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Analyzing a New Approach to the Assessment of Neonatal Abstinence Syndrome

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Date of Submission: August 5, 2010

Section I

Section II

Section III

Section IV

Abstract

Background and Review of Literature: Neonatal abstinence syndrome (NAS) is becoming an increasingly complex problem across many facilities. The use of standardized assessment is vital to ensuring that infants are properly assessed and managed. The use of the Finnegan or modified Finnegan score has been the most common method for assessing infants but lacks statistical validity or reliability. It also suffers from a lack of interrater reliability. This technique also requires that an infant be disrupted at least every four hours to look for signs of withdrawal. A new model called Eat, Sleep, Console Approach (ESC) is evaluating the importance of first line interventions such as cuddling, swaddling, breastfeeding on demand, and low stimulation environments. The model focuses on a neonate's ability to maintain vital functions.

Purpose: The purpose of this project is to find a new approach to assessing NAS that will enhance the ease and reliability of NAS assessment.

Methods: A pre and post assessment survey of frontline staff will help to determine how implementation of the new model improves care and assessment.

Implementation Plan: Implementation of this project included a PowerPoint training to help ensure that staff can utilize the new assessment technique. A side by side comparison of the Finnegan scoring and ESC model was done with both assessments taking place on each infant. Surveys will evaluate the before (Finnegan) and after (ESC) to see if staff perceive one method as superior in simplicity and reliability

Conclusions: ESC model has been well received by staff on the unit. It has been a better way to decrease interruptions for neonates and is perceived as an easier alternative to Finnegan's scoring.

. ***Keywords***: Neonatal abstinence score, Finnegan score, Eat, Sleep and Console Model

Implementing a New Approach to the Assessment of Neonatal Abstinence Syndrome

Introduction

This project is submitted to the faculty of Marian University Leighton School of Nursing as partial fulfillment of degree requirements for the Doctor of Nursing Practice, Family Nurse Practitioner track.

NAS scoring has become an important way to determine if neonates are able to function after being exposed to prescribed and illicit drugs in utero. After delivery, it is important to get an accurate assessment of withdrawal. Finnegan's scoring has been the method of choice for approximately 50 years. This method has struggled with reliability and clarity. This can lead to improper treatment of neonates and overmedication. Therefore, newer methods are being evaluated and have proven to have better overall assessment value promoting decreased length of stays, medication usage and frustration with frontline staff. This project evaluates the method Eat, Sleep and Console to determine if nursing and providers feel like assessment is improved with this method.

Background and Practice Problem

The opioid epidemic in the recent years has moved beyond the adult population and is affecting many neonates as a result of passive exposure to opioids in utero. Pregnancy should be a time of careful consideration of the effects of any substance that is allowed into the body. However, due to consistent use of prescribed and illicit substances pregnant women have become dependent on drugs and infants are exposed through the placental circulation. When neonates are born, there is an abrupt cut-off in the systemic circulation of these substances leading to withdrawal.

The consequence for healthcare is that evidence-based methods are needed to assess and care for the infants subject to neonatal abstinence syndrome (NAS). According to MacMullen, Dulski, & Blobaum (2014), evidence-based interventions for infants experiencing neonatal abstinence syndrome include breastfeeding, swaddling, quiet environments, decreased stimuli, gentle awakening, minimal handling, non-nutritive sucking (pacifiers), and rooming in with parents or using cuddlers (volunteers who hold babies when parents are unable to be present). These recommendations can be inhibited by methods which require scoring infants at least every four hours and completing multiple interventions which are in disregard to the first line defense of these infants.

The Finnegan score has been the most widely used method to assess infants with neonatal withdrawal since its conception in the 1970s (Gomez-Pomar & Finnegan, 2018). Although it is the most used, there are many issues regarding interrater reliability and usability of this assessment method. See appendix for a copy of the Finnegan assessment method. Finnegan scoring requires an infant to be unswaddled to look for things such as skin excoriation, tremors, mottling, and tone. To properly complete the assessment, the infant must be disturbed on a schedule.

There is a need for a better way to assess and establish the importance of first line interventions to optimize care and increase reliability. Witham Labor and Delivery Unit is not unique in that the unit also suffers from the issues associated with utilizing Finnegan scoring. Providers are concerned with the lack of reliability and proper assessment of withdrawal. Thus, there is a need for a quality improvement initiative to change the way this unit approaches assessment of NAS.

The purpose of this DNP project is to change the way that neonatal abstinence is evaluated. By taking a step back from the current assessment protocols and evaluating the evidence that surrounds the topic of neonatal withdrawal, progress can be made towards a protocol that is better aimed at recognizing NAS and providing first line interventions to decrease the need for medication management. The new method will also simplify the assessment process making it more reliable in recognizing the need for further intervention.

Problem Statement

The current use of modified Finnegan scoring is lacking interrater reliability and validity. Finnegan scoring also requires nurses to perform multiple assessments on the infant every four hours which can be inherently detrimental to the infant's need of decreased stimulation. Therefore, an improved method of assessing infant NAS is needed to improve reliability, clarity and usability of the assessment method. The problem statement is: Does neonatal abstinence assessment have improved clarity, ease of use and improve the qualitative knowledge of neonatal functioning while decreasing disruptions by utilizing the ESC model rather than the traditional Finnegan scoring.

Practice Gap Analysis

The facility is currently using a modified Finnegan scoring to evaluate NAS in neonates (See Appendix . The facility incorporates the modified version of the tool, but still struggle with interrater reliability and validity. Gap analysis showed that there is a large gap between what evidence is showing as valid and the current protocols in place on the labor and delivery unit at this hospital.

Recommendations

This hospital needs to consider an alternative method to evaluating infants with NAS. This method will be directed at ensuring ease of assessment while maintaining the necessary reliability to ensure that infants are appropriately managed. The method should elevate the care of the NAS infant.

Method for Translation

Utilizing the Quality Enhancement Research Initiative as a framework and Change Theory as a guide, the researcher utilized the Eat, Sleep, and Console Model to compare it against the Modified Finnegan scoring. There was consideration given to how individuals make changes based on Lewin's Change Theory and the researcher will mitigate the forces with insight into evidence-based research.

Timeline

A Gantt chart was used for the timeline in this DNP project. The chart is in Appendix B for reference.

Stakeholder Assessment

The stakeholders included the administrator (CNO), project mentor (Dr. Cathryn Baack), director (practice mentors: Lynn Schafer), providers, nurses, patients, parents of the patients. These stakeholders will help to influence the direction of the project. If the stakeholders are open to the evidence, the project can move forward with less resistance. The director of the department served as a facilitator in communication among stakeholders and helped champion support for practice change. The providers needed to be willing to support the change and provide candid feedback. The nurses were actively involved in practicing the process change and providing feedback. Patients are the mechanism through which the change will elicit needed data to verify the validity.

