2018

Early Detection of Neonatal Abstinence Syndrome by Neonatal Intensive Care Unit Nurses

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MS, Walden University, 2014

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Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

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Abstract

Neonatal abstinence syndrome (NAS) is a public health concern that is increasing in the United States due to the use of illicit drugs by pregnant women, which exposes the fetus to these substances. NAS results in increased infant morbidity and prolonged stay in the hospital, which can lead to increased cost of care. The inability of the nurses to care for at-risk infants can lead to inconsistent NAS scores, which can affect the infant's care treatment. The project examined the effectiveness of educating the neonatal intensive care unit (NICU) nurses on the correct use of the modified Finnegan Neonatal Abstinence Tool (FNAST) and implementing a practice protocol in the management of infants experiencing NAS, thereby reducing inconsistencies in NAS scores. Implementing clinical guidelines and proper use of the modified FNAST can lead to early intervention and treatment of infants exhibiting withdrawal symptoms. An educational session was conducted, pretests and posttests were used to evaluate the NICU nurses' baseline knowledge of the correct use of the modified FNAST and their acquired knowledge after the educational intervention on the correct use of the modified FNAST. The goal of the project was met with the NICU nurses experiencing knowledge gain evidenced by a 30% increase between the pretests and posttests and obtaining consistent NAS scores by applying the correct technique of scoring. The mastery of the use of the modified FNAST brought about social change by impacting positive attitudes and behaviors among the NICU nurses and enhancing collaboration between the physicians and nurses.

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Dedication

I dedicate the paper to my sister, Nnenna Nwizu, who encouraged me to start the journey of becoming a nurse, and has been by my side all the way.

Acknowledgments

My love and gratitude goes to my parents, Sir Samuel and Lady Regina Chinwuba, who have been my rock throughout my life as a child, and an adult. I thank them for their sacrifice, and for believing in me even when I had the thoughts of quitting. I thank my siblings Nnenna Nwizu, Tochukwu Chinwuba, Chikodili Ene, and Ifeanyi Chinwuba, for encouraging me on a day to day basis. I will not fail to thank my Pastor, Dr. Ajayi who has helped me spiritually, and encouraged me to keep pushing, and my childhood friend, Dr. Nkiru Ibrahim, who always came to my rescue anytime I struggled with my school work. Finally, I thank my children for their prayers, support, and understanding even when it seemed like I was ignoring them in order to complete an assignment. I appreciate all of you, your prayers, and encouragement in my journey.

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Section 1: Nature of the Project

Introduction

In United States, there is a public health concern regarding the increase in the use of opioids, substance dependency among pregnant women, and the exposure to the fetus to these substances. Infants exposed to controlled and non-controlled substances such as opioids, heroine, and methamphetamines are at high risk of developing abstinence syndrome (NAS). Neonatal abstinence syndrome results in increased morbidity, prolonged stay in the hospital, and increased costs of care. The ability of care providers to assess and identify an infant who has been exposed to substance use is essential. Infants with NAS require specialized nursing care based on the best evidence obtained from the literature and global benchmarking of best practices (Macmullen, Dulski, & Blobaum, 2014). The purpose of this paper is to develop an educational intervention on how to use and apply the modified Finnegan Abstinence Scoring Tool (FNAST) by nurses in the care of an infant with NAS. Section one will discuss the introduction, background and context, problem statement, purpose statement, project objectives, reduction of gaps, significance of the project, project question, implications for social change, definition of terms, and any assumptions, limitations and delimitations.

Background

The Medical Center, a nonprofit health care network is a 553-bed that provides a wide array of high-quality services in Atlanta. In 2014, the medical center was recognized as the top large hospital in the state and as a national leader in single incision laparoscopic surgery, advanced cardiovascular services, and home to a level II trauma

center. The Medical Center has repeatedly received national recognition for clinical excellence, ranking in the top five percent in the nation for clinical quality. The women's health division of the Medical Center delivers up to 6000 babies annually, and the facility has a level III neonatal intensive care unit (NICU). The facility is in the suburb of the Atlanta area where the use of controlled substances is high, contributing to the high number of infants admitted who have been exposed to substances.

In the NICU, one out of every five births is admitted to be observed for symptoms of NAS. It is therefore imperative that the nurses detect the signs and symptoms of withdrawal to be able to use the FNAST to score the infant correctly and ensure the right treatment is initiated. The practice problem is the inability of the neonatal nurses to use the modified FNAST properly and consistently, resulting in infants being assigned incorrect NAS scores; which in turn may lead to too low or high a dose of medication administration, prolonged days in the hospital, and poor clinical outcome. To improve the neonatal nurses' ability to score the neonate evidencing withdrawal symptoms, nurses will be educated on the proper use of the modified FNAST, and identification of the symptoms of NAS for improved quality of care.

Problem statement

The Medical Center is in an area where there is an increased incidence of prenatal exposure to substances such as opiates. Thus, it is essential that the neonatal nurse can identify symptoms of withdrawal and evaluate the neonate using the FNAST to obtain the appropriate score to guide treatment. Knowledge and correct use of the modified FNAST is in the care of infants with NAS because it leads to proper treatment, reduced length of

hospital stay, and reduced costs of care. When the score is not accurate, the neonate may be hospitalized longer than expected due to the discrepancies in NAS scores, which leads to inadequate treatment. Most of the nurses verbalized that they scored the infants based on their assessment without any basic knowledge of what assessment is being used to score the infant. One of the consequences of an erroneous score is that of an incorrect dose of morphine or methadone, medications used in the treatment of the infant displaying symptoms of withdrawal. Clinical presentation of withdrawal symptoms such as irritability, jitteriness, tremors, poor feeding, poor weight gain, diarrhea, and excessive crying may be exacerbated due to inadequate treatment. A hallmark of poorly treated NAS is the development of agitation, difficulty sleeping, and inconsolable crying (Kocherlakota, 2014, p. e550). Consistency is important in the use of the FNAST, which is currently not the clinical practice in the nursery areas. According to Bagley et al, it is impossible to achieve quality of care for infants without consistency of care (2014).

Purpose

The purpose of the project was to increase the knowledge of NICU nurses in the use of the modified FNAST by incorporating practice guidelines in the form of continuous education/training, which will increase consistency in the use of the scoring tool. The purpose of the project aligned with Doctor of Nursing Practice (DNP) second Essentials of organizational and systems leadership for quality improvement and systems thinking. Implementing practice guidelines leads to improved patient care, patient safety, quality of care, and better healthcare outcomes demonstrated by reduced length of stay, appropriate treatment for the infants, and reduced cost of care. Because correct scoring

will lead to proper treatment, the symptoms will be relieved, resulting in a non-clinical presentation of the withdrawal symptoms. Increased knowledge of the NICU nurses in the use of the scoring tool resulted in consistency of NAS scores.

Question(s) and Hypotheses'/Aims, Goals, Objectives

Nursing practice uses evidence based practice to improve patient care. Nurses need to have a spirit of inquiry, and a culture that supports it to fully implement EBP (Stillwell, Overholt, Melynk, & Williamson, 2010). The practice question was asked using the PICOT format, "In the management of infants experiencing NAS in the neonatal intensive care units, does education and implementation of a practice protocol related to use of the modified Finnegan Scoring Tool increase the nurses' knowledge and reduce inconsistency in scores indicating NAS? Lucas (2012) supports the practice question where he noted that educating the nurses equipped them with the necessary knowledge and tools needed to care for the patients with NAS.

