Implementing the Infant Positioning Assessment Tool in a Neonatal Intensive Care Unit

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A DNP Project Manuscript
Submitted in Partial Fulfillment of the Requirements for the
Doctor of Nursing Practice Degree

University of Maryland School of Nursing
May 2022

Abstract

Problem: Infants in the neonatal intensive care unit (NICU) are at increased risk for long-term complications and disability. Developmentally supportive positioning improves neurodevelopmental outcomes in this patient population. Infants hospitalized in NICUs with standardized positioning practices benefit from enhanced developmental outcomes. The valid and reliable Infant Positioning Assessment Tool (IPAT) promotes appropriate infant positioning and encourages caregiver accountability in developmentally supportive positioning practices when used with bedside education. In an academic community medical center NICU, there was no standardized positioning practice in place. Baseline data indicated that 75.1% of infants were being positioned in a developmentally supportive manner.

Purpose: The purpose of this quality improvement project was to implement the IPAT to improve consistency in developmentally supportive positioning by promoting appropriate positioning and encouraging accountability in positioning practices. The goal was for 100% of eligible patients to have an acceptable IPAT score of ≥9 by completion of the implementation period.

Methods: The project took place in a 26 bed, Level III NICU from November 2021 to January 2022. All infants over 32 weeks gestation, 1,500 grams, past the first 72 hours of life, and admitted to the unit for more than one twelve-hour shift were eligible. Implementation involved a bedside IPAT reference, an online educational training module, informational reference posters, and ongoing bedside education. Data was collected semiweekly on IPAT scores of eligible patients once per shift. A percentage of IPAT scores ≥9 was calculated for weekly averages.

Results: The results demonstrated an increase in the average percentage of eligible patients having an acceptable IPAT score of ≥9 when compared to baseline data (82.8% versus 75.1%), with the median percentage being 83.9%.

Conclusions: Implementation of the standardized IPAT positively impacted consistency in developmentally supportive positioning practices at the project site. Recommendations to strengthen practice change include integrating IPAT documentation into the electronic health record (EHR), increasing the completion rate of the educational training module, and incorporating developmentally supportive positioning as part of annual competencies and new staff orientation.

Implementing the Infant Positioning Assessment Tool in a Neonatal Intensive Care Unit

In the United States, one of every ten infants is born prematurely and 10 to 15% of all infants require care in the neonatal intensive care unit (NICU) (Centers for Disease Control and Prevention [CDC], 2020). Premature infants and infants requiring critical care in the NICU are at increased risk for long-term complications and disability. Developmentally supportive positioning is an intervention used to improve neurodevelopmental outcomes in this patient population. NICUs which have standardized positioning protocols demonstrate enhanced developmental outcomes in their patient population (Coughlin, Lohman, Gibbins, 2010). In an academic community medical center NICU, there is no standardized developmentally supportive positioning guideline in place. Baseline data indicates that infants are positioned in a developmentally supportive manner 75.1% of the time. The Infant Positioning Assessment Tool (IPAT) is a valid and reliable pictorial tool for evaluating infant positioning in the NICU (Coughlin, Lohman, & Gibbins, 2018). Evidence demonstrates that use of the IPAT promotes appropriate infant positioning and encourages caregiver accountability in developmentally supportive positioning practices when used in conjunction with bedside education (Coughlin, Lohman, Gibbins, 2010). The purpose of this quality improvement (QI) project is to implement the standardized IPAT to improve consistency in developmentally supportive positioning by promoting appropriate positioning and encouraging accountability in positioning practices in the NICU project site.

Evidence Review

Neurodevelopment follows a cephalocaudal and proximodistal pattern. The fetus begins to develop active muscle tone at 36 weeks gestation. The third trimester in utero provides the ideal environment for development of physiological flexion (Madlinger-Lewis et al., 2014).

Infants born prematurely do not have adequate physiological flexion as they lack sufficient neurological and musculoskeletal maturity. The extrauterine environment is characterized by an absence of appropriate boundaries, presence of increased gravitational pull, and abundance of neurosensory input. As a result, premature infants in the NICU often have an unfavorable alignment with a natural extended positioning for postural stability, placing them at risk for developing misalignment, skeletal deformation, and gross motor delay (Sweeney & Gutierrez, 2002). Inadequate containment and flexion in the extrauterine environment are associated with hindered development of sensory information processing in this patient population. Developmentally supportive positioning of infants in the NICU promotes skeletal integrity, postural control, and sensorimotor organization, reduces positional deformities and pain responses, improves muscle tone, postural alignment, and movement patterns, which collectively support proper neurodevelopment (Hunter, Lee & Altimier, 2010; Jeanson, 2013; Liu et al., 2007; Sweeney & Gutierrez, 2002). Developmentally supportive positioning practices of premature infants in the NICU ultimately lead to enhanced neurodevelopmental outcomes.

While developmentally supportive positioning is associated with improved neurodevelopmental outcomes for premature infants, inconsistency in best positioning practices is a common problem in NICUs (Coughlin, Lohman, Gibbins, 2010). An evidence-based recommendation to improve consistency in developmentally supportive positioning is implementation of a standardized tool along with bedside education on developmentally supportive positioning. The Infant Positioning and Assessment Tool (IPAT) is a pictorial tool developed in 2010 by Coughlin, Lohman, and Gibbins, and is copyright (2018) of Koninklijke Philips Electronics N.V., specifically developed to be used as an educational reference and

evaluation instrument to standardize best positioning practices of premature infants in the NICU (Coughlin, Lohman, & Gibbins, 2010). This tool provides an objective and measurable assessment of body alignment in supine, prone, and side-lying to improve consistency in positioning practices.