Parents took an active part in providing first line interventions and provide an outlet for nurses to educate.

Organizational Readiness/SWOT

A SWOT assessment has been performed to determine issues regarding organizational readiness. See Appendix C to view the SWOT evaluation.

Review of the Literature

Finnegan Score History

Infants have long been exposed to the potential harms of substances they encounter in utero. In 1875 after several cases of deceased infants, providers provoked the use of the terminology Congenital Morphinism which described infants who were born seemingly healthy until the third day of life when crying became inconsolable, generalized seizures ensued and eventually death. (Gomez-Pomar & Finnegan, 2018). This prompted the further study into how morphine affected neonates and ultimately the first thoughts of a morphine wean became known. Neonatal abstinence syndrome has evolved into a complex disorder which is diagnosed by signs and symptoms associated with the neonate being cut off from substances that were passively being supplied. NAS admissions have increased four-fold from 2003 to 2012 and the economic impact was around 315 million in 2012. (Carr & Hollenbeak, 2017). Economic challenges are often only a small portion of the difficulties related to a NAS diagnosis. Finding ways to properly assess for withdrawal in a valid and reliable manner have also proven challenging. Finnegan scoring has been the method used to assess and manage infants for many years without challenge or proper evaluation. Methods should not be based on historical precedent but best practices that promote good outcomes with good reliability.

Interrater Reliability

A unique challenge associated with NAS scoring infants to be reliable and for two observers to score infants in a similar manner. Interrater reliability is basically the ability for two raters to assign the same score (McHugh, 2012). In the case of NAS, two raters would need to assign the same score to an infant with the Finnegan scale or similar scale while independently rating. This has caused concern as either rater never have different scores, rate at different times or even just trust the judgement of the initial rater. There is also a concern about rater bias.

According to Macguire, Cline, Parnell, and Tai (2013), the Finnegan score has been modified but even with this change the form is long, tedious, and difficult to obtain interrater reliability. Gomez-Pomar and Finnegan (2018) specifically discuss that there is no national agreement regarding: which tool to assess NAS, cutoff numbers for treatment, or timeframe for assessing. According to Isemann, Stoeckle, Taleghani, and Mueller (2017), the limitation associated with their research on modified Finnegan scoring was the interrater variability. The limitation of interrater reliability continues to show up in research that is aimed at improving Finnegan scoring. Gomez-Pomar et al. (2018, p 1) states, "...the lack of subsequent validation and interrater reliability is a major concern regarding FNAS." The concern of validity and reliability of the Finnegan scoring method should be a consideration when deciding what tool to use.

Validity

The Finnegan tool currently measures a host of symptoms that are present in neonatal withdrawal. The issue is if quantifying these symptoms really gives providers the information that they seek in terms of neonatal withdrawal. Timpson, Killoran,

Maranda, Picarillo, and Bloch-Salisbury (2018) did quality improvement research in an attempt to improve the consistency and accuracy of the Finnegan tool. After education, clinical guidelines and restructuring the tool more that 60% of nurses "did not assess withdrawal to the target score immediately following the training period and improvements did not persist over time" (Timpson et al., 2018, p. 70). This calls for concern in relation to the ability for the Finnegan tool to be valid and reliable in NAS assessment and makes the need for a better method evident. This method should be aimed at providing the best care while simultaneously pushing interventions that have been scientifically proven.

First Line Interventions

Gomez-Pomar and Finnegan (2018) explains that first line interventions such as feeding on demand and decreasing stimuli through swaddling have proven to decrease the severity of symptoms. New knowledge is directed at extensively utilizing these first line interventions as an integral part of NAS management. The American Academy of Pediatrics (AAP) clinical report on withdrawal recommends supportive care as the first line for NAS management (Hudak & Tan, 2012). This same report further explains that interventions that interfere with these first line non-pharmacological interventions limited (Hudak & Tan. The American Academy of Pediatrics (AAP) clinical report on withdrawal recommends supportive care as the first line for NAS management (Hudak & Tan, 2012)., 2012). Thus, non-pharmacologic interventions should be of upmost importance during the care of these infants. Providers and staff should be making decisions that help to support and empower mothers/caregivers to understand the impact these types of interventions provide. By advocating for extreme use of first line

interventions, unnecessary drug weans could be eliminated. According to Hudak & Tan (2012, p 548), "Unnecessary pharmacologic treatment will prolong drug exposure and the duration of hospitalization to the possible detriment of maternal-infant bonding." It is unknown the amount of long-term consequences when an infant is exposed to a wean of morphine or other medication for withdrawal.

Rooming in has also proven to be a valid way to provide infants with the first line intervention care required to limit pharmacologic exposure. Wachman, Schiff, and Silverstein (2018) examined multiple studies with rooming in as the intervention and concluded that this intervention decreased the need for pharmacologic therapy 20-60%.

Breastfeeding is another first line interventions to help limit the need for medication management. Raffaeli et al (2017) explains that active parenting through breastfeeding has a positive impact on decreasing the average length of stay.

Overall, first line interventions pushed aggressively have shown promising improvements in decreasing the severity of NAS symptoms, lengths of stays and need for medication management. According to Wachman et al. 2018, the most clinically significant finding within their systematic review were regarding nonpharmacological care. The model that should be considered to assess NAS infants should put focus on managing infants with the first line interventions that have been discussed.

Eat, Sleep, and Console

A new model that has been proposed at Yale New Haven Children's Hospital is called Eat, Sleep and Console. This model evolved out of a need to provide better assessment for infants who have been passively exposed to substances in utero. Grossman, Osborn, and Berkwitt (2017) state, "This FNASS-guided approach, though

never validated, has gone largely unchallenged since its inception, and it is time to reconsider whether management should be driven by a system that is so heavily based on cataloguing specific signs of withdrawal, many of which may be unrelated to the infant's function or comfort" (p. 115). A quality improvement (QI) project at Yale New Haven Children's Hospital (YNHCH) included 287 infants and included interventions such as: standardization of non-pharmacologic care, empowering messages for parents, a novel approach to assessment, morphine given on an as needed basis. (Grossman et al. 2017). This QI project led to a decrease in average length of stay from 22.4-5.9 days, morphine initiation from 98%-14%, and costs from $44,824-$10,289. Grossman at al., 2017). This project focused directly on a more qualitative look at an infant's ability to function and first line interventions versus the quantitative number provided by the Finnegan scoring. The Eat, Sleep, and Console Model was developed based in years of observations of infants with NAS and considering the essential functions of an infant. It considers an infant's ability to eat, sleep and be consoled. According to Wachman et al. (2018), infants assessed with the Eat, Sleep, Console method has a minimum of a 45% reduction in medication management. A retrospective analysis of treatment decisions based on care provided by utilizing the ESC model while simultaneously performing a Finnegan score yielded this statistically significant result: 12% of infants began medication management with ESC versus 62% predicted by Finnegan (Grossman, Lipshaw, Osborn, Berkwitt, 2018). These results were followed for 30 days and no adverse outcomes or readmissions were found. These results continue to provide a necessary reason to look at practice for opportunities for quality improvement.

