IMPLEMENTATION OF A TUMMY TIME PROTOCOL: A QUALITY IMPROVEMENT PROJECT IN A LEVEL 3B NICU

by

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ABSTRACT

Background: Infants who spend prolonged periods in the supine position, particularly in the NICU, face an increased risk of plagiocephaly and developmental delays. Supine sleeping is recommended by the American Academy of Pediatrics, "*Back to Sleep*" campaign, which has successfully reduced sudden infant death syndrome by 40-60%. However, an increase in cranial abnormalities was observed following the widespread adoption. Daily tummy time supports motor development, reduces the risk of plagiocephaly, and promotes parental bonding.

Methods: A six-week tummy time protocol was implemented in a level 3b NICU for infants who were 32 weeks corrected gestational age and medically stable. Brief 1–2-minute tummy time sessions were completed in the infant's bed or while holding with a parent. Tummy time sessions, education, and return demonstrations were documented on a bedside tracker. Pre- and post-implementation surveys were distributed to staff to gather perspectives. Parent surveys were distributed at discharge to evaluate readiness to complete tummy time at home.

Results: Between January 15th and February 25th, only 23 out of 42 eligible infants had tracker sheets returned (55%). Out of 504 eligible days, tummy time sessions were recorded on 214 days, accounting for 42%. Post-implementation staff surveys showed positive results regarding their confidence in educating parents (M=4.7, *sd*=0.47) and the ease of implementation (M=4.38, *sd*=0.65). Comparing the results of the pre-and post-implementation surveys using a t-test yielded no significance. Obstacles to compliance included difficulty integrating new workflows, time constraints for education completion, tummy time, and documentation.

Conclusion: Implementing the Tummy Time Protocol was crucial in changing practice patterns to align with best practices for infants admitted to the NICU. However, more work must be done to integrate tummy time sessions, early education, and documentation into a new workflow. Suggestions for improvement were provided, focusing on incorporating documentation into the electronic health record (EHR) system to improve compliance and reduce the risk of losing tracking sheets. In addition, future research is necessary to evaluate the long-term effects of tummy time implementation within the NICU. Specifically, research should focus on rates of plagiocephaly and outpatient therapy referrals following discharge from the NICU.

CHAPTER ONE

REVIEW OF THE LITERATURE

Introduction

Plagiocephaly is a significant issue affecting neonates who spend prolonged periods in the supine position in the neonatal intensive care unit (NICU). As a result, physical therapy and corrective helmets are often required to reshape their rapidly developing and malleable skulls. The American Academy of Pediatrics (AAP) recommends starting tummy time when infants are discharged from the hospital. (Goodstein et al., 2021). However, infants who stay in the NICU for days or months may not have the opportunity to practice tummy time. Research indicates that implementing tummy time in the NICU may reduce the incidence of plagiocephaly, promote motor development, and enhance bonding in the intensive care environment (Hewitt et al., 2020; Carson et al., 2022; Uzark et al., 2022). Tummy time education in the NICU is often delayed until discharge, hindering early integration. These infants already face an increased risk of developmental delay due to prematurity and prolonged hospitalization. A tummy time protocol focusing on early NICU integration is crucial for optimizing parental bonding, motor development, and head shape.

Background and Significance

In the United States, over 3.8 million babies were born in 2018; of those, 10-15% required admission to the NICU because of prematurity, infection, respiratory distress, hypoglycemia, hypoxic-ischemic encephalopathy, or congenital abnormalities (Goodstein et al., 2021). In Montana, approximately 9.7% or one in ten babies are born prematurely, defined as

delivery before 37 weeks of gestation (March of Dimes, 2022). In 2020, there were 10,791 live births in Montana, of which approximately 1,047 babies were born prematurely (March of Dimes, 2022). Premature infants are at a higher risk of temperature instability, respiratory distress, infection, poor feeding, and hypoglycemia (Goodstein et al., 2021). These infants are often admitted to the NICU for close monitoring and medical interventions. The classification of prematurity includes late preterm infants born between 34 and 36 weeks, moderately preterm infants born between 32 and 36 weeks, and very preterm infants born before 32 weeks (March of Dimes, 2022). These classifications are valuable as they often correspond to clinical characteristics. Premature infants will generally require more medical intervention and have longer NICU stays than those born closer to term or 40 weeks gestation. Infants born at earlier gestations are less developed, increasing their morbidity and mortality risk (March of Dimes, 2022).