Several studies evaluate the validity and reliability of the IPAT. Coughlin, Lohman, and Gibbins (2010) assessed the efficacy of the IPAT in teaching consistency in positioning practices through a system-wide quality improvement initiative focusing on implementing the IPAT in conjunction with a developmentally supportive care educational program (Coughlin, Lohman, & Gibbins, 2010). Following the intervention, IPAT scores were statistically significantly higher in six urban tertiary care centers when comparing fifty-five patients during the implementation pretest phase and fifty patients during the posttest phase. Spilker, Hill, and Rosenblum (2016) also implemented the IPAT along with informal bedside education to determine the effectiveness of the implementation tactic in improving developmental supportive positioning proficiency in the NICU, yielding similar results. They found a statistically significant increase in the mean IPAT scores of the pre-intervention compared to the post-intervention groups (Spilker, Hill, & Rosenblum, 2016). Similarly, Jeanson (2013) found that application of the IPAT tool with one-to-one bedside education improves positioning consistency in their study engaging an interdisciplinary team of nurses, practitioners, and physical therapists to compromise an IPAT team scoring infants' positioning and providing bedside education. 98% of staff indicated competency in developmentally sportive positioning following the protocol (Jeanson, 2013). Finally, Painter and colleagues (2019) examined the impact of appropriate developmental positioning on length of stay, infant weight gain, tone, and flexion by implementing an educational in-service on developmentally supportive positioning and using the

IPAT as a visual guide for evaluating infant positioning. Infants who were consistently positioned in a developmentally supportive manner had a statistically significantly increased rate of weight gain, improved tone and flexion, and higher mean scores on the Hammersmith Infant Neurological Exam (Painter et al., 2019). The evidence demonstrates that use of the IPAT along with bedside training in the NICU setting improves consistency in developmentally supportive positioning practices. See Tables 1 and 2.

Theoretical Frameworks

The Synactive Theory of Infant Development was developed by Heidelise Als in 1982 to understand how infants organize their behavior as a response to environmental influences, such as the hospitalized neonate in the NICU setting (Figure 1). This middle range theory describes the nervous system through behavioral observation. The presumption the theory is based on is that all living organisms are in constant communication and interaction with their environment (Als, 1982). The Synactive theory identifies infant development as an interactive and hierarchical process of five subsystems, including the autonomic, motor, behavioral, attention to interaction, and self-regulation. Als (1982) suggests that each individual subsystem is in continual interaction with these four subsystems, the environment, and the caregiver. The caregiver in the NICU setting is any individual providing hands-on care for the infant. The Synactive Theory determines that developmentally supportive positioning of infants by caregivers in the NICU aids in normalization of infant neurobehavioral organization. Thus, developmentally supportive positioning practices is a fundamental intervention for this patient population in the NICU.

Complex Innovation Implementation is the implementation framework applied for this QI initiative. Helfrich, Weiner, McKinney, and Minasian (2007) theorize that effective innovation is a function of managerial support and resource availability and is mediated by an organization's

policies, practices, and climate (Figure 2). The assumption of the Implementation Process Framework is that the climate of implementation is influenced by innovative champions and the fit between the values of the organization and the QI initiative (Helfrich et. al., 2007). In this QI practice setting, the innovation of improving consistency in developmentally supportive positioning is a shared mission among organizational stakeholders. Factors which aided the initiative include the culture of the organization placing high value in evidence-based practice, quality improvement, and professional development. These commitments facilitated achievement of the goal of the QI initiative by supporting clinical practice change with the aim to improve patient outcomes in the NICU in this academic community medical center.

Methods

This QI project took place in the 26-bed, Level III NICU in an academic community medical center over the course of ten weeks from November 2021 through January 2022. Infants over 32 weeks gestation, 1,500 grams, past the first 72 hours of life, and admitted to the unit for more than one twelve-hour shift were eligible for the QI initiative. The standardized instrument used in the QI project was the IPAT (Figure 3) (Coughlin, Lohman, & Gibbins, 2018). In detail, this tool uses a two-point scoring system for six areas of the body, including the head, neck, shoulders, hands, hips/pelvis, and knees/ankles/feet. A score of zero to two is allocated to each body area, zero indicating misaligned positioning to two indicating idea alignment. A total cumulative IPAT score ranges from zero to twelve, with a total score greater than or equal to nine as indicative of acceptable developmentally supportive positioning of the infant to account for technological interfaces necessary in the NICU.

In the months preceding implementation, the Project Lead (PL) engaged and mobilized an interdisciplinary team of stakeholders in the NICU at the project site, including the unit

manager, clinical educator, medical director, medical core team, registered nurses (RNs), nursing support technicians (NSTs), Education Committee, Director of Maternal Child Health Services, Informatics Nurse Specialist, the academic community medical center's Director of Professional Practice, Chief Nursing Officer, and Director of Research Review to gain support to implement this QI initiative. This process included obtaining multilevel approval for QI implementation within the academic community medical center, developing a draft developmentally supportive positioning guideline using the IPAT for the unit, preparing a draft of the IPAT for the electronic health record (EHR), placing the IPAT reference at each bedside, creating and assigning an online educational training module through NetLearning to NICU caregiver staff outlining developmentally supportive positioning and use of the IPAT (Figure 4). In addition, the PL developed an informational resource poster to act as a resource for staff (Figure 5). This poster was displayed throughout the unit for staff to review. Prior to implementation, baseline assessment was obtained by the PL using the IPAT once per shift semiweekly to calculate an averaged percentage of eligible infants with an IPAT total cumulative score of greater than or equal to 9 resulting in the baseline data of 75.1% of infants being positioned in a developmentally supportive manner on the unit pre-implementation.