Evidence based practice guides nursing practice. Healthcare providers rely on evidence based practice to provide the best care to patients. Research shows that increased knowledge of neonatal abstinence syndrome and application of practice guidelines will help to improve care of infants experiencing withdrawal symptoms (Lucas, 2012). The first objective of the project was to increase the NICU nurses' knowledge on the use of the modified FNAST for better accuracy of scores and treatment of the infants. To evaluate their baseline of knowledge, a pre-test was given to the nurses before the presentation, and a post test was given to evaluate their knowledge after the presentation. The educational presentation discussed signs and symptoms of an NAS

infant, how to use the modified FNAST tool, appropriate timing for scoring, and environmental factors to consider that may affect the scores of the infant. The goal was that at the end of the presentation, the nurses will have a better understanding on the use of the modified FNAST, which reflected in the scores on the post test.

The second objective was to measure the effect of nurses' use of the practice guidelines in the use of the modified FNAST. There was a reduction in the NAS scores between nurses, which signified that they applied the same common standardized guidelines. These guidelines include consistency on when to score, duration of observation for scoring, and right assessment of the infant. The ability of the nurses to apply the same standards and consistency in scoring NAS infants led to better and more accurate scores, which provided improved management of the symptoms of the neonate experiencing withdrawal.

Framework of the Project

The theoretical framework chosen for the project was the Cognitive Learning Theory (CLT). Cognitive Learning theory was used to support an educational intervention for the NICU nurses with respect to the use of the modified FNAST. The theory focused on the ability of a learner to perceive, interpret, and understand information. The foundations for learning in CLT are the "learner's goals, thoughts, expectations, motivations, and abilities in the processing of information" (McEwen & Willis, 2014, p.392). An individual's way of learning influences the process of understanding. The learner must be able to act on the information received to promote transfer of learning. Memory and retention are stimulated when an individual is mentally

active with information received. As individuals, we learn in different ways, which may affect the way information is processed for future use. Placing these learning differences in perspective, multiple formats was used for the educational sessions to achieve the desired goals. The conceptual framework of CLT was to provide education to the learner while adapting to the learner's need, and receive a feedback to measure the level of knowledge gained.

Nature of the Project

The project was a quality improvement project geared towards achieving a better clinical outcome for infants with NAS. The goal was to increase the knowledge of the NICU nurses by educating them on the proper use of the modified FNAST. A pretest, which consists of a ten multiple choice questions on NAS scoring was given to the nurses to evaluate the level of their knowledge of the scoring tool. An educational presentation on the proper use of the modified FNAST was delivered using PowerPoints and video clips. After the educational component, a posttest was given to the nurses to measure the amount of knowledge gained from the educational presentation. Compiled results from the pre- and post-tests as well as the assessment of knowledge gained was analyzed using paired-samples *t* tests. Neonatal abstinence syndrome scores given to the baby was compared among the nurses providing care to that specific neonate to determine if the practice guidelines are being implemented as per educational session. The expectation was that the NAS scores of the specific neonate will not differ between nurses, which is an indicator of the proper use of the modified FNAST. Section 3 will provide more in-depth information related to the methods.

Definitions

According to DiCenso et al (2005), *Clinical Practice guidelines or Protocols* are "useful in providing health professionals with explicit recommendations to aid the comprehensive care of a particular condition" (as cited in Murphy-Oikonen, Montelpare, Bertoldo, Southon, & Perschino, 2012, p.497). Implementing practice guidelines for the project will bring a positive outcome in caring for the NAS babies such as decreasing the length of hospital stay for the neonates.

The *Finnegan Neonatal Abstinence Scoring Tool* is the most widely used scoring tool for NAS. The tool assesses 21 of the most common signs of neonatal drug withdrawal syndrome and is scored based on the pathological significance and severity of the adverse symptoms (Hamdan, 2016).

Lucas and Knobel (2012) defines *neonatal abstinence syndrome* "as a multi-symptoms syndrome with abnormal symptoms of the central nervous, gastrointestinal, autonomic nervous, and respiratory systems presenting in the infant when transfer of harmful substances from the mother to the fetus abruptly stops at the time of delivery" (p. 40). A sudden discontinuation of substances used or abused by a pregnant mother causes exhibition of withdrawal symptoms by the newborn.

"Opioids are a class of natural, endogenous, and synthetic compounds that activate primarily μ-opioid (but also κ- and δ-opioid) receptors in the CNS to produce supraspinal analgesia. Examples of opioids are heroin, methadone, and oxycodone. Heroin is an illegal, highly addictive opioid drug, which can cause slow and shallow

breathing, coma, and death when overdosed (CDC, 2017). Methadone is a generic drug that can provide long lasting pain relief (CDC, 2012).

Assumptions

A critical assumption was that all the NICU nurses will participate in the project, and will be willing to learn, so that by the end of the educational intervention, there will be a significant result showing the extent of knowledge gained from the scores on the pretest and posttest. The second assumption was that nurses can identify signs of NAS. The third assumption was that the NICU nurses will be able to use the knowledge from the educational intervention to adequately utilize the FNAST. The fourth assumption was that infants will experience less symptoms of NAS withdrawal because they are receiving proper treatment.

Scope and Delimitations

The project aimed at increasing the knowledge of the NICU nurses in the use of the modified FNAST by using an educational intervention. The tool serves as a guide to both the physicians and the nurses in the care of an at-risk infant who has been exposed to illicit drugs in utero. The ability of the NICU nurses to efficiently use the tool without discrepancies in the scores will assist in providing improved treatment and management of the infants experiencing withdrawal symptoms. The focus of increasing the reliability of screening and scoring NAS of the NICU nurses was chosen because currently the practice is inconsistently implemented by the nurses. Given the high population of infants exposed to illicit drugs the the institution serves, it is important for the NICU

nurses to effectively use the modified FNAST to improve clinical outcomes. All the NICU nurses at GMC will be required to participate in the project.

The first delimitation was using only the nurses working in the NICU because most of the neonates experiencing NAS are admitted to that unit. A second delimitation was that only NICU nurses will be the target population as they are the nurses who staff the NICU. The third delimitation was the use of the medical facility as the only hospital.

Limitations

The limitation encountered was availability of all the nurses to attend the proposed training class. Even though the education was meant for all the NICU nurses, there was a possibility that there will not be 100% attendance. A second limitation was inconsistent NAS scores as a result of inconsistency between nurses in using the FNAST tool even after the education. A third limitation was that the physicians or nurse practitioners may not agree with the scores obtained using the FNAST and the neonate may not receive adequate pharmacological treatment.

Significance

Knowledge of the use of the modified FNAST is essential in the care of infants experiencing neonatal abstinence syndrome. With the increased number of admissions of infants exposed to substances, it is important that they receive proper patient care. Most of the nurses at the Medical facility do not know how to accurately score the infants experiencing NAS. Educating these nurses on the correct use of the FNAST, and implementing the practice guidelines will lead to proper treatment of the infants thereby improving the issue of prolonged stay, and reducing cost of care. Infants experiencing

withdrawal symptoms need to be carefully observed to recognize fever, dehydration, or weight loss promptly (Hudak & Tan, 2016). The withdrawal symptoms, which may be exacerbated by inadequate treatment will be decreased with increased nurse's knowledge thereby leading to a better clinical outcome.