Infants in the NICU are fed, diapered, and assessed every three hours or more frequently as needed. The positioning of infants for sleep in the NICU depends on medical needs and may involve side or prone positions (Goodstein et al., 2021). As infants become stable and reach 32 weeks of corrected gestation, they are moved to supine positioning to demonstrate safe sleeping practices to parents as they prepare to take their babies home. (Goodstein et al., 2021)

In 1992, the AAP launched the Back to Sleep campaign to decrease sudden infant death syndrome (SIDS) in the United States (Hewitt et al., 2020). Recommendations advised parents against placing infants on their stomachs while sleeping. This practice was adopted worldwide, significantly reducing unexpected infant mortalities (Santos et al., 2023). However, after adopting Back to Sleep practices, literature identified that prolonged supine positioning

negatively impacted motor development and caused increased incidences of cranial abnormalities commonly referred to as plagiocephaly (Mendres-Smith et al., 2020). To combat this outcome, caregivers were encouraged to use supervised prone positioning while infants were awake. This form of physical activity, also known as tummy time, has helped decrease the implications of prolonged supine positioning and encourage family bonding (Santos et al., 2023).

According to the AAP, tummy time should begin when healthy babies are discharged from the hospital (Hewitt et al., 2020). However, premature infants admitted to the NICU may experience delayed discharge for days or months (Santos et al., 2023). This delay, combined with the higher risk of plagiocephaly and developmental issues associated with prematurity, underscores the importance of implementing recommended tummy time practices as soon as possible.

A Scoping Review of the Literature

Methods

This scoping review examines the importance of tummy time for motor development and head shape in NICU infants and the barriers to its implementation. The articles included in this scoping review were identified through a systematic search of various peer-reviewed literature databases such as Cat search, PubMed, Cochrane, and Cumulative Index to Nursing and Allied Health Literature (CINAHL). Reference lists of various articles were reviewed to find additional relevant articles. These searches were conducted during August and September of 2023. The following terms were used in the search: “tummy time” AND development, “tummy time” AND plagiocephaly, “tummy time” AND NICU, development AND NICU, “tummy time” AND premature, and “tummy time AND guidelines.”

Inclusion Criteria: To be included in the scoping review, articles must have been peer-reviewed and published within the last ten years, be written in English, and have full texts available online. Articles focused on the impact of tummy time on common barriers to implementation in term or premature infants were considered for inclusion. Excluded articles included duplicates, non-English translations, and those focused on measuring tummy time.

Study Selection: The initial electronic search yielded 205 results, which was reduced to 35 after search criteria were entered and duplicates were removed. Articles were initially screened based on their abstracts for relevance. The remaining 17 full-text articles were assessed for eligibility and excluded based on the reasons identified in Figure 1.1. Ten articles remained after the articles were excluded based on the criteria.

Results

The articles included in this scoping review of literature include one systematic review, one double-blind randomized control trial, one randomized control trial, one quasi-experimental article, two longitudinal studies, and four practice guidelines. After examining the remaining eligible articles, several common themes emerged, achieving saturation. Most studies focused on integrating tummy time for healthy, full-term infants. The studies that focused on inpatient implementation of tummy time showed improved developmental scores compared to tummy time implementation after discharge (Uzark et al., 2022). Despite the demonstrated safety of tummy time implementation, the lack of NICU-specific tummy time research highlights a gap in the literature. Nevertheless, it is hypothesized that the benefits of tummy time could translate to the inpatient NICU population.

