting, diarrhea, sleep disturbances, nasal flaring, frequent sneezing and yawning, and fever (Fraser, Barnes, Biggs, & Kain, 2006; Oei & Lui, 2007; D'Apolito, 2009; O'Grady et al.). Symptoms of

withdrawal usually occur in the first 48-72 hours of life. Manifestation of symptoms is influenced by the half-life of the drug (D'Apolito, 2009). The timing of onset may be delayed up to four weeks after birth, and continue up to six months of age.

Of all the scoring systems available, the Finnegan NASS is the most comprehensive scoring system (D'Apolito, 2009). The Finnegan NASS is comprised of 31 items designed to quantify the severity of the symptoms of NAS. The items are weighted on a scale of 1-5 depending upon the symptom and the severity of the expressed symptom (Jansson, Velez, & Harrow, 2009). The total score is used to guide pharmacologic management. Treatment is indicated when the total score is equal to or greater than 8 for three consecutive scores, the total score is equal to or greater than 12 for two consecutive scores, or the average of two scores is equal to or greater than 12 (D'Apolito, 2009). Scoring is done every 4 hours and should be reflective of the entire time that has lapsed since the previous scoring (Jansson et al.).

The goal of pharmacologic management is to stabilize the symptoms so that the infant is able to eat, sleep, gain weight, and interact with caregivers (Jansson et al., 2009). Given the importance of scoring in relation to management of NAS, it is critical that the scoring reflects an accurate picture of the symptoms being experienced by the infant. Because these infants are under the constant care of the nursing staff, nurses are charged with the responsibility for the assessment of these infants. Thus it is imperative that nurses are knowledgeable about NAS and the use of the Finnegan NASS (Fraser et al., 2007; Oei & Lui, 2007).

There are several factors that could potentially impact scoring. The items of the Finnegan NASS are subjective in nature and rely on the nurse's interpretation of the various items. The result is that the obtained score might not be completely objective (Greene & Goodman, 2003). How this subjectivity influences the scoring, and ultimately treatment, is unknown. One could

hypothesize that there is a learning curve with the use of the scoring system and that experience with infants with NAS will improve the ability of the nurse to accurately score the observed symptoms. Nurses do report the need for ongoing education with the assessment of NAS (Fraser et al., 2007). In addition, the scoring system does not take into account the workload of the nursing staff. Nurses report that infants with NAS are demanding to care for and can require a significant amount of nursing time. However, the acuity of the infant is often not considered in relation to staffing patterns (Fraser et al.). The concern is that symptoms could easily be overlooked when the nursery census is high due to the variability in symptom manifestation. Inaccurate assessment will impact the treatment the infant receives (Jansson et al., 2009).

The influence of the environment and handling of the infant are also factors that have the potential to impact the score. Because of the effects of withdrawal on the autonomic nervous system, the infant has a limited ability to respond to environmental demands. The result is that the infant can become overstimulated in a loud, high-stress environment (Greene & Goodman, 2003). Overstimulation will increase symptom manifestation. In addition, overhandling of the infant also has the potential to increase symptoms. The obtained Finnegan score will most likely be higher as a result of outside influences on the infant's sensitive nervous system.

In summary, NAS is a significant problem in the United States. Accurate assessment of the infant with NAS will result in better pharmacologic management. The Finnegan NASS provides a mechanism for quantifying the symptoms manifested by the infant experiencing NAS. The nursing staff has primary responsibility for assessing infants with NAS. There is concern that several factors can influence the obtained Finnegan score. Given the responsibility of the nursing staff for use of the Finnegan NASS, it is important to understand what factors nurses perceive impact their ability to accurately use this assessment tool.

## **Methodology**

The plan for this exploratory study is to survey the nursing staff in order to examine staff nurses' perceptions of the use of the Finnegan NASS. Staff nurses were recruited from the Mother-Infant Unit at a large University Medical Center. The Mother-Infant Unit houses 40 beds and 16 nursery beds. The nurses recruited for this study must be permanent employees of the unit and have completed the orientation program for new employees. Staff nurses were recruited via email messaging, flyers distributed in the break room, and placement of the study notice in the "Friday Newsie," a unit-based publication.