Reduction of Gaps

Currently in practice at the Medical facility, nurses have no guidelines or protocols to use for NAS scoring. Hubak & Tan (2016), states that "only fifty-five percent in a recent survey of accredited US neonatology fellowship programs have implemented a written NAS protocol, and sixty-nine percent use a published abstinence scoring system" (p. e548). If facilities adopt a protocol for the evaluation and management of infants with NAS, and train the staff in the correct use of an abstinence scoring tool, infants will receive the appropriate care to maximize their clinical outcomes. For example, if the Medical facility chooses to adopt a protocol of scoring an infant one-hour post feed, it will create consistency in the scoring as opposed to the current practice of the nurses scoring the neonate at any time that they desire. The application of proper Finnegan method techniques has been proven to assist the caregiver in assigning appropriate and consistent scores (Lucas & Knobel, 2012). Educating nurses on the use of the modified FNAST reduces the gap between using evidence based intervention and the traditional practice of nurses scoring the infants with NAS infants at different times without consistency. According to MacMullen, Dulski, & Blobaum (2014), "nurses seek evidence, not tradition, as the basis for best practice" (p.165). Increased knowledge

brought about consistency, which led to more clinically appropriate scores, thereby improving infant care.

Implications for Social Change

A change in a person's behavioral pattern, cultural values, and norms that may bring about a positive change in an environment in the future is referred to as social change. Applying a social change model according to Read, Pino Betancourt, and Morrison will "promote self-knowledge, service, and collaboration" (2016, p.164). In caring for neonates exhibiting withdrawal symptoms, implementing clinical guidelines and proper use of the FNAST will assist with early intervention and treatment of at risk infants. Applying the proper technique in the use of the FNAST empowered the NICU nurses in providing excellent care to the infants. Infants experienced a decrease in the clinical symptoms of NAS when properly treated. Knowledge empowers, and by increasing the knowledge of the NICU nurses by mastery of the FNAST, more babies were scored correctly, which led to early treatment and discharge to their caregivers. There was better collaboration between the physicians and the nurses by the consistent scores, which reflects better understanding of the use of the FNAST. Other benefits associated with the correct use of the FNAST is assurance in the quality of care in the NICU. If there is no consistency, quality of care will be risked and questioned. Using the FNAST in a consistent manner between the nurses provided a foundation for both pharmacological and non-pharmacological treatment. The extent of pharmacotherapy used in the treatment of the infants and the length of hospitalization needed for the affected infants was reduced.

Summary

Neonatal abstinence syndrome is a public issue in healthcare due to continuous use or abuse of substances by pregnant mothers. Infants who are exposed in the utero exhibit signs of withdrawal after birth. The Medical facility is located in a region where there is a high population of people using illicit drugs, thereby leading to an increase in the number of infants exposed to these drugs. The ability of the NICU nurses to effectively care for these infants will improve the quality of care. The Finnegan Neonatal Abstinence Scoring Tool is used to score the infants to be adequately treated. The ability of the nurses to correctly use the tool continues to be a struggle at Medical facility, which leads to inadequate care for NAS symptoms and a longer hospital stay for the infants. Increasing the knowledge of the NICU nurses with adequate training, and use of practice guidelines helped them to be able to detect infants experiencing withdrawal symptoms, thereby leading to improved patient care. There was a decrease in the exhibition of withdrawal symptoms with adequate treatment due to consistent scores. The collaboration between the physicians and nurses also led to a better clinical outcome for the infants. Increase in knowledge of the use of the FNAST caused a positive change in the attitude of the nurses towards caring for babies with NAS.

Section 2: Background and Context

Introduction

The large population of pregnant women using illicit drugs who deliver at the Medical facility is a contributing factor to the number of infants exposed to these drugs. Currently at the Medical facility, there are no practice guidelines to help the nurses adequately care for infants experiencing NAS, which has led to inconsistent neonatal abstinence scores. Inconsistency in scores affects the quality of care provided for these infants. Increasing the knowledge of the nurses through training in the use of the modified FNAST assisted them to adequately care for the infants. Positive outcomes in the forms of reduced hospital stay, decreased exhibition of withdrawal symptoms, better physician / nurse collaboration in form of trust, and improved infant development when the right scores and treatments are given to the infants. The purpose of the project was to increase the NICU nurses' knowledge of the use of the FNAST through educational intervention, which led to improved quality of care. Section two will discuss the literature search strategy, concepts, models and theories used in the project, the framework utilized in the project will be explained, literature review related to the method, and background and context will be described.

Literature Search Strategy

Different search strategies were utilized in the literature review to retrieve articles relevant to the project. It is important for a researcher to use the appropriate search words, terms, databases, and Boolean operators to find an article. The databases used to locate articles are CINAHL, PUBMED, and EBSCOHOST. The search words included

Neonatal Abstinence Syndrome, Finnegan Scoring tool, withdrawal symptoms in infants, nursing management of NAS infants, clinical guidelines for NAS, and nursing education. The Boolean operators used were OR and AND. Literatures older than 10 years were not included in the literature review. Evaluation of each article was based on John Hopkin's level of evidence, and articles that rated between levels I and V were selected for inclusion. A total of 25 articles that were published between 2006-2016 were reviewed and analyzed for relevance, of which 9 articles were selected.

Concepts, Models, and Theories

Learning is a permanent change in behavior that occurs as individuals interact with their environment, integrating new information in what they already know. Cognitive Learning Theory is an aspect of learning that deals with the depths of the mind from the viewpoint of the process. Cognitive Learning Theory assumes that human beings have unique learning processes, knowledge is organized, the formation of mental representation is involved in the learning process, and the focus of science inquiry is objective, systematic observations of people's behavior (Omrod, 2008).

Cognitive learning theory focuses on the learner's ability to receive and process information, and it forms a conceptual framework for the quality improvement project. The theory supports the quality improvement project in the creation of an educational intervention to enhance nurses' understanding of NAS, and the ability to accurately use the FNAST. The nurses' expectations are assessed prior to the presentation of the educational sessions and their learning needs addressed during the sessions. The use of CLT provides an avenue to improve the understanding of the use of the modified

FNAST, while applying the clinical guidelines for a more positive clinical outcome. With the use of CLT, the NICU nurse's base knowledge of the assessment, management, and application of clinical guidelines of NAS is identified. The cognitive learning theory, which focuses on the learner's perception of information guides the way the information is shared, and how much new knowledge is acquired will be the model used in the project.

Literature Review Related to the Methods

Reviewed peer literature have shown that a great variability exists in the assessment and management of infants with NAS. According to McQueen & Murphy-Oikonen (2016), a gap still exists, even though there has been lots of research on the management of NAS with lack of clarity and consistency in the definition of the syndrome. Dearth of high quality evidence, which guides the management of infants exposed to illicit drugs are attributed to the variability in the assessment and treatment of NAS (Bagley, Wacchman, Holland, & Brogly, 2014). NAS can be expressed in different ways and interpreted differently by independent observers, which leads to extended weaning, and a delay in discharge of the infant (Garcia, Jnah, & Newberry, 2015). Only a few "NICU with accredited fellowships have a protocol for NAS management" (Bagley, Wacchman, Holland, & Brogly, 2014, p.1). The literature review consists of compiled evidence, which supports assessment of NAS, use of clinical practice guidelines for NAS, treatment and nursing management of infants experiencing withdrawal symptoms, and use of the Finnegan Scoring tool. Signs and symptoms of NAS, and nursing education related to the proper use of the FNAST will be discussed.

Assessment of Neonatal Abstinence Syndrome

Infants born to pregnant mothers who live in urban cities are more likely to be exposed to illicit drugs due to the growing number of use of prescription medication for chronic pain or mental health issues. These infants experience symptoms of withdrawal called neonatal abstinence syndrome. Assessment of NAS is done to identify infants experiencing withdrawal symptoms from intrauterine exposure to illicit narcotic drugs. Infants are assessed within two to three hours after birth, with continued evaluations every three to four hours after that. The assessment of withdrawal symptoms guides the healthcare provider in the management and treatment of the infant.