During implementation, the PL continued to score infant positioning using the IPAT once per shift semiweekly for ten weeks from November 2021 through January 2022. The deidentified patient IPAT total cumulative scores were then averaged to record a weekly percentage of eligible infants with an IPAT total cumulative score of greater than or equal to 9 (Appendix A & Appendix B). The stated goal for this project was for 100% of eligible patients to have an IPAT score of greater than or equal to 9 by completion of the implementation period. Data was stored on a secure data management spreadsheet by the PL to monitor progress to goal achievement.

No infant identification was recorded during any stage of data collection. Patient privacy and data confidentiality were ensured throughout the QI initiative.

This QI project was intended for internal purposes for the Level III-B NICU at the project site academic community medical center. These interventions were uniquely tailored to meet the practice problem identified by the stakeholders of the site. While implementation of this QI project involved interventions designed for and data collected from humans, the intent of the implementation was to improve consistency in developmentally supportive positioning practices in the Level III-B NICU rather than contribute to generalizable knowledge on developmental positing in this patient population. This project received Human Research Protections Office (HRPO) Non-Human Subject Research designation as well as the project site's Institutional Review Board (IRB) Quality Improvement and Not Human Subjects Research determination.

Results

At the conclusion of the implementation period, the results indicated an increase in the average and median percentage of infants positioned according to developmentally supportive positioning practice on the unit. Pre-implementation, the baseline data for infants being positioned according to developmentally supportive positioning practice was 75.1%, indicating that at any given time, 75.1% of infants have an IPAT score of 9 or greater on the unit. Following the initiative, the average percentage of infants with an IPAT total cumulative score of greater than or equal to nine was 82.8% and the median percentage was 83.9 (Figure 6). Both values demonstrate an increase in infants being positioned according to developmentally supportive manner post-implementation at the project site.

Several factors led to the unfulfilled QI project goal, including the short data collection period and a low educational training module completion rate. The data collection period

spanned ten weeks, which is too short to detect true trends in the data. A project timeline of greater than ten weeks is needed to document continual improvement in infants being positioned in a developmentally supportive manner at the project site. In addition, the NICU caregiver educational training module completion rate by the second week of January was only 23.2%. Anticipating a low completion rate for an online training module, the abridged informational reference poster was created and displayed on the unit. Despite the information being readily available, the completion rate for the educational training module is the only way to keep an accurate record of what percentage of staff accessed the training on developmentally supportive positioning and use of the IPAT. Further barriers to the success of the initiative also included high acuity on the unit accompanied with abnormally inadequate staffing due to the novel COVID-19 pandemic. Finally, there were no costs associated with this intervention outside of the PL printing the physical IPATs and informational reference posters.

Discussion

To improve consistency in developmentally supportive positioning on the unit, the standardized IPAT was implemented to promote developmentally supportive positioning and accountability in positioning practices in the NICU. The goal of this QI project was for 100% of eligible patients to have an IPAT score of greater than or equal to 9 by completion of the implementation period. While the goal of the project was not achieved, an increase was seen in the percentage of infants with IPAT scores when comparing the pre-implementation, baseline percentage and the post-implementation, average and median percentages.

On bedside education by the occupational therapy staff, training additional unit champions on use of the IPAT to reinforce bedside education by NICU caregiver staff, and an

increase in completion rate of the educational training module will strengthen this practice change. An increase in developmentally supportive positioning was documented in the research on other units implementing use of the IPAT. Jeanson (2013) found that application of the IPAT tool with one-to-one bedside education improves positioning consistency when engaging with an interdisciplinary team. Spilker, Hill, and Rosenblum (2016) also implemented the IPAT along with informal bedside education, yielding similar results in an increase of infants being positioned in developmentally supportively. Continuing education at the bedside on the unit in conjunction with the ongoing training will improve the rate of practice change and establish permanent practice change. Furthermore, integrating the IPAT into the EHR will increase caregiver accountability during routine cares. Once NICU caregiver staff begin to document an IPAT score at least once per shift, a chart audit can support the use of the IPAT by tracking scores. Finally, NICU caregiver staff were assigned the educational training module outside of the normal time for annual competencies when staff are constantly reminded to complete assigned modules. Expanded access of the educational training module to the NICU interprofessional team during annual competencies will increase completion of the training.

Conclusion

This QI initiative resulted in a positive change in infants being positioned in a developmentally supportive manner on the unit. The conclusion of this QI initiative is that implementation of the standardized IPAT positively impacts consistency in developmentally supportive positioning practices at the project site. Developmentally supportive positioning practices lead to improved neurodevelopmental outcomes in this patient population. A patient population with improved developmental outcomes ultimately lowers the cost of health care expenditure at the macrosystem level. Therefore, the no-cost, valid and reliable IPAT use in the

NICU is an invaluable intervention for infants hospitalized in the NICU.