## ***Procedure***

The surveys were placed in the nurse's mailbox, which are located in the staff locker room. The surveys were initially available for a 10 day period. Nurses were asked to fill out a short anonymous survey with all responses kept confidential. The survey should take approximately 30 minutes to complete. Upon completion, the nurses placed the survey in an attached envelope and sealed the envelope. Sealed envelopes were given to the Unit Clerk and placed into a second envelope, which the nurses signed the front of. The Principal Investigator went to unit each day of the study period to collect the envelopes. All nurses who have signed the outside of the second envelope will be given a gift card to Season's Cafe. After the process was complete with 14 nurses responding, the process was completed again with six more nurses filling out the survey.

## ***Survey Instrument***

The anonymous paper and pencil survey comprised of nine open-ended questions. Components of the survey include overall view of the scoring system, outside influences on the scoring, and the perceived subjectivity of the scoring.

## **Data Analysis**



Content Analysis was used to analyze the narrative data obtained for each of the survey questions. McLaughlin and Marascuilo (1990) describe three primary phases involved in content analysis. The first is to decide on the unit of analysis. The second is to create or use mutually exclusive and exhaustive categories to sort information into dimensions. The final phase is to develop rules for assigning the data to the categories developed. The first phase of content analysis is to identify individual units of analysis. For each of the interview questions, themes were determined based on the responses. Each of these thoughts and themes were individually coded by the PI. A second expert in Content Analysis was asked to review the transcripts for themes. The thoughts and themes for each question were then compared and a percent agreement obtained (Krippendorff, 1980). The following formula was used to determine percent agreement for each question:  $(N_A - N_B) / \text{Total}$ , where  $N_A$  = number of agreements,  $N_B$  = number of disagreements, and the Total = the total number of units. The predetermined acceptance rate will be set at 90% agreement. The second phase of content analysis is to use or create mutually exclusive and exhaustive categories to sort information into dimensions (McLaughlin & Marascuilo, 1990). Similar themes were placed into categories and given a name and a definition. Finally, these themes were defined as categories of responses, the third phase of content analysis (McLaughlin & Marascuilo, 1990). A comprehensive list of categories was formulated. Percent agreement between the two researchers was obtained for interrater reliability. A predetermined minimal acceptance level was set at 90% agreement. Once the categories or themes were agreed upon for each of the survey questions, frequencies and percentages were used to describe and present the content of each category. In addition, frequencies and percentages were used to present the yes/no responses accompanying the survey questions.

Currently, there is a lack of empirical evidence to support a gap between the actual Finnegan score and the reality of the infant's clinical condition. As stated above, there is some concern about the subjective nature of the scoring system and its influence on the management of infants with NAS. To our knowledge, there have been no published reliability studies for the Finnegan NASS. While the Finnegan scoring system has been available for over 30 years, we do not know if it is the most accurate scoring system available or whether the subjective nature of the system is impacting the accuracy of the nurse's assessment. Ideally, future research should involve reliability studies that would allow for comparisons among nurses scoring the same infants.

## **Results**

Our cohort consisted of 20 out of 65 nurses meeting the inclusion/exclusion criteria. The response rate was 30.7%. Nursing experience ranged from eight months (just out of orientation) to 28 years, with a mean of 9.92 years. Thirteen nurses have received their BSN, 2 received an associate's degree, 3 received a master's degree, and 2 completed diploma programs.

In doing a median split of the sample by years of experience, there were no significant differences in the two groups in relation to whether or not the nurses were adequately trained. There were also no significant differences in the two groups on whether they believed the Finnegan NASS adequately captured the symptoms of the infants with NAS. Therefore, we will be looking at this data as a cohort for the twenty respondents without taking into account years of experience.

Training for the NASS. Fifty percent of the nurses responded that the NASS was explained to them during orientation by their preceptor. Twenty percent of the nurses responded they were shown the NASS and told to follow the policy and 20% were taught by "word of mouth." Another 10% responded that they received an inservice.