Bagley, Wacchman, Holland, and Brogly (2014) conducted a systematic review, which aimed to determine the best practices for assessment, pharmacologic and non-pharmacologic interventions, and management of infants with NAS to improve clinical outcome. Eight out of the 365 articles focused on the evaluation and assessment tools, and four articles were finally chosen for the review. The authors noted a variability in the assessment and treatment of infants with NAS, which was due to the lack of high quality evidence to guide the management of NAS infants. The systematic review revealed that a lack of standardized approach limited the data on the inter-observer, and the limitation of the data led to inconsistencies in the NAS scores, which affected the treatment. It was concluded that inconsistency clinically impacts the care of infants with NAS because inconsistency jeopardizes the quality of care. The systematic review supports the quality improvement project by enhancing care of infants with NAS, leading to improved clinical outcomes.

Clinical Practice Guidelines (CPG)

The issue of lack of standardized approach in the identification of infants with NAS has plagued healthcare. Having standardized CPGs will help streamline patient care. Murphy-Oikonem, Montelpare, Bertoldo, Southon, and Persichino (2012) aimed to evaluate the effectiveness of CPGs on infants with increasing symptoms of NAS. A retrospective cohort comparative design was used to compare neonates born six months prior and six months following the implementation of CPGs. Results showed that there was a significant decrease in the overall NAS scores, and the change in CPGs post intervention led to a significant reduction in the length of hospital stay among the neonates. The research aligns with the quality improvement project because implementing CPGs will decrease NAS scores and infant's length of hospital stay.

The Finnegan Scoring Tool

The use of a standardized tool such as the gold-standard Finnegan abstinence scoring tool is recommended by the American Academy of Pediatrics to assess and guide the management of NAS (Garcia, Jnah, & Newberry, 2015). The modified Finnegan Scoring Tool is "mainly used to distinguish drug-exposed and non-drug exposed infants, monitor the severity of NAS and the need for, or response to, pharmacological treatment in infants with established drug exposure" (Oei & Lui, 2007, p. 10). Infants are assessed and scored during a wakeful period before a feed, and the result serves as a guide in the treatment and management of the infant. The modified Finnegan Scoring tool is the most commonly used scoring system of choice in the objective assessment of NAS. The tool is used to assess central nervous, gastrointestinal, respiratory, and vague autonomic

symptoms of NAS by health care professionals in clinical practice (McQueen, Murphy-Oikonen, & Desaulniers, 2015). A cumulative score based on interval observation of 21 items relating to signs of neonatal withdrawal is assigned to the infant by the nurses using the modified FNAST (Hudak & Tan, 2016). Based on the score obtained, the physicians determine if the infant requires a pharmacological wean therapy or a non-pharmacological approach. It is therefore imperative that nurses who care for infants exhibiting NAS have a good understanding of the use of the scoring tool to decrease the bias and variability in scores, which may be subject to the experience of the nurses. "An infant's duration of therapy and hospital length of stay (LOS) is primarily dependent upon accurate and consistent use of the FST" (Garcia, Jnah, & Newberry, 2015, p.1). The study supports the quality improvement project because clinicians will use the scores to determine if pharmacological or non-pharmacological interventions are sufficient to ease the effects of withdrawal symptoms and to ensure safe weaning process for better clinical outcome.

Signs and Symptoms of NAS

"The neonatal abstinence syndrome refers to a postnatal opioid withdrawal syndrome that can occur in 55 to 94% of newborns whose mothers were addicted to or treated with opioids while pregnant" (McQueen & Murphy-Oikonen, 2016, p.2469). It is a complex disorder or group of problems, which involves the central and autonomic nervous systems and the gastrointestinal systems experienced by the infants shortly after birth. The clinical manifestations of the syndrome include hyperirritability, excessive crying or high pitched crying, mild tremors, fever, excessive weight loss, poor feeding,

seizures, hypertonia, diarrhea, projectile vomiting, sneezing, nasal stuffiness, excessive sucking, mottling, frequent yawning, sweating, tachypnea, regurgitation, loose or watery stools, excoriation, myoclonic jerks, and poor sleep. These signs may manifest within 24-72 hours post-delivery or may a week to be apparent. The severity and timing of the symptoms sometimes are tied to the type and dose of opioid the infant was exposed to in the utero. The symptoms of NAS depend on the type of drug used, the dose or amount used while pregnant, the genetic factor of the infant which affects how the body breaks down and clears the drug, how long the drug was used, and gestational age of the infant (full-term or premature). Knowledge of the symptoms of NAS supports the project because nurses will be able to efficiently and effectively care for these infants thereby increasing their clinical outcomes.

Treatment and Nursing Management of NAS

Neonates exposed to illicit drugs in the utero exhibit some form of NAS withdrawal post-delivery, and the degree of withdrawal varies from infant to infant. Infants with NAS are treated using either a pharmacological or non-pharmacological approach. The onset of withdrawal symptoms and the NAS scores determines the timing of the interventions. Care that is individualized, supportive, and non-pharmacologic are initially given to infants with NAS while pharmacological treatment is used for improvement if the infant is not responding to the non-pharmacological measures. Kocherlakota (2014) conducted a review which summarized the history, epidemiology, pathophysiology, clinical presentation, toxicology confirmation, and treatment of NAS. The review concluded that non-pharmacological therapy is easily acceptable, less

expensive, and less controversial. Interventions included controlling the environmental stimuli as infants with NAS thrive in an environment that is quiet and dark. Decreased lighting and sound, tight swaddling, which helps contain the infant from erratic movements, and rocking the infant gently are used in soothing and supporting the infant with NAS. Nurses are encouraged to allow the infant to sleep, and promote long periods of undisturbed rest to reduce unnecessary caloric consumption since they have difficulties regulating their sleep and wake patterns. Clustered care also assists the infant in attaining sleeping states (Sublett, 2013). Pacifiers provide the opportunity for non-nutritive sucking, which soothes the infant, and protects the skin from excoriation due to erratic movements. Small frequent feedings are encouraged since infants with NAS experience gastrointestinal upset. Increased caloric intake may be used to facilitate weight gain and metabolic demands. Kocherlakota (2014) concludes that continuing excellent supportive care can help avoid pharmacological intervention thereby leading to early discharge from the hospital. The review supports the project because if NICU nurses consistently apply the non-pharmacological interventions in caring for infants with NAS, it will lead to better clinical outcomes, and early discharge of the infants.

Local Background and Context

The Medical Center is a non-for profit hospital serving the northern community of the Atlanta area. There is a high percentage of pregnant women who are exposed to illicit drugs that deliver in the Medical Center, which accounts for the number of NAS infants admitted to the Medical Center. The NAS infants are admitted to the NICU to be observed once they are identified after delivery to be exhibiting signs and symptoms of

withdrawal, or if their mothers have a documented history of substance abuse. Presently at the medical center, the NICU does not have a standardized protocol to care for infants with NAS, which causes inconsistency in NAS scores, poor treatment, delayed discharge. The ability of the NICU nurses to be able to identify infants exhibiting withdrawal symptoms is essential in the care of NAS infants. Early recognition will lead to early treatment, reducing hospital stay, and cost of care. Having a standardized protocol for the care of an NAS infant will improve quality of care, reduce length of hospital stay and cost of care. For effective patient care, the assessment between the nurses must be accurate and consistent. Trust between the providers and the physicians will also be improved when there is consistency with scoring the symptoms using the modified FNAST.

Role of the DNP Student

The DNP student is a change agent. With so much emphasis on quality of care, change is inevitable in healthcare. Evidence based practice drives patient care, which leads to quality improvement, increased patient safety, and client-centered care. As a current employee of the medical center, I saw the need for increased knowledge and standardized guidelines in the use of the modified FNAST, which was the motivating factor for the project.