NAS needs to be managed based on the best scientific evidence to ensure good outcomes. Unnecessary pharmacological management could potentially have long term harmful effects. The method should be intuitive and easy to perform. It should measure what it is aimed to measure and be reliable to determine an infant's need for more intense nonpharmacological interventions up to medication management. The ESC model is aimed at pushing first line interventions, empowering parents, and evaluating an infant's ability to perform life sustaining functioning.

Theoretical Framework/Evidence Based Practice Model

Quality Enhancement Research Initiative

According to MacMullen, Dulski, & Blobaum (2014), evidence-based interventions for infants experiencing neonatal abstinence syndrome are important. Thus, evidence-based practice is the highest priority for this patient population. The Quality Enhancement Research Initiative is a framework developed by the Veterans Administration to help guide evidence-based interventions into practice. (Stetler, Mittman, & Francis, 2008). This model involves using the best research, expertise and resources to enhance healthcare through the implementation of evidence-based interventions. The use of this framework will help to guide implementation of a valid evidence-based model (Eat, Sleep, Console) into an environment that currently uses an outdated and unvalidated model (Finnegan Scale). With the preceding framework in mind, the first step entails identifying a high-risk population. Neonates who have been exposed to any substance in utero can be considered the chosen high-risk population for this project. The second step involves identifying an evidence-based intervention. After consulting a research librarian and many searches through multiple databases, most

current practices are rooted heavily in traditions and are not well proven as reliable or consistent. It had become clear that new approaches are more aimed at providing first line interventions which decrease medication management and make assessment of these infants less complex. The third step measures gaps in current practice in relation to the evidence. After reviewing current policy and procedures the facility uses the Finnegan scoring tool and providers are unhappy with the interrater reliability and consistency of this tool. There is a large gap in current practice considering the evidence. The fourth step involves the implementation of the improvement. This step will require provider and nursing education, doing a pretest survey of current practice and a post test of the new method. The fifth step is evaluating the feasibility and seeking out feedback. This will be accomplished through provider and nursing communication regarding how the newly implemented intervention is working. This will include an open line of communication through email, calls and in person encounters. Finally, the sixth step of this framework evaluates the intervention. A posttest regarding uptake of the new intervention will be utilized.

Change Theory

Lewin's Change Theory is based around the concept that there is a host of forces that work in opposing directions that need to be better understood to promote change. (Petiprin, 2016). This theory focused on three stages: unfreezing, change, and refreezing. (Petiprin, 2016). In the unfreezing stage, it is important to help others find out why letting go of old or outdated processes are important. In the case of Finnegan scoring, the current assessment system is based in historical roots which are neither proven valid or reliable. The Finnegan score is not really giving providers the information they seek in terms of if

an infant is able to manage withdrawal. The theory gives insight into attempting to direct the forces away from the status quo and decrease the restraining or in this case providers who are unsure of the change. The second phase of change must involve a movement of feeling or behavior to a more productive and liberating level (Petiprin, 2016). This movement is the momentum that will allow the change to take hold. Finally, refreezing needs to occur. This is when the new procedure becomes habit or the standard of practice (Petiprin, 2016). Change to the Eat, Sleep, Console Method of assessing NAS infants with become the new norm. This theory will help establish a guideline to allow a more evidence-based model to be accepted even when there is initially some resistance.

Goals Objective and Expected Outcomes

Project Design

The project moved towards actualization by getting initial buy in from the unit director. This allowed the researcher to gain access to needed stakeholders to provide education about how evidence-based research is affecting the area of NAS scoring. Research focused on how Finnegan scoring is not appropriately measuring infant withdrawal severity and how a newer method is more accurately measuring the clinical need for a higher level of care beyond first line interventions. The project design was specifically an educational intervention followed by a practice intervention and was measured by utilizing a pre and post survey.

The researcher provided education to providers to work towards support for the Eat, Sleep and Console Model of NAS management. This education was in the form of live education provided by the researcher and through a PowerPoint presentation

explaining the new assessment method. This was provided through email to all nursing staff on the unit even if they were able to attend the live training.

Measurement Instruments

A paper assessment method was formulated for nurses to do in addition to the current Finnegan scoring. A pre-survey helped determine how staff view the ease and reliability of the current method of NAS scoring. A hard date was set, May 1, 2019, which the researcher implemented dual assessment with Finnegan's scale and the Eat, Sleep, Console (ESC) Model of NAS management. After 90 days of using both assessment methods, the researcher performed a post-intervention survey to evaluate the new method. Each survey is the same but will be geared toward the Finnegan scale as a pre survey and ESC as a post survey. See Appendix D for the NAS assessment tool.

Setting

This project will take place at a small rural hospital. The facility is a suburb of Indianapolis, Indiana. The facility provides level 1 nursery care which requires transfer of infants that need medication management for the care of NAS.

Participants

The subjects will be the nurses and that are caring for NAS infants. This population is largely Caucasian females which caused some confounding variables. The unit consists of 25 nurses, 18 nurses are bachelors prepared (72%), 5 are associate prepared (20%) and 2 have a masters level education (8%). This number varied throughout the project duration as attrition occurred.

Perceived Barriers

The facility will have some barriers to implementation of the Eat, Sleep, Console Model as the facility has always utilized modified Finnegan scoring to assess NAS infants. There were barriers regarding letting go of the current protocols. The physicians expect a numerical value in relation to infant withdrawal. The new model is about assessing an infant's ability to function as a neonate and will not give them a numerical value. In trade off, the providers will be given a more qualitative assessment of the neonate. This will be hard to overcome as the historical precedent of Finnegan scoring is very evident. Change can be difficult to embrace when a process has been in place for a long period of time. Finnegan scoring is what providers and nurses have been taught as the best way for NAS management. This is comfortable and changing to a new procedure will cause some discomfort. It is a process that did face barriers on just the premise of discomfort. The nurse needs to be committed to evaluating the infant's eating, sleeping and ability to be consoled and not become complacent. Another barrier will be time. This project has been implemented on a very tight timeline.

Another barrier to the project will be the confounders. The unit is primarily Caucasian females between the ages of 25-60. Therefore, the sample is not diverse. Another confounder is the size of the sample. It is hard to ensure statistical significance from a sample size of 25. There was also attrition during the process which impacts the post- survey.