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Table 1

Evidence Review Table for Improving Consistency in Developmentally Supportive Positioning Practices in the NICU

Citation: Coughlin, M., Lohman, M. B., & Gibbins, S. (2010). Reliability and effectiveness of an infant positioning assessment tool to standardize developmentally supportive positioning practices in the neonatal intensive care unit. *Newborn and Infant Nursing Reviews, 10*(2), 104–106. https://doi-org.proxy-hs.researchport.umd.edu/10.1053/j.nainr.2010.03.003					Level III
Purpose	Design	Sample	Intervention	Outcomes	Results
"The aim of this study was twofold: (1) to develop an infant position assessment tool to standardize best practices in neonatal positioning and (2) evaluate its effectiveness in teaching consistent positioning practice."	Quasi-experimental, pretest-posttest design	Sampling Technique: Convenience Eligible: All NICU patients not receiving direct care at the time of observation Control: No control due to quasi-experimental design Intervention: Fifty-five NICU patients during the pretest phase and 50 NICU patients during the posttest phase Statistical analysis: Not applicable	Control: Baseline IPAT scores on NICU patients not receiving direct care at the time of observation Intervention: NICU staff at six urban tertiary care centers underwent the Wee Care program, a system wide educational program focused on developmentally supportive care as a quality improvement initiative Intervention fidelity: Three research assistants collected baseline IPAT scores (T1). Thirteen months later (T2), the same research assistants collected post-intervention IPAT scores. Neonatal care providers were blinded to the timing of the data collection	Dependent Variable: IPAT scores Measure: Reliability was established by having four independent reviewers compute IPAT scores for five infants. Interrater reliability scores were above 90% using Fleiss's κ	The system wide quality improvement initiative implementing the IPAT in conjunction with an educational program focusing on developmentally supportive care yielded statistically higher IPAT scores at T2 ($P <$ .0001) at each of the six sites

Citation: Jeanson, E. (2013). One-to-one bedside nurse education as a means to improve positioning consistency. *Newborn and Infant Nursing Reviews, 13*(1), 27–30. https://doi-org.proxy-hs.researchport.umd.edu/10.1053/j.nainr.2012.12.004					Level III
Purpose	Design	Sample	Intervention	Outcomes	Results
"The purpose of this article is to describe how using the Infant Positioning Assessment Tool paired with one-to-one bedside education can improve positioning consistency across shifts and experience."	Quasi-experimental, pre-, intra-, and posttest design	Sampling Technique: Convenience Eligible: All infants less than 34 weeks gestation regardless of technology interface or gestational age during randomly assigned shifts Control: No control due to quasi-experimental design Intervention: Thirty infants in phase one, 21 infants in phase two, and 37 infants in phase three Statistical analysis: Not applicable	Control: Baseline IPAT was performed on all infants younger than 34 weeks gestation by 4- to 5-person IPAT reliable teams Intervention: Scripted education paired with IPAT training in a 52-bed level IIIb midwest medical center nursery Intervention fidelity: Three NICU wide positioning assessments were completed, including initial baseline IPAT evaluation, scripted education paired with IPAT evaluation one month after baseline, and four months after initial bedside education with infants assessed during randomly assigned shifts without staff forewarning	Dependent Variable: IPAT scores Measure: Reliability was established using analysis of individual IPAT administrations with 96% to 100% agreement of scores across teams with modification of scoring to account for asymmetry improving IPAT scoring reliability to 98%	In phase one, baseline score distribution ranged from 3 to 11. In phase two, the education phase, scores ranged from 6 to 11. In phase three, the post-education phase, the scores ranged from 6 to 12. Mean IPAT scores were 8.3, 8.7 and 9.2 respectively. Hand positioning has the greatest change, increasing from 1.2 to 1.5. Head position increased from 0.6 to 0.8. The frequency of acceptable scores increased and the frequency of subpar scores decreased. A modified *t*-test determined that changes in mean scores were not large enough to reach statistical significance

Citation: Spilker, A., Hill, C., & Rosenblum, R. (2016). The effectiveness of a standardized positioning tool and bedside education on the developmental positioning proficiency of NICU nurses. *Intensive & Critical Care Nursing*, *35*, 10–15. https://doi-org.proxy-hs.researchport.umd.edu/10.1016/j.iccn.2016.01.004					Level III
Purpose	Design	Sample	Intervention	Outcomes	Results
"The objective of this study was to determine if the use of a standardised infant positioning assessment tool (the IPAT) and informal bedside education is an effective way to improve the developmental positioning proficiency of NICU nurses."	Quasi-experimental, pretest-posttest design	Sampling Technique: Convenience Eligible: Infants who were less than 34 weeks gestation, in incubators, using developmental positioning supplies Control: No control due to quasi-experimental design Intervention: Fifty-four infants pre-intervention and 55 infants post-intervention Statistical analysis: Levene's test indicated that the assumption of equal variances was met ($F = 1.546$, $p = 0.217$) for the 54 pre-intervention scores and 55 postintervention scores collected for two different samples of infants	Control: Baseline IPAT scores on infants who were less than 34 weeks gestation, in incubators, using developmental positioning supplies Intervention: Introduction of the IPAT tool and several types of educational materials in multiple formats, individualized for this 46 bed, level III NICU in the western United States, over the course of one month Intervention fidelity: Pre-intervention IPAT scores were collected over a period of 12 days and post-intervention IPAT scores were collected over a period of eight days	Dependent Variable: IPAT scores Measure: Reliability was established through a developmental positioning team by having each member independently score for five sample infants, with the inter-rater reliability intraclass correlation for consistency of single measures was 0.797 and for consistency or average measures was 0.972, and for absolute agreement of single measures and absolute agreement of average measures was 0.712 and 0.957 respectively. Cronbach's alpha was 0.972, indicating that the IPAT had internal consistency	An independent samples *t*-test indicated a statistically significant ($p = 0.027$) increase in the mean IPAT scores of the pre-intervention and post-intervention groups. The mean for the preintervention group was 8.39 (SD = 2.498) and the for the post-intervention group was 9.42 (SD = 2.283)