As the project leader, my role is to ensure that measures are put in place to improve patient care as the change process is initiated. In this project, I conducted the educational session that was used in teaching the NICU nurses how to efficiently and effectively use the modified FNAST when caring for an infant with NAS. I evaluated the

nurses' competencies with respect to the newly acquired knowledge, and be a resource to the nurses at all times. I ensured that the project was accomplished within the timeline specified in the planning of the project. As a project leader, I monitored the use of the information in the care of the infants and evaluated how the NAS scores were affected.

Summary

Inconsistency in neonatal abstinence scores remains an issue that hinders the treatment of infants experiencing withdrawal symptoms. The inconsistent scores, which are a misrepresentation of the actual scores can lead to poor treatment of infants with NAS. Educating NICU nurses on the correct use of the modified FNAST helped reduce incidence of inconsistent scores. It is therefore essential for NICU nurses to efficiently care for these infants for better clinical outcomes. Proper assessment of infants, knowledge of the use of the modified FNAST, and implementation of clinical guidelines led to adequate treatment of these infants, thereby improving quality of care. The next section will discuss collection and analysis of evidence, approach and rationale, data analysis, and project evaluation plan.

Section 3: Collection and Analysis of Evidence

Introduction

The purpose of the quality improvement project was to increase the knowledge of NICU nurses on the correct use of the modified FNAST. With the increase in the number of infants exposed to illicit drugs, it is essential that the care providers are able to effectively and efficiently care for them. The NICU nurses should be able to identify symptoms of withdrawal, and use the modified FNAST to obtain appropriate scores necessary to guide treatment. Discrepancies in NAS scores because of an inability to properly use the modified FNAST, may lead to prolonged hospitalization of the infant, and poor clinical outcomes. The goal of the project was to reduce the discrepancies in NAS scores by increasing the knowledge of how to use the modified FNAST, and implementing standardized clinical practice guidelines to be used by the NICU nurses while caring for infants with NAS. Components involved in planning an educational intervention includes identifying the target population, developing a project design and method of sampling, data collection and analysis discussing the reliability and validity of the data, and evaluation of the project. Incorporating these components in a project will ensure an effective and successful project completion leading to a desirable outcome. In section three, I will discuss the project design, population and sampling, data collection, data analysis, project evaluation plan, and summary.

Approach and Rationale

Project Design and Methods

The quality project used a before and after design to determine if an increase in the knowledge of the use of the modified FNAST among the NICU nurses, and use of standardized protocols led to consistent NAS scores, thereby reducing the length of hospital stay, and improving clinical outcomes. The NICU nurses at the Medical facility attended the educational sessions on how to use the modified FNAST in scoring infants experiencing withdrawal symptoms. Understanding the proper way to use the modified FNAST when caring for infants is imperative because better clinical outcomes will be achieved, leading to increased quality of care. The NICU nurses' inability to correctly assess and score an infant experiencing NAS withdrawal symptoms with the modified FNAST adversely affects the treatment of the infants. Educating the nurses, and using standardized protocols improved treatment of the infants, reduced length of hospital stay, and decreased cost of care, thereby leading to improved quality of care of the infants.

Population and Sampling

The participants in the quality improvement project consists of all the NICU nurses at the medical facility. I met with the clinical manager and the neonatal nurse clinician at the medical facility, who assisted in furnishing me with the demographic information of the NICU nurses. Currently, the facility has seventy-eight full time registered nurses. Ninety-seven percent of the nurses have a Baccalaureate degree, two percent have a Masters degree, and the remaining one percent have an Associates degree, but working towards obtaining their Baccalaureate degree. Fifty percent of the nurses have 1-5 years of nursing experience, twenty-five percent have 6-10 years, ten percent have 16-20 years, and the remaining five percent have greater than 20 years of nursing

experience. The average number of NAS babies cared for by the NICU nurses per month are 5.

Data Collection

The quality improvement project was held in one of the educational rooms at the Medical Center upon obtaining IRB approval from Walden University. Before the educational presentation, a pre-test consisting of ten questions (Appendix A), was distributed to the nurses by myself in the educational room. The nurses were asked to develop a unique number to write on their pre-test response papers. The number was used during the compilation of the results to compare to the post-test. The pre-test was an evaluation of their base knowledge of the use of the modified FNAST, and took approximately 30 minutes to complete. Answers to the questions were completed with a pen or a pencil; I was not be present in the room during the time of the pre-test evaluation. Once the pre-test was completed, the nurses placed it in a locked box labelled "Pre-Test," which was placed in the classroom. Data of the pre-test with the nurses' responses secured in the locked box was compiled by myself in an Excel Spreadsheet using my personal computer, which was password protected. The pre-test with the nurses' responses was shredded after the pre-test evaluation. The computer was kept in the Manager's office, which was locked at all times.

The one-hour presentation was an educational session to teach the NICU nurses the appropriate use of the modified FNAST. I used a power point presentation for the educational session, which highlighted the the proper use of the modified FNAST in caring for an infant with NAS. At the end of the presentation, the nurses were given

sufficient time to ask questions. A post-test consisting of ten questions (same as the pre-test) were distributed to the nurses. The nurses were asked to use the same unique number which they developed for the pre-test for the post-test response paper. The post-test was an evaluation of the knowledge gained from the educational session and took approximately 30minutes to complete. Answers were completed with a pencil or a pen, and I was not present in the room during the post-test evaluation. Once the post-test was completed, the nurses place the post-test response paper in a locked box labelled "Post-Test," which was placed in the classroom. Data of the post-test with nurses' response was compiled with an Excel Spreadsheet using my personal computer, which was password protected. The post-test with the nurses' response was shredded after the post-test evaluation. The computer was kept in the Manager's office, which was locked always.

To address the second objective, I conducted a retrospective and prospective chart review to look for consistencies in NAS scores by the NICU nurses. Consistency in NAS scores showed that there was an increase of knowledge from the educational intervention. I met with the NICU manager to obtain permission to view 10 charts. Data was recorded in an Excel Spreadsheet in my personal computer, which was password protected. After the educational intervention, I conducted a prospective review of 10 charts to evaluate if there is a consistency in NAS scores. Data obtained from the chart review was recorded in an Excel Spreadsheet in my personal computer, which was password protected. Similarity in NAS scores among the NICU nurses was an indication that the nurses applied the knowledge gained from the educational session.

Instruments

I developed an Excel spreadsheet to record both the results of the pre-and post-tests (Appendix B), and results of chart review 1, and chart review 2 (Appendix C). The columns were named with variables as follows: ID is the unique number, P_1 is the pre-test scores, P_2 is the post test scores, CR_1 is chart review 1, and CR_2 is chart review 2. The descriptive statistics tool in the Excel workbook was used in calculating the mean, mean difference, standard deviation, and analyzing the data.

Protection of Human Subjects

I submitted the project initiative to the Medical Center and Walden's Institutional Review Board for approval. All the NICU nurses were required by the institution to participate in the quality improvement initiative so that there can be consistent care provided to the sick neonates. The NICU nurses were informed that they will be using a unique ID number for their responses to make it anonymous. Since patients were not used, there was no need for informed consent. The data collected from the educational session was stored on the Excel workbook in my personal computer, which was password protected. The computer was placed in the manager's office, which was always locked. The pre- and post-tests were shredded after placing the information in the Excel spreadsheet.