Back to Sleep Recommendations Sudden unexpected infant death (SUID), which includes sudden infant death syndrome (SIDS), remains the primary cause of post-neonatal mortality in the United States (Goodstein et al., 2021). Moreover, premature and small for gestational age infants face a two to three times higher risk of sudden and unexpected death than term infants with uncomplicated birth experiences (Goodstein et al., 2021). The AAP's "Back to Sleep" recommendations have been widely accepted since their adoption in the early 90s (Hewitt et al., 2020; Marshall & Shahzad, 2020; Mendres-Smith et al., 2020; Goodstein et al., 2021; Carson et al., 2022; Sampaio et al., 2023). These recommendations include placing infants on their backs to sleep on a firm mattress and advising against placing infants on their stomachs (Santos Sampaio, de Amorim Rodrigues et al.

Despite success in reducing the incidence of SIDS by 40-60%, prolonged supine positioning has led to an increase of 400-600% in the incidence of cranial deformities (Marshall & Shahzad, 2020). AAP guidelines were adjusted to include "Back to sleep, tummy to play" in an effort to encourage time in a prone position and promote appropriate development and head shaping; however, uptake has been inconsistent (Laughlin et al., 2011; Hewitt et al., 2020; Uzark et al., 2022; Zhang et al., 2023). The AAP recommends that infants in the NICU transition to their back for sleep once they are 32 weeks corrected gestation and medically stable. However, the AAP does not offer guidance on initiating tummy time until the patient is discharged home (Goodstein et al., 2021).

Plagiocephaly Plagiocephaly is the development of a flat spot on a baby's head. Prolonged supine positioning, hospitalization, and prematurity increase a patient's risk. The skull should expand during normal development due to the growing brain's outward force (Marshall &

Shahzad, 2020). Additionally, muscles attached to the posterior part of the skull assist in rounding out the occipital bone (Marshall & Shahzad, 2020). These muscles become stronger as the baby spends more time lifting their head while lying on their stomach. However, when an infant spends excessive time lying on their back instead of their stomach, the growing brain cannot exert force against the external pressure on the back of the head, causing a flat spot. (Marshall and Shahzad, 2020)

Multiple factors are associated with developing plagiocephaly, including inadequate tummy time, prematurity, prolonged hospitalizations, developmental delays, and unilateral tightening of neck muscles, known as torticollis (Marshall & Shahzad, 2020). Infants with these conditions require physical therapy to improve their range of motion and may require specialized helmets to correct flat spots (Mendres-Smith et al., 2020). It is important to note that cranial abnormalities are not simply a cosmetic issue; differences in appearances can lead to negative self-esteem, bullying, or safety concerns, as bike or sports helmets may fit improperly (Marshall & Shahzad, 2020). Evidence also shows that plagiocephaly may be associated with auditory processing disorders, speech difficulties, and visual deficits. (Marshall and Shahzad, 2020)

Motor Development Back-to-sleep recommendations and prolonged NICU hospitalizations have led to infants spending significant time in the supine position. To promote optimal motor development, infants must have daily tummy time. Lack of tummy time has been shown to cause delayed developmental milestones (Laughlin et al., 2011; Hewitt et al., 2020; Carson et al., 2022; Lovell et al., 2023; Zhang et al., 2023). Time in the prone position is essential for strengthening an infant's neck, back, and core muscles (Laughlin et al., 2011). Improved strength improves head, neck, and upper body control (Lovell et al., 2023). This is

essential for future movement milestones that build on each other, from prone control to rolling over to crawling on the belly to hands and knees crawling (Carson et al., 2022; Uzark et al., 2022; Lovell et al., 2023; Santos et al., 2023). Inadequate tummy time has been associated with lower scores across several developmental scoring tools compared to infants who receive the recommended amount of prone activity (Hewitt et al., 2020; Carson et al., 2022; Uzark et al., 2022; Zhang et al., 2023).