“Someone with more clinical expertise would have been better to train me”

“Inservice would have been beneficial”

“Here it is”

“No training, viewed system and hope to complete in an accurate manner”

Perception of Adequacy of NASS Training. Sixty percent of the nurses perceived that their training did not adequately prepare them for scoring infants with NAS in the clinical setting. Nurses mentioned that they were either not trained, they learned from experience, did not understand the rationale, had unclear directions, saw too many inconsistencies from nurse to nurse, and saw the scoring system as vague and subjective.

“I just learned I was wrong about how to score excoriation, what else am I wrong about?”

“The scoring is subjective, I have been asked by a physician to change my score.”

“Just told to score. Not how to score.”

From a nurse of sixteen years:

“I have never been told of any changes and still follow the same scoring.”

Accuracy of the NASS Capturing What is Observed. Forty percent of the nurses surveyed do not believe that the Finnegan NASS adequately captures what they are observing in the infants. Barriers mentioned included the need for continuous observation for the scores to be correct, not being able to score when the infants are in their mother’s room, and that it often only reflects the score at the time of assessment and not for the full four hours.

“Doesn’t capture how fussy they are.”

“Sometimes the baby is obviously miserable but the score does not reflect.”

“Doesn’t paint an accurate picture.”

“It doesn’t give any leeway for BAD!”

“Crying may be because due to eat, not NAS status.”

“Documentation/time of meds not taken into account in high/low scores.”

“Onset of symptoms should be documented along with severity.”

Environmental Influence on the NASS. Ninety-five percent of the nurses perceived that environmental influences resulted in higher scores. When asked what influence environment has on the infant’s NASS, 70% believe that too much noise increases the score, 65% believe that bright lights increase the score, and 35% mentioned too much activity/too many people increases the score. One nurse responded that she does not believe the environment plays a role in the score.

Influence of Staffing Numbers and Unit Census. Fifty-five percent of the nurses believe that not having enough staff can increase the infant’s Finnegan Score. Forty-five percent of the nurses perceived that a high census in the nursery can increase the score due to overstimulation from noise and increased activity. Twenty-five percent believed that a high census resulted in not having enough time to score the NASS accurately. Ten percent of the nurses indicated that shift change is busy and that it can make a difference in the accuracy of scoring.

“Not all nurses score the same”

“When there are 20 plus babies they [babies with NAS] do not get the attention they need.”

“On busy days scoring doesn’t get done.”

Most Difficult Items on the NASS to Score. Overall, 65% of the nurses believed that there were items on the NASS that were difficult to score. Fifty percent of the nurses listed sleeping patterns as the most difficult item to score. Reasons for this included:

“Too busy to monitor.”

“Sometimes people wake them does that count?”

“...wet/dirty diaper wake them?”

“In the mom’s room.”

Other items perceived as difficult to score included yawning (50%), sneezing (40%), and tremors (20%). In regards to tremors, a nurse replied:

“I’m not sure we’d see them with them being wrapped up.”

Other items nurses were unsure of how to score were sweating, high pitched cry, continuous cry, stools, fever, regurgitation, poor feeds, excessive sucking, myoclonic jerks vs. seizures, increased muscle tone, and nasal stuffiness.

“Many people are changing the baby [not just the nurse scoring].

“All babies spit up.”

“VS are only taken Q8 hrs.”

“Often held so no cry but would if not held, what to score?”

“How long is continuous?”

Difficulties in Caring for Infants with NAS. Nurses were in agreement that infants with NAS are difficult to care for. Seventy-five percent of the nurses perceived that infants with NAS are difficult to calm or console. Twenty percent of the nurses said there is not enough staff available to try to calm these infants down. In addition, 20% of the nurses found the parents of infants with NAS difficult to interact with.

“They cry constantly.”

“Inconsolable crying.”

“Inability to calm increases the stress level of nurses.”

“Sometimes nothing I do helps.”

“There are other babies to care for.”

Interventions to Comfort Infants with NAS. Forty percent of nurses surveyed believe that the infants should be put in a different room to keep the scores low. Other interventions nurses utilize or recommend to account for environmental influences include: less noise, dimming of lights, use of the swing, tight swaddling, and frequent diaper changes/checks. Nurses mentioned that there is no way to include the influence of the environment into the score.