Data Analysis

The paired *t* test was used in analyzing the results of the data. Paired *t* test is one of the statistical methods used in comparing the mean of a before-and-after educational intervention to determine if an improvement occurred with the intervention (Connelly,

2011). The ten multiple choice questions contain three answers, of which one is the best answer possible to be chosen. After attending the educational session, it was expected that the nurses will obtain higher scores on the post-test. The results of the scores were sorted and entered into an Excel worksheet. The difference between the pre-and post-test was calculated and mean obtained. The mean was obtained by adding the sum of the difference in the scores, and dividing by the total number of nurses that attended the class. In this project, *N*, which is the expected total number of participants was 50.

To measure the effect of knowledge gained from the educational intervention, I compared the mean of the data from the pre- and post-tests, and the percentage of consistent scores obtained from the retrospective and prospective chart review. An increase in the mean of the data indicated that there has been an increase in knowledge gain. Before the intervention, the retrospective study showed that only 10% of the scores were consistent, and after the intervention, the prospective study showed a 95% consistency in scores, which indicated that the nurses applied the knowledge gained from the educational session.

Project Evaluation Plan

Evaluating a project initiative is essential to determine if the goal of the project has been achieved. The P(Plan), D (Do), S (Study) / C (Check), A (Act) model was used in evaluating the quality improvement project. The model called Edward Deming's cycle is often used to help teams improve quality of care to make healthcare safer, more efficient, patient-centered, timely, effective, and equitable (Donnelly & Kirk, 2015, p.279). The continuous use of PDSA cycle in healthcare organizations to facilitate

change leads to sustained improvements. The PDSA cycle enabled me to stay on track with my project without derailing from my initial objectives, have a valid outcome measurement, and showed if any improvement has been achieved with the intervention. Pre-test data was collected, which served as a project baseline to measure the effectiveness of the intervention. The educational intervention was completed in a span of six days spread over a three-week period, and then, the results were analyzed, and evaluated.

Summary

The goal of the quality improvement project was to increase the knowledge of the NICU nurses by educating them on the correct use of the modified Finnegan Scoring Tool, and implementing clinical guidelines. There is need for more consistent neonatal abstinence scores, which drives the care of infants experiencing withdrawal symptoms. Approval of the project will be obtained from the Walden University Institution Review Board before initiating the project. An educational session was presented to all the NICU nurses, and data was collected thereafter. The data was analyzed using the paired *t* test, a statistical method of comparing a before and after intervention. Finally, to determine the effectiveness of the educational intervention, an evaluation plan was utilized.

Section 4: Findings, Discussion, and Implications

Introduction

There has been an increase in the use of illicit drugs in the United States, and the concern has been growing because of the number of pregnant women who expose their unborn babies to the drugs in the utero. A need for nurses' education in the use of the modified Finnegan Neonatal Abstinence Syndrome Tool (FNAST) was identified because of the NICU nurses' inconsistencies in scoring the symptoms of neonatal abstinence syndrome (NAS). I conducted the quality improvement project in a facility that is located in an area where there is a high usage of illicit drugs, which accounts for the high percentage of infants admitted to the NICU who are experiencing NAS. The purpose of the DNP project was to increase the NICU nurses' knowledge on the use of the modified FNAST and to decrease variability in the scoring of the modified FNAST. A pre-test consisting of ten questions was distributed to the NICU nurses and then an educational session was presented to them. The use of clinical practice guidelines was incorporated in the educational session. Clinical practice guidelines will help to standardize care and will serve as a standard of excellence in practice thereby offering solutions that will help alleviate the issue of inconsistencies in NAS scoring. A post-test, same as the pre-test was used to evaluate how much knowledge the NICU nurses acquired from the educational session. In this section, I will discuss the project findings, implications, project strengths and limitations.

Summary of Findings

The goal of the quality improvement project was to increase the knowledge of the NICU nurses in the correct use of the modified FNAST to ensure more accurate and consistent scoring of the neonate undergoing NAS. The practice focused question for the project was in the management of infants experiencing NAS in the neonatal intensive care unit (NICU), does education and implementation of a practice protocol related to use of the modified Finnegan Scoring Tool increase the nurses' knowledge and reduce inconsistency in scores indicating NAS? The first objective was to increase the NICU nurses' knowledge on the use of the modified FNAST for better accuracy of scores and treatment of infants. The second objective was to measure the effect of nurses' use of the practice guidelines in the use of the modified FNAST. Descriptive statistics were used in analyzing the findings of the project to determine if the educational session was effective in increasing the knowledge on the use of the modified FNAST and if there are more consistent NAS scores indicating improvement.

Objective 1: Increase the NICU nurses' knowledge on the use of the modified FNAST for better accuracy of scores and treatment of infants.

Forty percent of the NICU nurses attended the educational class sessions and participated in the pre-and post-test exercises. The results of the pre-test showed a sixty percent mean average score of knowledge on the use of the modified FNAST and the post-test results showed a ninety percent mean average score of knowledge on the use of the modified FNAST (Table 1). The mean difference between the pre- and post-test scores was supportive of the project's objective in that providing an educational session will increase the NICU nurses' knowledge on the use of the modified FNAST.

Statistically, there was a thirty percent increase between the pre- and post-test, which showed a significant improvement in knowledge of the use of the modified FNAST.

Table 1

Mean Difference of the Pre- and Post-Tests

ID (Unique Number)	P1 (Pre-Test)	P2 (Post-Test)
N=20	1200	1800
Mean Difference %	60%	90%

A t-Test: Paired Two Sample for Means was used in comparing the means of the pre- and post-tests (Table 2). The paired *t*-test tries to find evidence that a significant difference exists between two samples. The data shows that the mean test for the pre-test was 60 and the mean test for the post-test was 90 signifying a large change from the pre- and post-test. It is a positive change because the mean increased from the pre-test to the post-test.

Table 2

t-Test: Paired Two Sample for Means

	Pre-test scores	Post test scores
Mean	60	90
Variance	73.68421053	63.15789474
Observations	20	20

Objective 2: Measure the effect of nurses' use of the practice guidelines in the use of the modified FNAST.

Ten medical records were reviewed retrospectively before the educational session to evaluate the NAS scores. The chart reviews revealed forty-five percent consistency in NAS scores. Following the educational session, a prospective medical record review was done to evaluate the extent of knowledge gained and to measure how effective the NICU nurses applied the knowledge in the care of the infants. The review showed a significant increase from forty-five to ninety-five percent in the consistency of the NAS scores. The increase showed that the NICU nurses applied the knowledge gained from the educational session and were able to effectively apply the knowledge thereby positively impacting care for the neonate by correctly scoring the symptoms of withdrawal. The results indicated that knowledge was retained and NAS scores improved.

Discussion of Findings in Context of Literature

The findings of the project were consistent with the literature that educating nurses regarding the correct way of using the FNAST positively impacted patient care, and led to better clinical outcomes. The increase in the mean from the pre-test to the post-test was an indication that the nurses acquired knowledge during the education session. There is an association with enhanced adherence to best practice when nurses are given specific information about a medical problem. According to Lucas and Knobel (2012), if nurses are provided with education, it can lead to increased knowledge, improved professional practice, and improved patient treatment goals. With medical problems like NAS, nurses are able to care for these infants if furnished with the right knowledge.

The outcome evaluation from the project supported the already existing research that knowledge increase leads to improved patient practice. The results from the medical record review were an indication that the knowledge gained from the educational session was applied in the care of the infants evidenced by better consistent NAS scores. Consistent NAS scores was because of the nurses' use of the clinical practice guidelines in the care of the infants. The evidence of improved NAS scores reinforced the research that implementing and using clinical practice guidelines provides clear direction to inter-professional teams in caring for at risk infants (Murphy-Oikonen, Montelpare, Bertoldo, Southon, & Persichino, 2012).