Bonding When newborns are admitted to the NICU, they are separated from their parents immediately after birth, thereby disrupting holding skin-to-skin after delivery, early breastfeeding, and parental-infant bonding. Infants who are hospitalized usually spend a prolonged period lying on their backs, which is often necessary for medical interventions. Infants in the NICU spend a significant period lying in specialized beds rather than being held by a caregiver, also interrupting bonding. The length of stay in the NICU depends on the medical stability of the infant, which can range from mere hours to months (Goodstein et al., 2021). Tummy time allows parents to interact positively with their infant, improving bonding. This can be completed while parents hold the infant skin-to-skin or in the infant's bed (Uzark et al., 2022). Parental involvement can be beneficial in increasing the amount of time an infant will tolerate tummy time. In a study that evaluated tummy time, decreased negative vocalizations were demonstrated when parents interacted with their infant during tummy time compared to a researcher and no interaction at all (Mendres-Smith et al., 2020). This reinforces the importance of parental involvement to promote bonding and independence.

Knowledge Deficit Based on the AAP guidelines, it is recommended that infants have thirty minutes of tummy time throughout the day to support their optimal growth and development (Hewitt et al., 2020). However, since introducing the back-to-sleep guidelines, parents have placed infants on their stomachs less frequently (Hewitt et al., 2020). This presents an opportunity for healthcare professionals to educate parents on the significance of both supine sleep positioning and supervised prone positioning. It is essential to highlight the negative consequences of insufficient tummy time in addition to back to sleep information.

Poor Uptake Despite the AAP recommendations, many parents have expressed that their infants do not receive sufficient tummy time daily (Hewitt et al., 2020). This may be due to factors such as resistance or intolerance to prone positions and safety concerns from parents (Mendres-Smith et al., 2020; Uzark et al., 2022; Zhang et al., 2023). However, it is essential to reinforce that prone positioning has not been shown to have any adverse effects during hospitalization, even in critically ill patients (Uzark et al., 2022). Parents have reported feeling discouraged and terminating tummy time prematurely when infants cry (Zhang et al., 2023). Parents have expressed positive feedback regarding staff-led demonstrations of tummy time, underscoring the value of education through hands-on demonstration (Mendres-Smith et al., 2020; Uzark et al., 2022).

Discussion and Conclusions

Although a wealth of information supports the benefits of tummy time for term infants, further research is necessary to evaluate the advantages of early tummy time integration in the NICU. The AAP recommends that NICU infants transition to supine sleep by thirty-two weeks,

allowing prolonged supine positioning and associated complications (Goodstein et al., 2021). Studies in the scoping review indicate prolonged supine positioning increases the risk of cranial abnormalities and infant motor delays. This risk is heightened in premature infants admitted to the NICU as their skulls are more malleable and susceptible to positional molding. (Laughlin et al., 2011). These complications may require physical therapy and cranial helmets to correct abnormalities, resulting in high costs and missed work for parents (Laughlin et al., Initiating tummy time before discharge has limited risk, and no adverse effects have been observed (Uzark et al., 2022)The AAP does not have specific recommendations for tummy time for NICU infants, highlighting the need to develop a protocol.

CHAPTER TWO

QUALITY IMPROVEMENT PROPOSAL

Clinical Problem

Prematurity refers to infants born before 37 weeks gestation. Premature births can happen spontaneously or due to medical complications that require induction. Prematurity is the leading cause of death in children under the age of 5 years globally (WHO, 2023). In 2020, approximately 12.4 million babies were born prematurely, accounting for more than 1 in 10 births worldwide (WHO, 2023). Premature infants often require intensive care due to various medical conditions, including infection, respiratory distress, hypoglycemia, hypoxic-ischemic encephalopathy, or congenital abnormalities (Goodstein & Stewart et al., 2021). Infants admitted to the NICU are separated from their parents, interrupting their parental role and bonding. The NICU environment can be distressing for parents as their infant is covered with cords and wires, making simple diaper changes intimidating. In the United States, about 10-15% of the 3.8 million babies born in 2018 required admission to the NICU (Goodstein et al., 2021). Montana has an estimated premature birth rate of 9.7%, which means that one in ten babies is born prematurely (March of Dimes, 2022). In 2020, Montana recorded 10,791 live births, and approximately 1,047 babies were born prematurely, requiring close monitoring and medical interventions in the NICU (March of Dimes, 2022).