There were limitations to this study. The response rate of 30.7% is low. There is the risk that the views of those who chose to respond may not reflect the views of those who chose not to participate. On the questions where the respondent needed to answer “Yes” or “No”, they were only asked to elaborate if they selected “No.” Although there were many variables listed about the barriers of the Finnegan NASS, 60% of nurses said they believe the NASS adequately captures what they see in the infants. Upon evaluation of the results further information as to why the nurse selected “Yes” to the following questions would have been beneficial:

“Do you believe that your training adequately prepared you for scoring infants with NAS in the clinical setting?”

“When you consider your experiences in caring for infants experiencing neonatal withdraw syndrome (NAS), do you believe that the Finnegan Scoring system accurately captures what you observe in the infants?”

## **Discussion**

The scores the nurses obtain from the Finnegan NASS are used by the physician to plan dosage and titration of medications, such as methadone, in infants experiencing NAS. If the scores are not correct, the infant will not receive the correct amount of the drug and could end up

on the medication for the incorrect amount of time. Nurses' interpretation of how to score the items comprising the NASS directly relate to whether these items will be scored correctly.

Research presented previously expressed nurses' concerns with the need for ongoing education in how to score the NASS. This was reflected in the results from this survey. 70% of nurses surveyed were told what the NASS was in orientation to their new job on the unit. Only two nurses surveyed had a type of inservice explaining the criteria for scoring each of the items.

More than half of the nurses surveyed do not feel prepared in their abilities to score correctly. The risk is that the infants may not be getting the correct drug dosages.

Feedback from the survey indicates that nurses are confused about many aspects of the Finnegan NASS and, as we hypothesized, they see it as very subjective. 40% of nurses do not believe that the Finnegan is an accurate tool. If nurses do not trust the Finnegan, they may not attempt to score in a diligent manner. The overwhelming majority of nurses state that environmental influences make the score higher. Whether or not they compensate for the environmental influences when they score the infants is unknown.

More than half of the nurses were concerned that not enough staffing or a high census can alter the accuracy of the score obtained. Previous research showed nurses expressing concern with the acuity of the infant not being considered in relation to staffing patterns (Fraser et al.). They are aware that there are discrepancies in the scores between nurses due to the fact that they were not trained in how to score each category appropriately. Nurses' survey responses illustrate that they are concerned the business of the environment is causing them to miss symptoms the infants are showing. Inaccurate assessment of infants with NASS will negatively impact the care that they receive.

As we suspected, nurses are aware that the feed times and medication administration times are not taken into account in the score. This is another area where they may make alterations in the score obtained to take into account the categories not on the Finnegan NASS. Nurses actually posed questions on the survey of issues they were concerned about with scoring.

One hypothesis for the survey was that many categories of scoring were subjective. The nurses were asked to list the top three subjective categories; the ones they found hardest to score. There was an incredibly wide variety of answers, with sleeping patterns agreeable the hardest to score. Nurses listed 16 different categories that they were unsure of how to score. Within those categories they all listed different reasons for why they could not score these areas. This evidence is conclusive in our hypothesis that nurses are unsure of how to score these infants. Because nurses are saying they do not know how to score those areas, we have to question whether they are trying to guess what answer would be. Without accurate scoring the infants are not getting proper care. The Finnegan NASS only works if the nurses are scoring correctly.

All research on NAS conclude that the infants are seen as hard to care for. This research was no different. Three quarters of the surveyors find the infants “difficult”. The majority of nurses feel that they cannot calm down these infants. With frustration with the infant being inconsolable in addition to uncertainty in how to score, we do not know if the infants with NAS are being cared for in an appropriate manner.