Table 2

Synthesis Table for Implementing the Infant Positioning Assessment Tool in a Neonatal Intensive Care Unit

Evidence Based Practice Question (PICO): Does implementing the Infant Positioning Assessment Tool (IPAT) as a reference and evaluation instrument improve consistency of developmentally supportive positioning practices in the NICU?			
Level of Evidence	**# of Studies**	**Summary of Findings**	**Overall Quality**
III	**2**	Coughlin, Lohman, & Gibbins (2010) found that the IPAT is a reliable resource for providing a standardized reference for developmentally supportive positioning practices in the NICU. Coughlin, Lohman, & Gibbins (2010) also found that the IPAT in conjunction with education is effective in improving developmentally supportive positioning practices in the NICU. Spilker, Hill, & Rosenblum (2016) also found that the IPAT is highly reliable and consistent instrument and too determined that a protocol of IPAT implementation along with bedside education yields significant increase in developmentally supportive positioning practices in the NICU.	B: Randomization was not possible with this study design. This study had an adequate sample size with statistically significant results. The findings were consistent across clinicians within and between multiple sites. Consistent recommendations based on a comprehensive literature review with reference to scientific evidence. B: Randomization was not possible with this study design. An adequate sample size was used with statistically significant results. While sample size was sufficient, IPAT scores were obtained on different infants cared for by different nurses at a single clinical site. This study had consistent recommendations based on a comprehensive literature review with reference to scientific evidence.
III	**1**	Jeanson (2013) found that staff reported being competent at positioning according to the protocol of using the IPAT and one-to-one bedside education. The IPAT served as an effective tool for assessing positioning and helps to bridge the difference between staff perception and actual positioning practices. Immediate feedback and correction of positioning allowed nurses to see the difference proper infant positioning has on physiological markers of stress in real time.	C: No randomization was possible for this study design. Power analysis was unreported to determine whether same size was sufficient for statistical analysis. Small sample size, fluctuations in census, and an inability to match staff caring for infants evaluated in the pre-, intra-, and post-intervention phases were limitation to the study. Finally, while mean IPAT scores did increase, the results were statistically insignificant, possibly due to the limited sample size.

Level of Evidence	Type of Evidence
I (1)	Evidence from systematic review, meta-analysis of randomized controlled trails (RCTs), or practice-guidelines based on systematic review of RCTs.
II (2)	Evidence obtained from well-designed RCT and/or reports of expert committees.
III (3)	Evidence obtained from well-designed controlled trials without randomization.
IV (4)	Evidence from well-designed case-control and cohort studies
V (5)	Evidence from systematic reviews of descriptive and qualitative study
VI (6)	Evidence from a single descriptive or qualitative study
VII (7)	Evidence from the opinion of authorities

Rating Scale for Quality of Evidence (Newhouse)		
High (A)	Scientific	Consistent results with sufficient sample size, adequate control, and definitive conclusions; consistent recommendations based on extensive literature review that includes thoughtful reference to scientific evidence
	Summative Review	Well-defined, reproducible search strategies; consistent results with sufficient numbers of well-defined studies; criteria-based evaluation of overall scientific strength and quality of included studies; definitive conclusions
	Experiential	Expertise is clearly evident
Good (B)	Scientific	Reasonably consistent results, sufficient sample size, some control, with fairly definitive conclusions; reasonably consistent recommendations based on fairly comprehensive literature review that includes some reference to scientific evidence
	Summative Review	Reasonably thorough and appropriate search; reasonably consistent results with sufficient numbers of well-defined studies; evaluation of strengths and limitations of included studies; fairly definitive conclusions.
	Experiential	Expertise seems to be credible.
Low Quality (C)	Scientific	Little evidence with inconsistent results, insufficient sample size, conclusions cannot be drawn
	Summative Review	Undefined, poorly defined, or limited search strategies; insufficient evidence with inconsistent results; conclusions cannot be drawn
	Experiential	Expertise is not discernable or is dubious

Note. Adapted from Newhouse RP. (2006). Evidence and the executive. Examining the support for evidence-based nursing practice. *Journal of Nursing Administration, 36*(7/8), 337–340.

Figure 1

The Synactive Theory of Infant Development (Als, 1982)