Method of Evaluation and Data Collection Procedures

Pre and post surveys using the NAS Assessment Tool Survey was the method of evaluation. This data was compared to determine if there is any statistically significant difference between the models in terms of ease and reliability of assessment.

Data Collection

This DNP Project will be guided by the previously stated theoretical framework and change theory. The following information will describe how the project was actualized.

Project recruitment: Nurses and providers at Witham Maternity Center were asked to voluntarily participate in a pretest and post-test survey to determine the ease, clarity, and perceived reliability of the current (Finnegan scale) and new intervention (Eat, Sleep, and Console). Providers were very willing to participate in the education but ultimately did not participate in the survey data. This will make the data solely focused on the nurses' opinions of the models. This ended up being a necessity as the providers do not routinely assess the withdrawal of a neonate but rather just look as the nursing assessment from the previous 24 hours when they round.

Intervention: Education was provided to all persons participating in managing infants during the preintervention period. Interventions included educating the staff through live teaching and a PowerPoint about the new method, setting a date for the Eat, Sleep, Console Model to be utilized alongside Finnegan for neonatal abstinence syndrome, having staff fill out the pre-survey and finally filling out the post survey. Change theory will be considered while the researcher looks for ways to continue to educate on the importance of evidence-based interventions for best patient outcomes.

Post-intervention: The researcher collected data from the pre and post surveys to determine if the new assessment method is seen as an easier, more reliable method to assess NAS. Consideration will also be given to the opinion of staff in relation to changing to the new method of assessment.

Instruments/Tools

To measure the data within this DNP Project, a pre and post-test (NAS Assessment Tool Survey) was used. At the time of development, the specific tool was evaluated for face validity through evaluation from Dr. Kelly Kean. The tool utilized a validated Likert scale which produced normative data.

Outcome Measures

This project measured outcomes in relation to a side by side use of the ESC model and Finnegan scoring. Outcomes included the functionality, ease of use, reliability, possible disruption of first line interventions and overall qualitative analysis of the new model by staff.

Ethics and Human Subject Permission

The Marian University Internal Review Board (IRB) determined that this project was exempt from full human subject review. Site-specific approval has been obtained. Research participants have signed an informed consent to participate and are aware participation is voluntary and that their questionnaires will remain anonymous. The researcher has also participated in training regarding the ethical treatment of research participants.

Data Analysis

The researcher evaluated the pre and post-test information. Further consideration was given to the need to use an ANOVA to properly evaluate statistical significance. This data showed some obvious trends based on the nurse's opinions.

The use of the Finnegan scoring tool showed that staff felt that it lacked clarity and ease of use. The were a few outliers that rated the tool neutral in its ease and clarity. Overall, the opinions were that there were many ways to evaluate certain parameters such as excoriation. Staff complaints included: lack of understanding of how many times to score the excoriation, just the first time it is evaluated or until it resolves. The overall complaint is that even training lacks clarity as it can vary.

The following chart shows the trends within each of the surveys. The vertical line represents the Likert scale which ranges from 1-Strongly disagree to 5-stongly agree. The horizontal axis represents the 8 questions on the survey. The questions are provided for ease below.

Circle the correct numeric response to each statement

#	Statement	Survey Scale: 1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree				
1	Assessment method is easy to use	1	2	3	4	5
2	Assessment method is clear	1	2	3	4	5
3	Assessment method is utilized at the appropriate intervals	1	2	3	4	5
4	Assessment method is helpful to guide patient care decision making	1	2	3	4	5
5	Assessment method helps to appropriately escalate care (determine need for transfer)	1	2	3	4	5
6	Assessment method accurately assesses an infant's ability to maintain vital newborn functioning	1	2	3	4	5
7	Assessment method requires infants to be disturbed from sleep	1	2	3	4	5
8	Assessment method is the best way to assess infants with NAS	1	2	3	4	5

The survey questions were based upon a need to determine if each method was clear, easy to use, utilized appropriately, helped determine the overall functioning of the neonate and decreased disruption which is recommended by the AAP.

The next section will focus on the results in relation to the Finnegan method of assessing neonates for withdrawal. The following results show that nurses overall strongly disagreed or disagreed with the statements:

Finnegan method is easy to use

Finnegan method is clear

Finnegan method is the best way to assess infants with NAS

Nurses rated the following questions from disagree to neutral

Finnegan method is utilized at the appropriate interval

Finnegan method is helpful to guide patient care

Finnegan method helps escalate care

Finnegan method accurately assesses an infant's ability to function

Nurses rated the following statement as strongly agreed to agreed

Finnegan method requires infants to be disturbed from sleep

This section will explain the results in relation to the ESC model of assessing infants. The following statement was rated from strongly disagree to disagree.

ESC method requires infants to be disturbed from sleep

The following statements were rated from agree to neutral.

ESC is utilized at the appropriate interval

The rest of the statements were rated as Strongly agree to agree.