Implications

Policy

According to Teague, Jnah, and Newberry (2015), understanding the statistics of morbidity associated with NAS impacts all stakeholders and methods of the delivery of best practices used by neonatal nurses in the care of the neonates to optimize the delivery of best practices is indicated. Clinical practice guidelines are developed from a systematic review of evidence intended to optimize patient care. Clinical guidelines provide nurses with clear directions when caring for infants experiencing NAS. "The Institute of Medicine recommends the use of high-quality research to develop clinical practice guidelines" (Casper & Arbour, 2014, p.378). Caring for infants experiencing neonatal abstinence syndrome is complicated, therefore, it is important that NICU nurses incorporate clinical expertise and provide evidence-based care for these infants leading to improved quality of care.

A substantial burden is placed on hospitals in the care of infants with NAS because of the increased length of stay associated with the treatment. Infants with NAS often experience respiratory problems, feeding difficulties, and low birth weight, which affects the length of stay and cost of care of these infants. Public health measures essential to reducing the incidence of NAS and its healthcare burden includes promoting responsible opioid prescribing practices, decreasing unplanned pregnancies among women who abuse opioids, screening and treatment during pregnancy, and standardizing postnatal treatment for infants with NAS (Ko, Wolicki, Barfield, Patrick, Broussard, et al., 2017).

Practice

The importance of NICU nurses' competency in assessing signs of withdrawal in infants cannot be overemphasized. There is a need for NICU nurses to have the knowledge and standardized training for conducting and scoring infants exhibiting signs and symptoms of drug withdrawal (Christophersen, D'Apolito, & Bakewell-Sachs, 2014). Implementation of NAS practice guidelines will serve as a standard of excellence in practice, which will offer a solution that will alleviate inconsistencies in NAS scoring, thereby optimizing neonate care. After review of evidence, the medical facility determined that continuous staff education on the use of the modified FNAST and the use of inter-observer reliability testing will lead to more consistent NAS scores, which is essential in providing standardized care to the neonates. Standardized care improves outcomes and provides consistency in practices.

The complex healthcare concern of nurse's range of emotions while caring for at risk infants "requires education and an interdisciplinary approach to optimize neonatal

outcomes" (Casper & Arbour, 2014, p.376). The evidence for nursing interventions lacks consistency thereby promoting inconsistent clinical practices leading to inconsistent scores. With the number of infants experiencing NAS admitted to the medical facility and the inconsistent NAS scores, the decision to standardize care with educational intervention and implementation of clinical practice guidelines has shown an increase in knowledge in the use of the modified FNAST.

Research

Gaps in scientific knowledge that exist in the care of infants with NAS is associated with inconsistencies in the use of the NAS tools. These gaps include the timing, duration, frequency of administration, and the degree to which observers were trained to reliability (Wolf & Perez-Montejano, 2014). Lack of recognition of NAS symptoms leads to possible under reporting and inadequate treatment, thereby increasing infant's hospital length of stay and increasing cost of care. Research focuses on proper education on the correct use of NAS tools to achieve better clinical outcomes for these infants experiencing withdrawal symptoms. Impaired maternal-infant bonding may be associated with adverse development outcomes of infants with NAS (Boucher, 2017). Research has focused on the infant isolation from the mother and offering rooming-in care to infants with NAS, which may decrease the infant's hospital length of stay and promote positive developmental outcomes.

Social change

The quality improvement project brought about social change by impacting positive attitude in the behaviors and norms of the NICU nurses with respect to the use

of the modified FNAST. With the social change, there will be more collaboration among the health care professionals leading to improved and more consistent care for at risk patients. Collaboration among the health care professionals denotes better understanding of the use of the modified FNAST. The proper use of the modified FNAST will lead to early treatment, improved quality of care, and better clinical outcome evidenced by a decrease in clinical symptoms, as well as shorter hospital stays, and decreased cost of care. The educational session empowered the nurses to be more confident in the knowledge of the use of the modified FNAST. They are empowered to care for the infants experiencing withdrawal symptoms because of the knowledge gained from the educational session. The knowledge is manifested in more consistent NAS scores by applying the correct technique of scoring. Applying a social change model according to Read, Pino Betancourt, and Morrison will "promote self-knowledge, service, and collaboration" (2016, p.164).

Recommendations for Gap-in-Practice

The clinical problem and incidence of NAS is a health issue that requires NICU nurses to be skilled in the use of the modified FNAST. Based on the findings and implications, it is recommended that all NICU nurses receive training on the use of the modified FNAST tool during orientation and yearly as part of their competency check-offs to ensure proper and consistent use of the tool. Performing an accurate assessment of NAS to quantify the severity of signs and symptoms, provides guidance and facilitates structured weaning in the care of infants with NAS, therefore, it is

recommended that inter-observer reliability is maintained in the NICU as a standard of care for consistent NAS scores.

Project strengths and limitations

Strengths

The quality improvement project was successful in meeting the goal of increasing NICU nurses' knowledge in the use of the modified FNAST and achieving more consistency in the nurses scoring NAS symptoms. The strength of the project included support received from the project site, and administration, as well as the support from the NICU nurses who were involved in the project. The NICU administration and management recognized the need for increased knowledge of the use of the modified FNAST and improvement in NAS scores. The NICU nurses were eager to participate in the educational session, especially for the review and reinforcement in the use of the modified FNAST. Some of the nurses who were not scheduled to work during the educational session, took time out to attend the educational session, which was very encouraging.

Limitations

One major limitation encountered while working on the project was the increase in acuity of the infants in the hospital, which caused a restraint on the attendance. During the educational session, some nurses who were eager to attend could not make it to the educational session because they could not leave the unit due to the high acuity of the infants. Another limitation encountered was the fact that many of the nurses were out sick due to the major outbreak of influenza in the country. The absence of the nurses

added to the shortage in the hospital, thereby causing a burn-out to the nurses who were working overtime. These nurses did not want to return to the hospital for the education because they were too tired and they wanted to recuperate before returning for their next shifts.

Recommendations for remediation of limitations in future work

A recommendation for remediation of limitations in future work is to extend the time period for the educational session to ensure that all the nurses have an opportunity to attend. Another recommendation is to increase the number of educational sessions to be offered so that the nurses will be able to choose a class that is convenient to attend. Having more classes will eliminate the issue of non-attendance because nurses will have more options to choose from, even when there is a high acuity in the unit. Another recommendation is to videotape the education and have it available online so that nurses can access it at anytime to help with continuous education.

Chapter 5: Dissemination Plan, Analysis of Self, and Summary

Dissemination

A dissemination plan is incorporated into a project improvement initiative in the early stages of planning to be effective. Key factors considered when creating a dissemination plan include goals, audience, medium, and execution. The goal of the dissemination is to share the information from the project to be used in practice for better patient care and improved clinical outcomes. The audience will be healthcare professionals (body of nursing) who are involved in the care of at risk infants with NAS symptoms. One of the mediums I will use in disseminating the information is a PowerPoint presentation of the findings of the practice improvement initiative to the NICU nurses, managers, clinicians, physicians, and nurse practitioners at the organizational level. I will also save a copy of the information online to be used for continuous education at the organizational level. Another method of disseminating the information will be submitting the paper for consideration for publication in the Journal of Gynecologic, Obstetric and Neonatal Nurses, presenting a poster or oral presentation at the national conferences of Association of Women's Health, Obstetric and Neonatal Nurses or National Association of Neonatal Nurses.