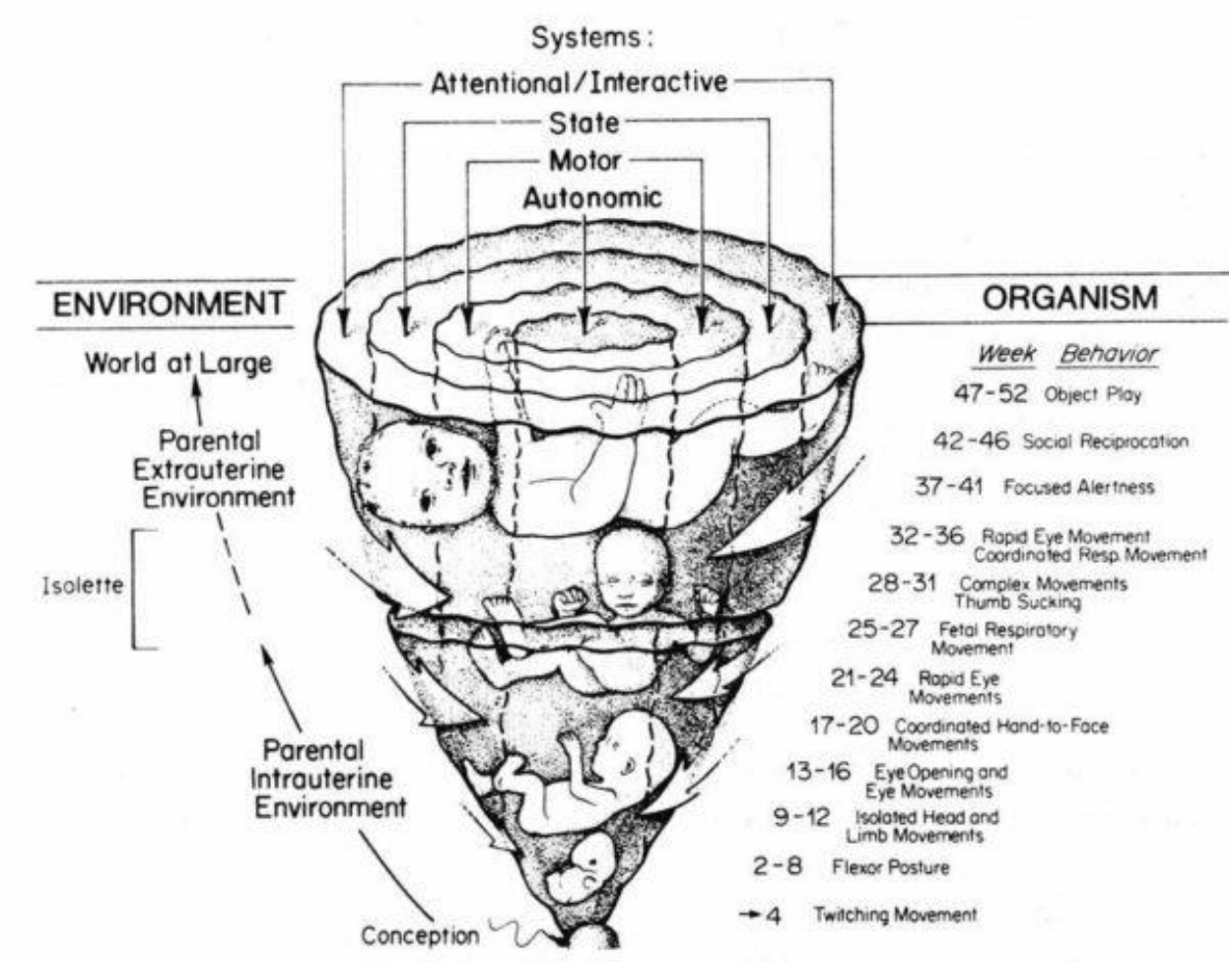


Figure 2

Complex Innovation Implementation (Helfrich et. al., 2007)