ESC method is easy to use

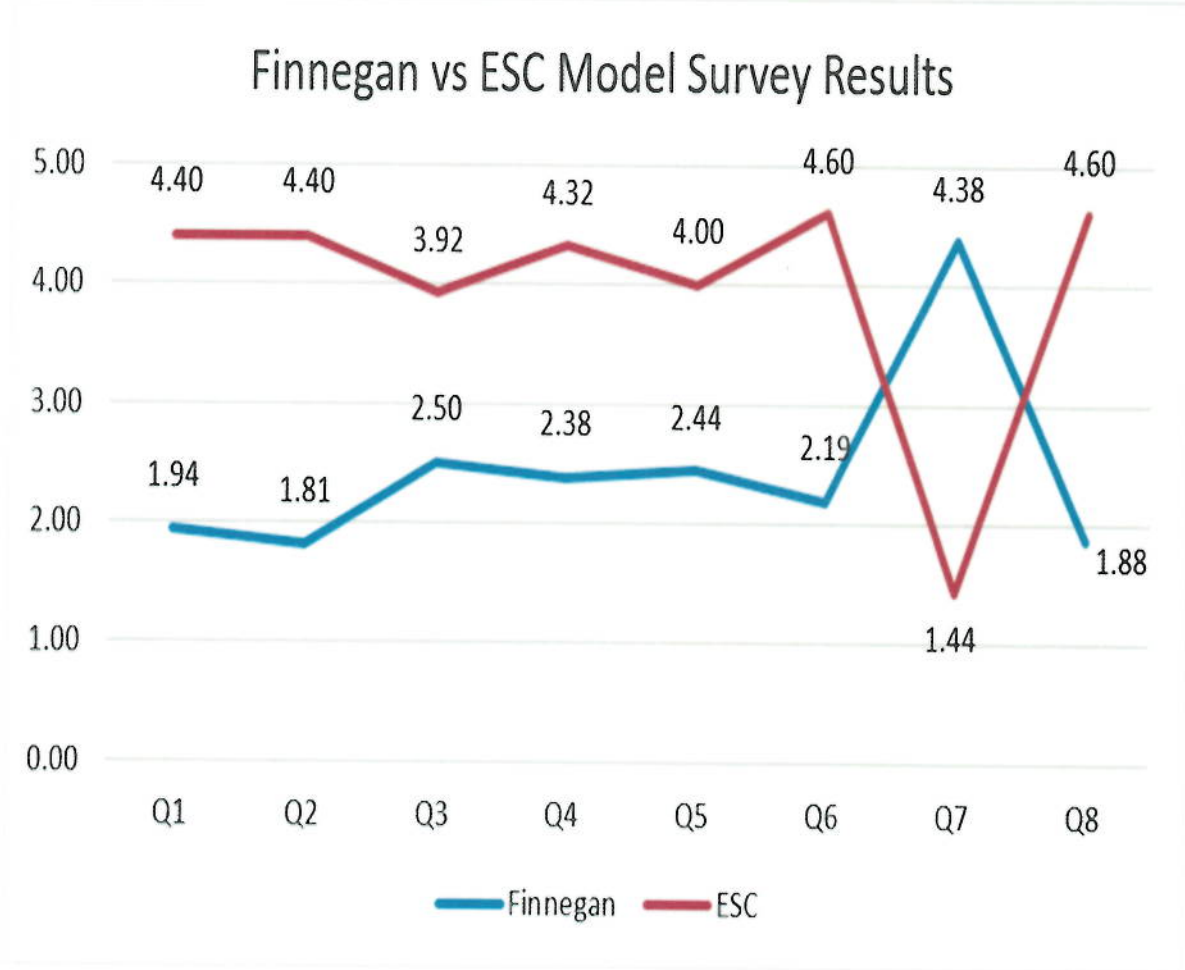
ESC method is clear

ESC method is helpful to guide patient care

ESC method helps escalate care

ESC method accurately assesses an infant's ability to function

ESC method is the best way to assess infants with NAS



A one-way ANOVA was performed to determine the statistical significance of the data presented in the above chart. The p value was < 0.00001 meaning that there was statistical significance. This data has some limitations as the sample size was 25 and the recommendation for a minimum sample size is 30 to ensure statistical significance. See chart below for calculations.

Summary of Data

	Treatments					
	1	2	3	4	5	Total
N	128	200				328
∑X	313	790				1103
Mean	2.4453	3.95				3.363
$\sum X^2$	899	3396				4295
Std.Dev.	1.0257	1.1766				1.3385

Result Details

Source	*SS*	*df*	*MS*			
Between-treatments	176.709	1	176.709	$F = 140.80842$		
Within-treatments	409.1172	326	1.255			
Total	585.8262	327				

The *f*-ratio value is 140.80842. The *p*-value is < .00001. The result is significant at $p < .05$.

Conclusion

This quality improvement project succeeded in several goals in relation to increasing the awareness of a new model for NAS management and determining what methods is most user friendly to frontline nursing staff. Due to the overall dissatisfaction with the current assessment method, the ESC model was well received by the staff. The overall findings were consistent with nurses wanting a method that is relatively easy to use, clear, and does a good job lining up with the true assessment of withdrawal. The ESC method should be continually evaluated with new research. In concluding, the ESC method was rated as easier, clearer and a better method to assess withdrawal while the Finnegan

score was evaluated to be more difficult with less clarity and staff were unsure of its ability to reliably assess withdrawal. Recommendations include: this unit should participate in additional training on ESC, frontline interventions for withdrawal, and possibly switch to ESC for their assessment of NAS.

References

Bagley, S., Wachman, E., Holland, E., & Brogly, S. (2014) Review of the assessment and management of neonatal abstinence syndrome. *Addiction Science and Clinical Practice*, 9(19), 1-10.

Corr, T. & Hollenbeak, C. (2017). The economic burden of neonatal abstinence syndrome in the United States. *Addiction*. 112(1), 1590-1599.

D'Apolito, K. (2014). Assessing neonates for neonatal abstinence. *J. Perinat Nonat Nurs*, 28(3), 220-231.

Gomez-Pomar, E., & Finnegan, L. P. (2018). The epidemic of neonatal abstinence Syndrome, historical references of its' origins, assessment, and management. *Frontiers in Pediatrics*, 6(33), 1-8. http://doi.org.forward.marian.edu/10.3389/fped.2018.00033

Grossman, M. Berkwitt, A., Osborn, R., Xu, Y., Esserman, D., Shapiro, E., & Bizzarro, M. (2017). An initiative to improve the quality of care of infants with neonatal abstinence syndrome. *Pediatrics*, 139(6), 1-8.

Grossman, M., Lipshaw, M., Osborn, R., & Berkwitt, A. (2018). A novel approach to assessing infants with neonatal abstinence syndrome. *Hospital Pediatrics*, 8(1), 1-6.

Grisham, L., Stephen, M., Coykendall, M., Kane. M., Maurer, J. Bader, M. (2019). Eat, sleep, console approach: A family-centered model for the treatment of neonatal abstinence syndrome. Advances in Neonatal Care, 19(2), 138-144.

Hudak, M. & Tan, R. (2012). Neonatal drug withdrawal. *Pediatrics*, 129(2), 540-560.

Lucas, K. & Knobel, R. (2012). Implementing Practice Guidelines and education to

improve care of infants with neonatal abstinence syndrome. *Advances in Neonatal Care*, 12(1), 40-45.

MacMullen, N., Dulski, N., & Blobaum, P. (2014). Evidence-based interventions for neonatal abstinence syndrome. *Continuing Nursing Education*, 40(4), 165-203.

Maguire, D., Cline, G., Parnell, L., & Tai, C. (2013). Validation of the Finnegan neonatal Abstinence syndrome tool-Short form. *Advances in Neonatal Care*, 13(6), 430-437.

McHugh, M. (2012). Interrater reliability: The kappa statistic. *Biochem Med*, 22(3), 276-282.

Petiprin, A. (2016). Lewin's Change Theory. Retrieved from http://www.nursing-theory.org/theories-and-models/Lewin-Change-Theory.php

Raffaeli, G., Cavallaro, G., Allegaert, K., Wildschut, E., Fumagalli, M., Agosti, M.,... Mosca, F. (2017). Neonatal Abstinence Syndrome: Update on diagnostic and therapeutic strategies. *Pharmacotherapy*, 37(7), 814-823.