Infants who spend prolonged periods in the supine position, particularly in the NICU, face an increased risk of plagiocephaly and developmental delays. Supine sleeping is recommended by the AAP's Back to Sleep campaign, which has successfully reduced sudden

infant death syndrome by 40-60%. (Hewitt et al., 2020). Following the widespread adoption of safe sleep in 1994, it was discovered that placing infants in a supine position for an extended period can have adverse effects on their motor development and lead to a 400-600% increase in cranial abnormalities (Mendres-Smith et al., 2020; Marshall & Shahzad, 2020). Tummy time guidelines were released in response to the rise in plagiocephaly cases resulting from back-to-sleep recommendations. The American Academy of Pediatrics recommends starting tummy time when infants are discharged from the hospital. Parents are encouraged to have their infant engage in supervised tummy time for 1–2-minute sessions 4-5 times per day, with the duration increasing with age (Hewit et al., 2020). This form of physical activity is essential as it focuses on strengthening the muscles responsible for head and neck control and those necessary for pushing up, rolling over, and crawling. However, infants who stay in the NICU for an extended period may not have the opportunity to practice tummy time as corresponding education is often delayed until discharge.

The AAP also advises that medically stable infants in the NICU be put on their backs to sleep at 32 weeks corrected gestational age (CGA) (Hewit et al., 2020). However, infants often leave the NICU around their due date or 40 weeks corrected gestational age, creating a significant gap between when supine positioning is initiated and when tummy time is introduced. While NICU stays cannot be avoided, a protocol that emphasizes early integration of tummy time can optimize motor development, reduce the incidence of plagiocephaly, and promote parental bonding (Hewitt et al., 2020; Carson et al., 2022; Uzark et al., 2022).

Problem Statement

A prominent NICU in the northwestern region of the United States cares for more than 300 infants annually. Infants are admitted for various conditions, including prematurity, respiratory distress, and infection. After an assessment, it was discovered that the facility lacks protocols for initiating inpatient tummy time. As a result, infants experience a delay in the recommended tummy time initiation, which increases the risk of plagiocephaly and developmental delays. Severe plagiocephaly can affect a child's development, leading to facial deformities and developmental delays (Marshall & Shahzad, 2020). As a result, corrective interventions, such as helmets and physical therapy, may be necessary but are costly.

With the implementation of a tummy time protocol, parents and infants admitted to the NICU will be exposed to tummy time before discharge. Consistent tummy time promotes motor development and head control, which are necessary for achieving anticipated developmental milestones (Marshall & Shahzad, 2020). This protocol was designed to provide comprehensive support for the optimal development of infants while reducing the risk of plagiocephaly while still in the NICU. Another benefit was parental bonding, which is crucial for creating a solid and nurturing relationship between parents and children. The NICU environment can overwhelm parents as monitors, cords, and wires surround their infants. Unfamiliar equipment and alarms can be immensely distressing for families. Parents may struggle to feel like they are part of their baby's care team in this highly stressful environment. Early education and initiation of tummy time can help increase parental confidence in positioning their infant correctly. Providing these opportunities while the infant is still in the hospital promoted bonding and improved family autonomy in an otherwise intimidating environment. Parents were familiar with the concept of

tummy time, promoting continuation at home at the time of the infant's discharge. This protocol allowed parents to ensure that their child's physical, cognitive, and emotional needs were met, leading to healthy growth and development.