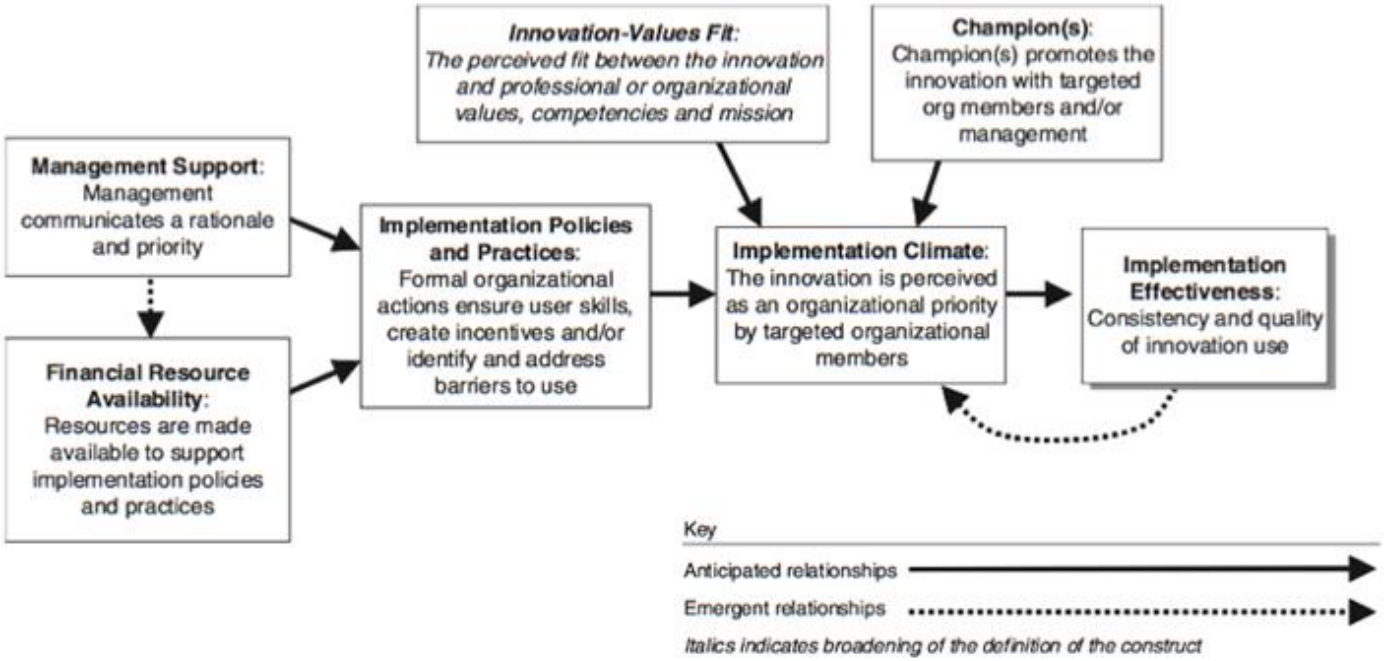


Figure 3

Infant Positioning Assessment Tool (IPAT) (Coughlin, Lohman, & Gibbins, 2018)

Infant Positioning Assessment Tool (IPAT)

Patient's name: Birth gestational age/corrected gestational age:

Clinician's name: Date/time of assessment:

Infant position: ☐ Supine ☐ Side-lying ☐ Prone

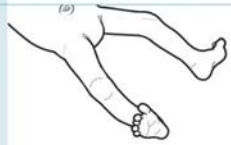
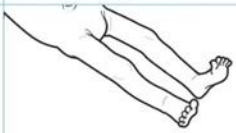
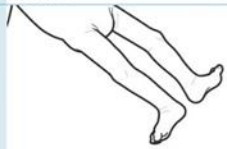
Indicator	0	1	2	Score
Head	 Head rotated laterally (L or R) > 45° from midline	 Head rotated laterally (L or R) 30 – 45° from midline	 Head aligned (L or R) 0 – 30° from midline	
Neck	 Neck in hyperextension or hyperflexion	 Neck neutral	 Neck neutral, aligned, head slightly flexed forward 10°	
Shoulders	 Shoulders retracted	 Shoulders aligned, flat to surface	 Shoulders rounded forward towards midline	
Hands	 Hands away from body	 Hands touching torso	 Hands touching face	
Hips/pelvis	 Hips/pelvis abducted, externally rotated	 Hips/pelvis aligned but extended	 Hips/pelvis aligned and softly flexed	
Knees/ ankles/feet	 Knees extended, ankles and feet externally rotated	 Knees, ankles, feet aligned but extended	 Knees, ankles, feet aligned and softly flexed	
12 = ideal cumulative score. 9 – 11 = acceptable cumulative score. ≤ 8 = need for repositioning.			**Total cumulative score**	

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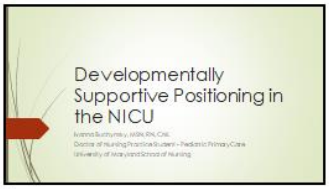
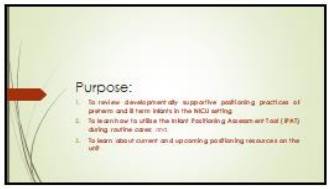
Figure 4

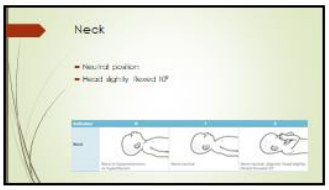
NICU Caregiver Educational Training Module on Developmentally Supportive Positioning and Utilization of the IPAT