Analysis of Self

As Scholar

The DNP program prepares nurses to be leaders in practice as well as change agents. Nursing practice evolves over time as researchers add to the state of the science and improve practice. The profession of nursing uses evidence-based practice in making

changes to policy to improve quality of care and clinical outcomes. The hospital I work for is currently in the process of implementing an Electronic Medical Record, and I am the Applications Analyst for Women's Health. My journey in the DNP program gave me the platform to function in this new role as a change agent and leader. As a DNP student, I can function as a leader in implementing changes that will improve quality of patient care. Currently, I am a preceptor to a student who is working towards obtaining a Master's degree in Nursing. The ability of a DNP graduate to use information systems/technology to support and improve patient care and healthcare systems, and provide leadership within healthcare systems and/or academic settings distinguishes them from other graduates (AACN, 2006).

As Practitioner

The Center for Medicare and Medicaid Services (CMS) has placed much emphasis on quality of patient care, which has caused many healthcare organizations to implement evidenced-based practice to improve quality of patient care, and receive reimbursement from CMS. Hospitals experience an adverse effect on hospital reimbursement regarding preventable complications and hospital personnel and nursing leaders are placed with a burden to use current evidence to improve care and prevent complications (White & Spruce, 2015). As a practitioner, I am able to lead quality improvement initiatives. A good leader has effective communication skills, which I have developed and improved on during my DNP program. Having worked in different hospital facilities, and seeing the knowledge deficit among NICU nurses with regards to the use of the modified FNAST, I was motivated to work on the project to increase the

knowledge of NICU nurses for better clinical outcomes of at risk infants. I can lead the implementation of the quality improvement project to ensure that the right care is given to these infants experiencing NAS symptoms. As nurses transform healthcare, they lead interprofessional teams in improving delivery systems with new competencies beyond evidence-based practice (Stevens, 2013).

As Project Developer

A project developer manages a project from start to finish, and collaborates with other teams involved in the project to ensure that the project is completed successfully. My communication skills have helped me to achieve my goals by effectively communicating with all the stakeholders of the project. A project manager is an essential piece of the puzzle, directing all the different players of a project, keeping them on time and on task (Eramo, 2016). I learned how to design, plan, and implement a project successfully during my DNP program. My writing skills are greatly improved and I can use them to help other colleagues as well. With the knowledge I have gained during my DNP program, I am able to function effectively and efficiently as the Women's Health Applications Analyst in the area of designs and build for the successful implementation of the facility's Electronic Medical Records.

Summary

The primary goal of the quality improvement project was to increase the knowledge of the NICU nurses in the use of the modified FNAST and improve consistency in NAS scores while applying the clinical practice guidelines in the care of infants experiencing NAS symptoms. Lucas and Knobel (2012) support the goal that

"evidence-based clinical practice guidelines and education around NAS and FNAST equip caregivers with the necessary tools to consistently and accurately assess an infant with NAS when using the FNAST" (p.40). The statistically significant improvement in the scores of the NICU nurses following the educational session and the consistency in NAS scores supported the project's goal.

With the increase in the number of pregnant women using illicit drugs, thereby exposing the unborn neonates, it is essential that care providers have sufficient knowledge to ensure that these infants are given adequate treatments for better clinical outcomes. Neonatal abstinence syndrome is complicated because it affects physical, emotional and social elements. It is the responsibility of the NICU nurses to use evidence-based information as shown in the results of the project to provide the best care to these infants. If the nurses can efficiently care for these infants, and the correct treatments given to them at the right time, there will be improvement in the quality of care evidenced by shorter hospital length of stay, decrease in cost of care, and better clinical outcomes.

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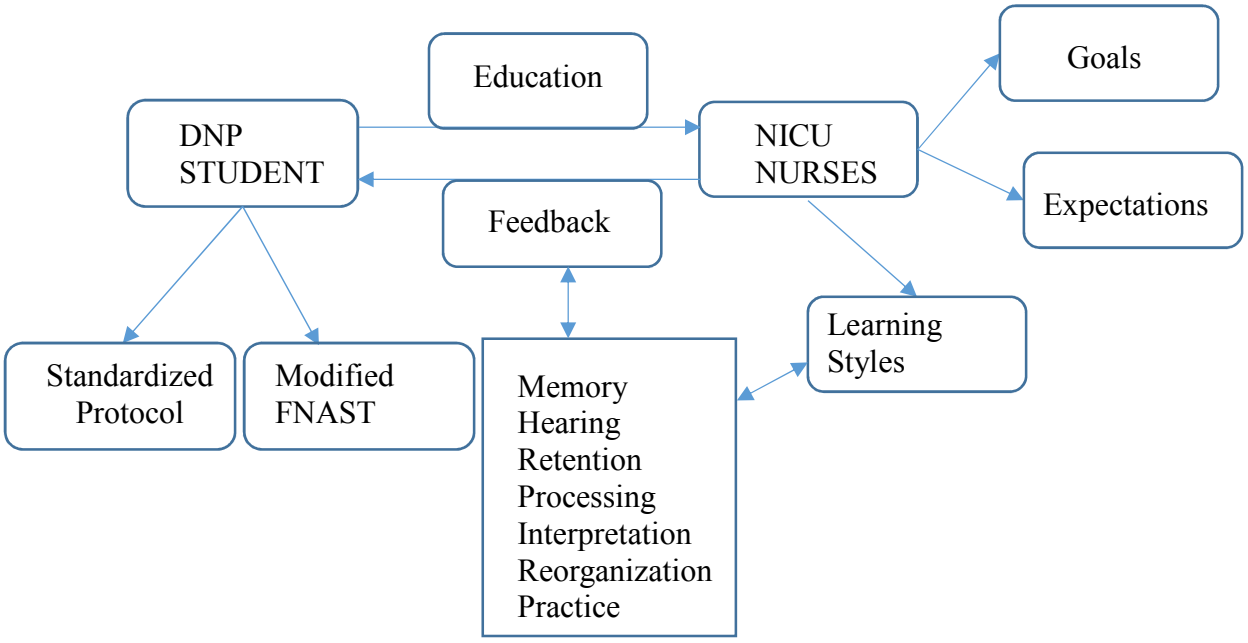

Figure 1. Conceptual model of cognitive learning theory for NAS Education

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Appendix A: Pre/Post-Test Questions

1. Are infants born addicted to drugs? Yes ( ) NO ( )
2. When should infants be scored with each interaction

a. 2-4hrs

b. b. 5hrs

c. c. Every Shift

3. When does withdrawal start?
4. When do we score babies?

a. 4hrs after birth if mom is on methadone

b. 6hrs after birth if mom is on methadone

c. 2hrs after birth if mom is on methadone

5. Which of the following is not a sign of NAS withdrawal?

a. Hyperactive muscle tone

b. Restlessness

c. Low blood glucose level

d. Frequent loose stools

6. Which of the following assessment finding would the nurse expect in an infant experiencing NAS withdrawal?

a. Sleepiness

b. Cuddles when baby is held

c. Lethargy

d. Marked irritability

7. When is the right time to score infants?

a. 30 minutes after feeding

b. 30 minutes before feeding

c. 1 hr after feeding

d. 1 hr before feeding

8. Should a nurse wake an infant for scoring? Yes ( ) NO ( )

9. If feeding takes > 20minutes, should the nurse score the infant? Yes( ) NO ( )

10. When caring for an infant experiencing withdrawal, how should the nurse assess respirations?

a. Count respirations for a full minute

b. Count respirations for 15 minutes and multiply by 4

c. Copy respirations from the monitor

d. None of the above

Appendix B: Pre/Post-Test Record Sheet

ID (Unique Number)	P1 (Pre-Test)	P2 (Post-Test)

Appendix C: Chart Review 1 and Chart Review 2 Record Sheet

CR1 (Chart Review 1)	CR2 (Chart Review 2)