Stetler, C., Mittman, B., & Francis, J. (2008). Overview of the VA quality enhancement research initiative. *Implementation Science*, 3(8), 1-9.

Timson, W., Killoran, C., Maranda, L., Picarillo, A., Bloch-Salisbury, E. (2018). A quality improvement initiative to increase scoring consistency and accuracy of the Finnegan tool: Challenges in obtaining reliable assessments of drug withdrawal in neonatal abstinence syndrome. *Advances in Neonatal Care*, 18(1), 70-78.

Wachman, E., Schiff, D., & Silverstein, M. (2018) Neonatal abstinence syndrome: Advances in diagnosis and treatment. *JAMA*, 319(13), 1362-1373.

Westagate, P. & Gomez-Pomar, E. (2017) Judging the neonatal abstinence syndrome assessment tools to guide the future tool development: The use of clinimetrics as opposed to psychometrics. *Frontiers in Pediatrics*, 5(204). 1-6. doi 10.3389/fped.2017.00204

Appendix

Appendix A

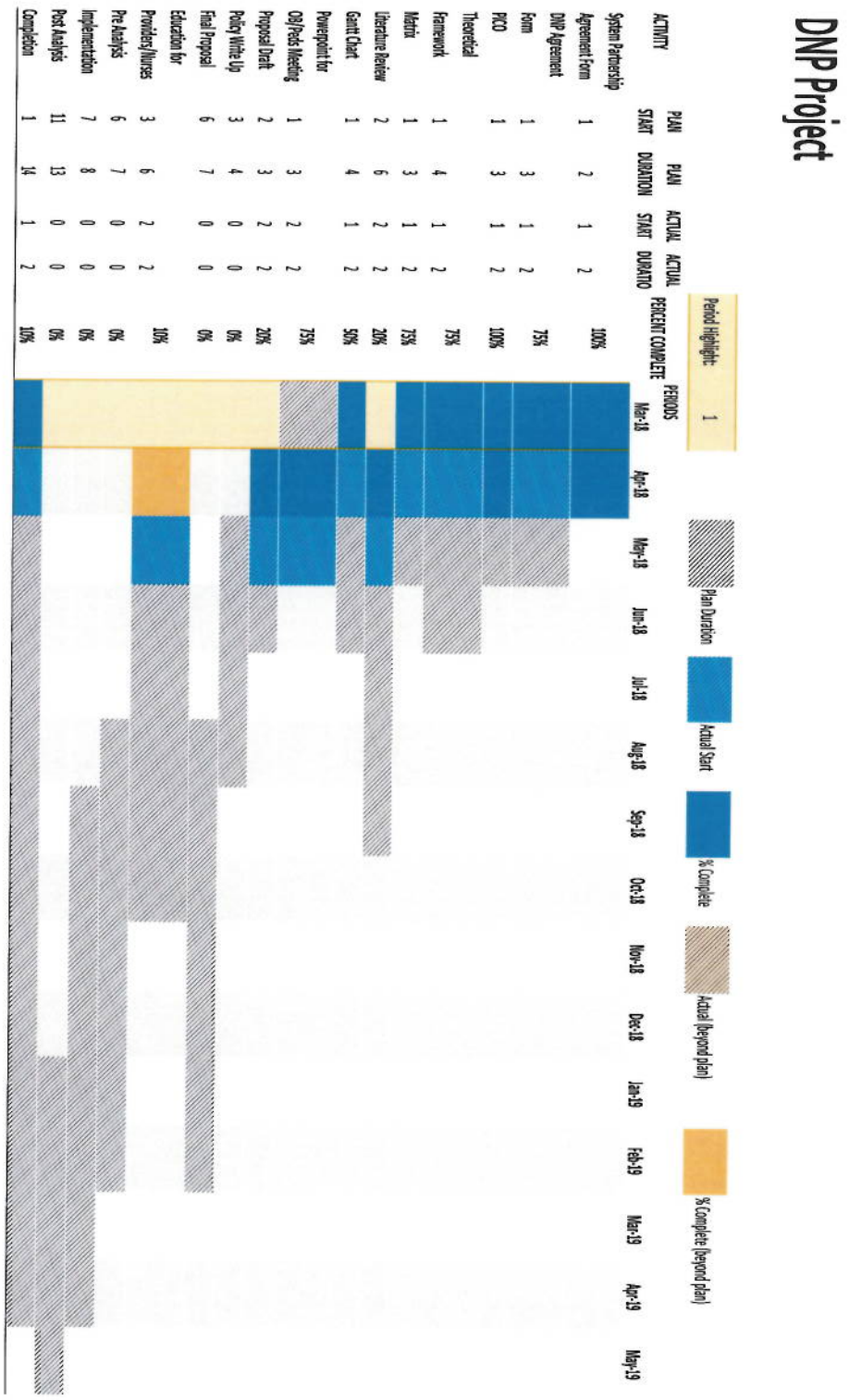
Research Matrix

Variables					Subjects		Data		
Authors, Titles, Journal	Year Pub	Purpose	Dependent Variable	Independent Variable(s)	# of Subjects	Subject Characteristics	Research Design	Conclusions	Comments
Lucas & Knobel. Implementing practice guidelines and education to improve care of infant with neonatal abstinence syndrome. *Advances in Neonatal Care*.	2012	To evaluate if education and practice guidelines could increase knowledge in reagrds to managing NAS infants	knowledge increase	practice guidelines and education	68	NICU nurses	non experimental pre/post test	post test 61% showed increase in ability to correctly rate NAS, 1 week later only 10 nurses took the test to showed retained knowledge, there was an increase in knowledge one week later	retained knowledge not well understood due to a very limited amount of subjects (10) in the one week follow up
Maguire, Cline, Parnell, Tal. Validation of the Finnegan neonatal abstinence syndrome tool-short form. *Advances in Neonatal Care*	2013	reduce Finnegan to minimum number of items while maintaining validity	validity of Finnegan scale	reduce the number of items	33,856 M-FNAS scores	scores from M-FNAS	Factor analysis	scores were correlated to the long version of Finnegan but with only 7 items it seems interrater reliability could be easier to obtain	Per the article, the longer version is cumbersome and harder to achieve interrater reliability however the scores were correlated from the short version to the long version after explicitely stating the long version was not well validated
Bagley, Wachman, Holland, Brogly. Review of the assessment and management of neonatal abstinence syndrome. *Addiction Science & Clinical Practice*.	2014	review current research related to assessing and managing NAS	NAS outcome measures	NAS scoring systems, pharacotherapies, non pharm therapies			systematic review	There is a need for high quality randomized control trials to determine best practices. Optimize outcomes by encouraging mother infant dyad. Although information is limited the evidence does support non pharm therapy which decreases NAS symptoms and severity.	Non pharm interventions included: limiting exposure to sounds and lights, clustering care, swaddling and holding, and breastfeeding
D'Apolito. Assessing Neonates for Neonatal Abstinence. *Journal of Perinatal Nursing*.	2014	Finnegan Scoring Consistency, accuracy and interrater reliability	assessment of NAS	Finnegan Scoring Tool				Important to maintain interrater reliability through timed assessments, definitions for each item	Issues with assessments of NAS not taking place at the same time. Interrater reliability is difficult to obtain with the current assessment process and unit constraints
MacMullen, Dulski, & Blobaum, P. Evidence-based interventions for neonatal abstinence Syndrome. *Continuing Nursing Education*	2014	Look at best practices in association with NAS scoring	NAS outcome measures	various inteventions and tools	24 studies	NAS infants, NICU nurses, other nurses caring for NAS infants (postpartum nurses etc)	systematic review	Screen infant, provide first line supportive measures, Correct nutritional deficiencies, encourage maternal neonatal relationship, provide parental education, minimize sleep disturbances by clustering care, reevaluate infants	Systematic review found that first line interventions are valid and useful with NAS, Finnegan scoring is in opposition to this as it requires disruption and evaluation of tone, more reflex, temperature at least every four hours
Mitrovic, Mitrovic, Mandic, Avramovic, Cecez, Stanimirovic, Jankovic. Neonatal abstinence syndrome: Diagnostic delimmas in the maternity ward. *Srp Arh Celok Lek*.	2015	Identify the problems in patient with early NAS and show the importance of clinical presentation used as a guide toward diagnosis			5	neonates over 38 weeks gestation.	retrospective case study	clinical presentation is the gold standard for diagnosis. Quantification of scores are most helpful in non pharmacological and pharmacological treatment selection	symptomatology occurred at the end of the first and beginning of second day. The most persistent symptoms were hypertonia and tremor. Important to evaluate patient symptoms not just record a number