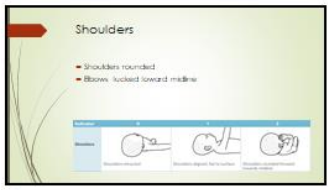
1



2



7

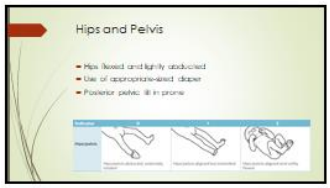


8

3

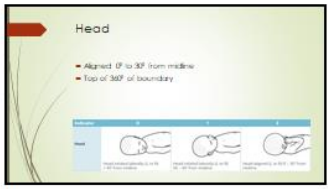
4

9



10

5



6

11

12

13

14

15

16

17

Figure 5

Developmentally Supportive Positioning Educational Poster

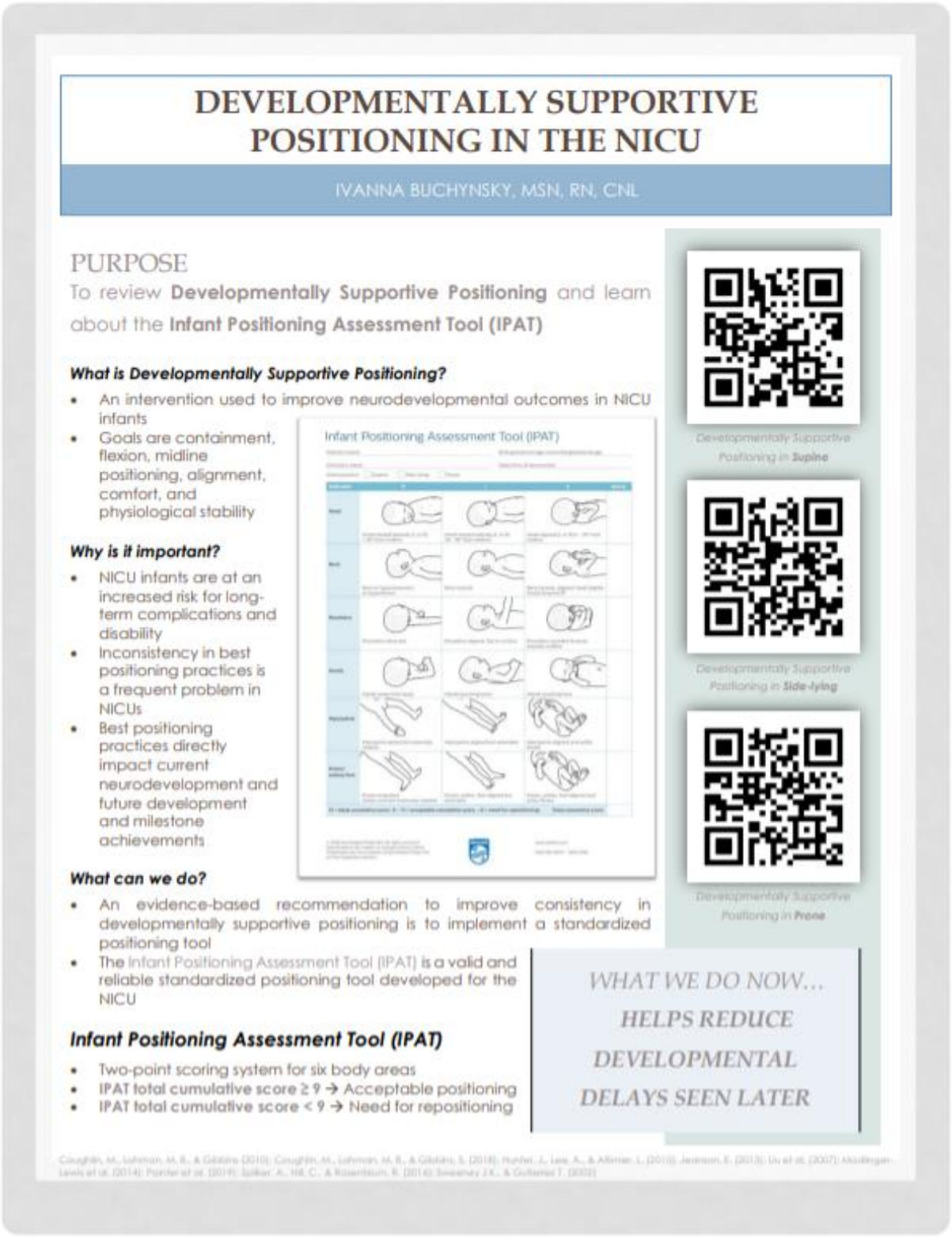
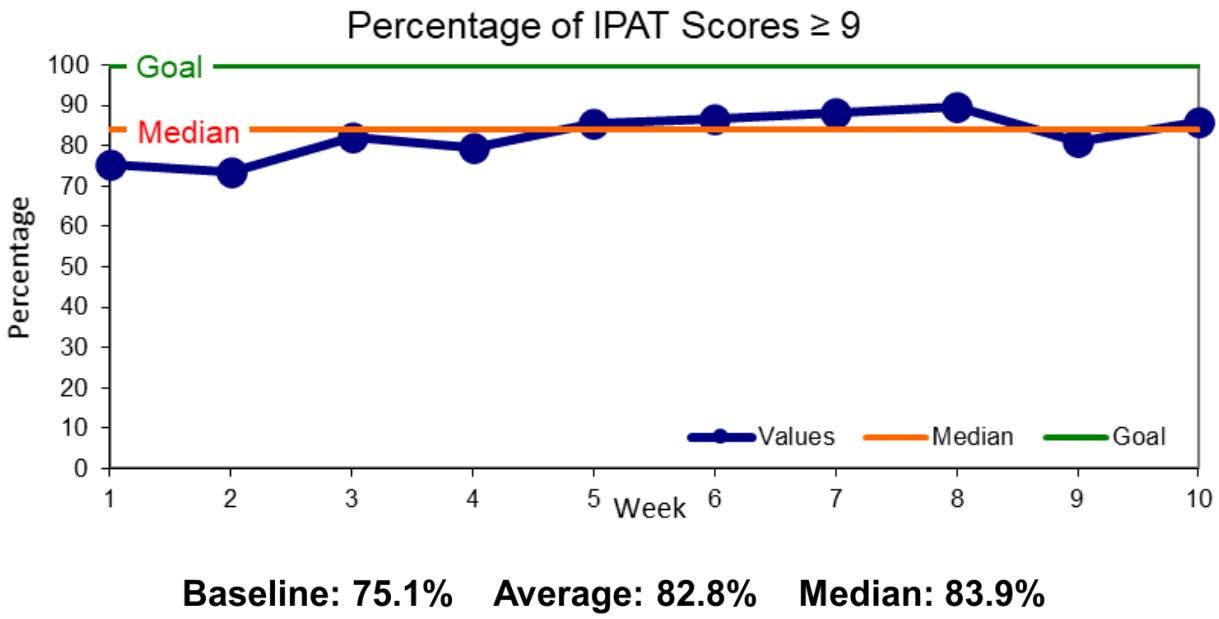


Figure 6

Run chart of the percentage of IPAT total cumulative scores of ≥9 per week



Baseline: 75.1% Average: 82.8% Median: 83.9%

Appendix A

Collection Tool for Infant IPAT Scores

Date	Infant	IPAT Score
	1	
	2	
	3	
	.	
	.	
	.	
	.	
	.	
	20	

Appendix B

Collection Tool for Percentage of IPAT Scores ≥9

Date	Percentage