## **Conclusion**

The results of this survey were beneficial in exploring the attitudes of nurse’s using the NASS. The majority of nurses do not believe they are adequately trained to use the NASS and do not think their training prepared them to adequately use the NASS for the infants benefit. Many surveyed do not believe the NASS adequately captures the infant’s symptoms. An



overwhelming majority of nurses state that environmental influences and inadequate staffing patterns result in higher scores. Whether or not there is compensation for these influences is unknown. Nurses are in agreement that a significant number of NASS items are difficult to score. Nurses have voiced that the items are subjective. Infants with NAS are difficult to care for and nurses employ numerous comfort-promoting strategies, although the majority feel that they cannot comfort the infants most of the time. These results demonstrate that NASS scores may be inaccurate due to multiple influences. The subjective score obtained by the nurse's assessment will determine the medication the infant with NAS receives. It is imperative that the assessment is correct using the Finnegan NASS so that the infant is being cared for appropriately.

### **Future Research**

Given the importance of NASS scores to pharmacologic treatment, future work should be focused on improving education of the nursing staff and ameliorating extraneous influences on the NASS scores.

## References

- American Academy of Pediatrics Committee on Drugs. (1998). Neonatal drug withdrawal. *Pediatrics, 101*, 1079-1088.
- Baxter, F.R., Nerhood, R., & Chaffin, D. (2009). Characterization of babies discharged from Cabell Huntington Hospital during the calendar year 2005 with the diagnoses of neonatal abstinence syndrome. *West Virginia Medical Center, 105*, 16-21.
- Beauman, S.B. (2005). Identification and management of neonatal abstinence syndrome. *Journal of Infusion Nursing, 28*, 159-167.
- Burgos, A.E. & Burke, B.L. (2009). Neonatal abstinence syndrome. *NeoReviews, 10*, e222-e229.
- D'Apolito, K. (2009). Neonatal opiate withdrawal: Pharmacological management. *Newborn and Infant Nursing Reviews, 9*, 62-69.
- D'Apolito, K. & Hepworth, J. (2001). Prominence of withdrawal symptoms in polydrug-exposed infants. *Journal of Perinatal and Neonatal Nursing, 14*, 46-60.
- Finnegan, L., Kron, R., Connaughton, J., & Emich, J. (1975). Neonatal abstinence syndrome: Assessment and management. *Addict Dis Int J., 1*, 141-158.
- Fraser, J.A., Barnes, M., Biggs, H.C., & Kain, V.J. (2007). Caring, chaos and the vulnerable family: Experiences in caring for newborns of drug-dependent parents. *International Journal of Nursing Studies, 44*, 1363-1370.
- Greene, C.M. & Goodman, M.H. (2003). Neonatal abstinence syndrome: Strategies for care of the drug-exposed infant. *Neonatal Network, 22*, 15-24.
- Jansson, L.M. (2008). Neonatal abstinence syndrome. *Acta Paediatrica 97*, 1321-1323.
- Jansson, L.M., Velez, M., & Harrow, C. (2009). The opioid exposed newborn: Assessment and pharmacologic management. *Journal of Opioid Management, 5*, 47-55.
- McLaughlin, F.E., & Marascuilo, L.A. (1990). *Advanced nursing and health care research: quantification approaches*. St. Louis: W.B. Saunders.
- Oei, J. & Lui, K. (2007). Management of the newborn infant affected by maternal opiates and other drugs of dependency. *Journal of Paediatrics and Child Health, 43*, 9-18.
- O'Grady, M.J., Hopewell, J., & White, M.J. (2009). Management of neonatal abstinence syndrome: A national survey and review of practice. *Archives of Disease in Childhood-Fetal and Neonatal Edition, 94*, 249-252.
- Saiki, T., Lee, S., Hannam, S., & Greenough, A. (2010). Neonatal abstinence syndrome— Postnatal ward versus neonatal unit management. *European Journal of Pediatrics, 169*, 95-98.
- Sarkar, S., & Donn, S. (2006). Management of neonatal abstinence syndrome in neonatal intensive care units: A national survey. *Journal of Perinatology, 26*, 15-17.
- Substance Abuse and Mental Health Services Administration. (2010). *Results from the 2009 National Survey on Drug Use and Health: Volume 1. Summary of National Findings* (Office of Applied Studies, NSDUH Series H-38A, HHS Publication No. SMA 10-4586Findings).