Fox, Kavanaugh, Fielder. A comparison of two neonatal withdrawl scales: A retrospective case note audit. *Journal of Neonatal Nursing*	2016	Compare the Lipsitz and Modified Finnegan Withdrawal scale	initiation and treatment of NAS	Finnegan scale versus Lipsitz scale	62	neonates born between 2000-2001 and 2010-2011	retrospective study	no differences were observed in medication initiation with each model	
Raffaeli, Cavallaro, Allegaert, Wildschut, Fumagalli, Agosti, Tibboel, Mosca, Neonatal abstinence syndrome: Update on diagnostic and therapeutic strategies. *Pharmacotherapy*	2017	review the diagnositic and therapeutic strategies for managing NAS	NAS outcome measures				retrospective review	validation of standardized protocols for assessment of NAS, implement high quality evidence based practice guidelines	enhancement of mother-infant bonding through breastfeeding and rooming in were found to be very important
Corr, Hollenbeak. The economic burden of neonatal anstinence syndrome in the United States. *Addiction*.	2017	evaluate the economic burden of NAS	cost	Nas admissions, length of stay, associated costs of NAS	27,943	infants with a diagnosis of NAS	Retrospective observational study	Costs are 3 times greater with NAS infant when compared to non affected infant	if infants are overdiagnosed, the cost of treating these infants is substantially higher so important to diagnose them accurately with a valid and reliable assessment

Isemann, Stoeckle, Tategbard, Mueller. Early prediction tool to identify the need for pharmacotherapy in infants at risk of neonatal abstinence syndrome. *Pharmacotherapy.*	2017	To better predict the need for treatment of NAS at 36 hours of birth after complete documentation of MFNAS score through hospital stay	tool with a high predictive value of the need for pharmacotherapy	symptoms + exposure tool	264 infants	many infants with polysubstance exposure	retrospective cohort study	tool has have a high positive predictive value in determining which infants will/will not need pharmacotherapy	The modified Finnegan score is used in this study. Per the study researchers, "Although the Modified Finnegan score is the one most widely used it can be imperfect. The subjectivity, potential for bias, and confounding factors are numerous."
Gomez-Pomar, Finnegan, Devlin, Bada, Concina, Ibonia, Westagte. Simplification of the Finnegan Neonatal Abstinence Scoring System: A retrospective study of two institutions in the USA. BMJ	2017	Develop a simplified Finnegan Neonatal Abstinence scoring system	simplified FNAS that will highly correlate with score >/= 8 and >/= 12 in infants being assessed with FNAS	simplified FNAS	367 infants	infants >/= 37 weeks	retrospective study	further studies are needed to establish clinical utility, validity, and reliability prior to widespread use of the simplified FNAS	Per the researchers, "...lack of subsequent validation and interrater reliability is a major concern with the FNAS"
Westgate & Gomez-Pomar. Judging the neonatal abstinence syndrome assessment tool development: The use of clinimetrics as opposed to psychometrics. Frontiers in Pediatrics.	2017	review the usefulness of NAS assessment tools in order to guide future tool development to reduce variable practices					review	recommend a formative model approach which can take into account the complexity of presenting symptoms. Look at the models and use curent research to judge.	plan to use in introduction
Grossman, Lipshaw, Osborn, Xu, Esserman, Shapiro, Bizzarro: An initiative to improve the quality of care of infants with neonatal abstinence syndrome. *Pediatrics.*	2017	Design a new system to decrease length of stays and medication management of NAS infants through advocating first line interventions	Average Length of stay (ALOS), medication initiation rates, cost	non pharmacologic care; prenatal counseling, transfer from nursery to room in, novel approach, rapid morphine weans; morphine as needed, empowering message for parents, spread of change concepts to NICU	287 infants	infants with NAS	Quality improvement through the plan, do, study, act cycle methodology with a pre/post test design	Decrease ALOS from 22.4 to 5.9 days, morphine treatment dropped from 98% to 14%, and costs decreased from $44,824 to $10,289	
Grossman, Lipshaw, Osborn, Berkwitt. A novel approach to assessing infants with neonatal abstinence syndrome. *Hospital Pediatrics.*	2018	Apply a new model, ESC, to NAS infants and compare with current practice of finnegan	Hospital length of stay, drug therapy	Eat, Sleep and Console Approach	50 infants	opioid exposed infants	retrospective study	Morphine was initiated in 12% of infants with ESC model and would have been initiated in 62% if the Finnegan scale had been utilized. LOS decreases with the ESC approach	ESC model focuses on a patient not a number. No adverse events after discharge were noted.
Wachman, Schiff, Silverstein. Neonatal Abstinence Syndrome: Advances in Diagnosis and Treatment. JAMA.	2018	summarize key studies that look at diganosis and management of NAS			53 articles	NAS infants	systematic review	Insufficient evidence to support an association between any diagnostic or treatment approach	ESC showed a 45% reduction in initiation of pharmacologic therapy

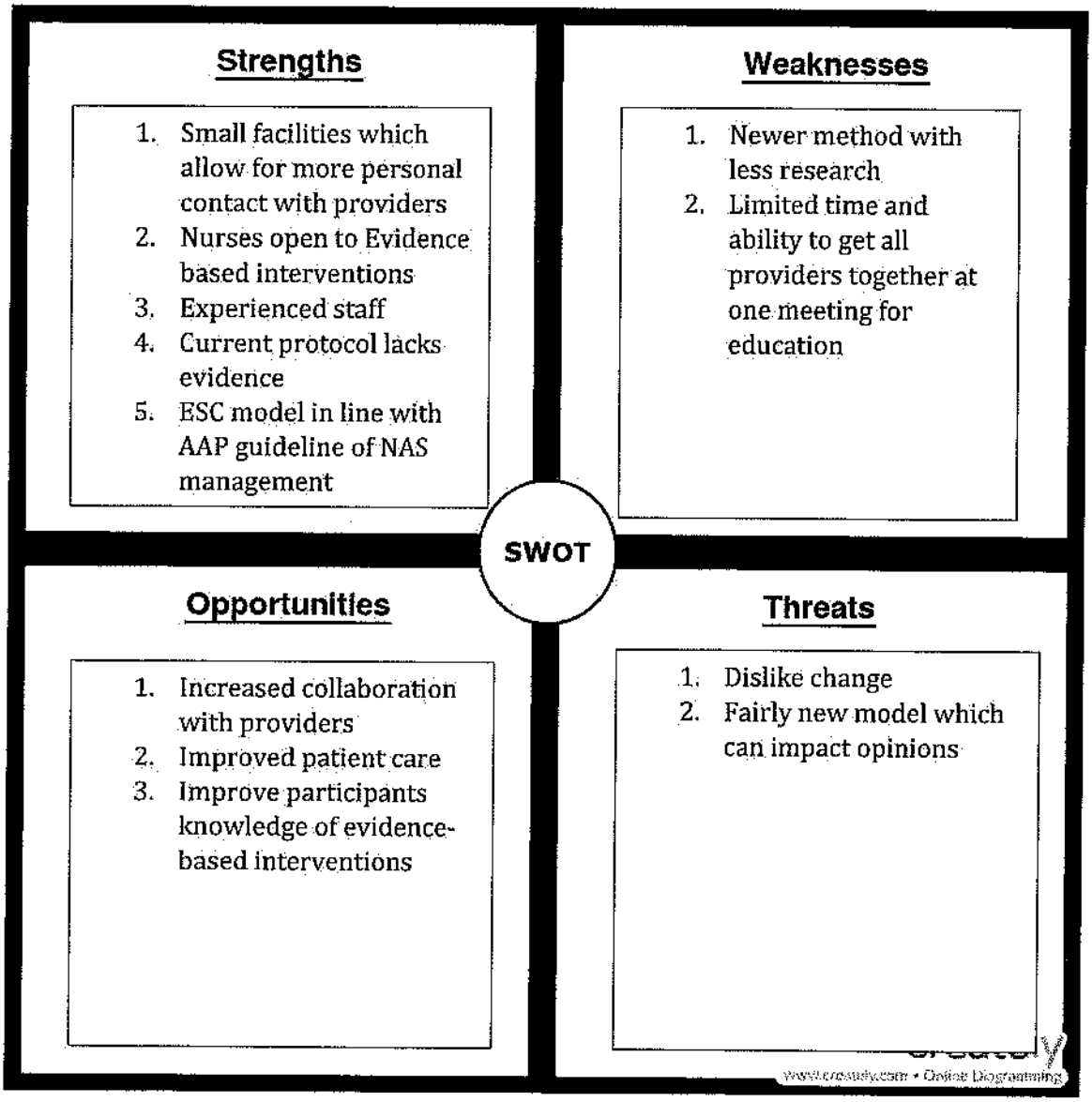
Appendix B

Timeline



Appendix C

SWOT Analysis



Appendix D

Modified Finnegan Assessment

	Time ⟶									
CNS		Score								
Cry	Highpitched, possible to soothe	2								
	Highpitched, not possible to soothe	3								
Sleep	Sleeps < 3 h after feed	1								
	Sleeps < 2 h after feed	2								
	Sleeps < 1 h after feed	3								
Moro-reflex	Over active	2								
	Very over active	3								
Tremor	Moderate tremors disturbed	1								
	Severe tremors disturbed	2								
	Moderate tremors undisturbed	3								
	Severe tremors undisturbed	4								
	Scratch marks	1								
Tone	Increased muscle tone	2								
Seizures	Myoclonic jerks	3								
	Generalised seizures	5								
Respiratory										
Yawning	Frequent yawning >3-4/interval	1								
Nose	Congested nose	1								
Sneezing	>3-4 times/interval	1								
	Nasal flaring	2								
Tachypnea (>60/min)	No retractions	1								
	With retractions	2								
Gastrointestinal										
Sucking behaviour	Excessive sucking	1								
Feeding	Poor feeding	2								
Vomiting	Regurgitation	2								
	Projectile vomiting	3								
Stool	Loose	2								
	Watery	3								
Other symptoms										
	Sweating	1								
Fever	37.2-38.2°C	1								
	>38.2°C	2								
Colour	Mottling	1								
TOTAL SCORE										

Appendix E

NAS Assessment Tool Survey

Witham Health Services

The following questions ask you about your current tool to assess Neonatal Abstinence Syndrome (NAS). Circle the number that most closely relates to your feelings about the current assessment tool:

Please specify by checking the Respondent Type that most closely matches your position

	Registered Nurse
	Physician
	Other

Circle the correct numeric response to each question

#	Question	Survey Scale: 1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree				
1	Current assessment method is easy to use	1	2	3	4	5
2	Current assessment method is clear	1	2	3	4	5
3	Current assessment method is utilized at the appropriate intervals	1	2	3	4	5
4	Current assessment method is helpful to guide patient care decision making	1	2	3	4	5
5	Current assessment method helps to appropriately escalate care (determine need for transfer)	1	2	3	4	5
6	Current assessment method accurately assesses an infant's ability to maintain vital newborn functioning	1	2	3	4	5
7	Current assessment method requires infants to be disturbed from sleep	1	2	3	4	5
8	Current assessment method is the best way to assess infants with NAS	1	2	3	4	5

PLEASE COMPLETE SURVEY BY:	**ASAP**
RETURN TO:	**Rachel Tiefel**

THANK YOU!