Organizational Microsystem Assessment

The Level 3b NICU is part of an extensive healthcare system that includes multiple hospitals in the northwestern region of the United States. This hospital serves a local population of approximately 120,000 people and thousands more from rural communities within the state, as well as patients from neighboring states who have access to the hospital's women and children services, including high-risk obstetrics and neonatal intensive care.

The NICU admits an average of 384 infants annually from within the hospital and via external transports. On average, 12 infants are in the unit at any given time. The typical mean corrected gestational age is 31 weeks, and the average length of stay is 16 days. This NICU sees a wide range of infants with various acuity levels. The neonatal intensive care unit is staffed by three neonatologists, five neonatal nurse practitioners, 37 registered nurses, two unit clerks, two case managers, and one nurse manager. Additional departments involved in the care team include respiratory therapy, dietary, and therapies (PT/OT, etc.).

Infants in the NICU receive a minimum of hands-on care every three hours. During these times, nurses complete assessments, take vital signs, change diapers, and provide feedings. Once the care is complete, infants at least 32 weeks of corrected gestational age (CGA) and medically stable are placed on their backs to sleep until the next hands-on care time. Although parents, staff, or volunteer cuddlers may hold the infants between care times, these practices are inconsistent. Currently, the unit's practice is to provide safe sleep recommendations, as medically

appropriate, starting at 32 weeks corrected gestation, per AAP guidelines. Tummy time education is initiated at discharge, and parents are instructed to start it at home.

Infants in the NICU are discharged directly to home based on specific requirements. Consistent growth, temperature, milk intake, and oxygen levels must be maintained. The standard requirements are the same for all infants, but special circumstances may arise for those who need home oxygen or a feeding tube. Infants may require varying lengths of hospital stays as they meet developmental milestones on their timeline. Infants may be positioned in different ways, such as being prone to promote increased oxygenation or digestion based on their clinical condition when they are first admitted. However, as they stabilize, they are transitioned to safe sleep practices, which require them to sleep on their backs without positioning devices. This transition usually occurs at 32 weeks or later if the infant is not medically stable. The transition is tracked through the electronic medical record system.

After the initiation of safe sleep, infants are usually not placed in the prone position. This demonstrates safe sleep habits and prepares the family for discharge. At discharge, families are educated on tummy time, including recommendations and instructions on performing it. The recommendations suggest placing an alert infant in the supine position for a few minutes and gradually increasing the duration as the baby grows older.

During a meeting with the unit educator, a gap was identified in the system-wide NICU policies. The policy stated that tummy time should be initiated in the NICU once an infant transitions to safe sleep positioning at 32 weeks CGA. While educational materials and tummy time recommendations are available in the unit's policy, they are inconsistently applied within the unit. Further evidence of a care gap was highlighted when an occupational therapist specializing

in the NICU revealed that she encounters NICU graduates in high-risk follow-up clinics who suffer from plagiocephaly or developmental delays following an extended hospitalization.

Participants

The quality improvement project involved neonates, family members, nurses, providers, therapists, unit educators, and unit clerks. It aimed to implement a tummy time protocol for premature infants in the NICU, which trained nurses will carry out. The NICU manager, a master' s-prepared registered nurse, acted as the site contact, while registered nurses supported implementing the protocol for eligible patients.

Quality Improvement Framework

The Replicating Effective Programs framework (REP) consists of four phases: pre-conditions (identifying need, target population, and suitable intervention), pre-implementation (intervention packaging and community input), implementation (package dissemination, training, technical assistance, and evaluation), and maintenance and evaluation (preparing the intervention for sustainability) (Kilbourne et al., 2007). The REP framework was created by the U.S. Centers for Disease Control and Prevention (CDC) to bridge the gap between research and practice through the development of easily implementable interventions for non-academic, community-based settings (Kilbourne et al., 2007). The REP framework provides a pathway to enhance the chances of introducing early integration of tummy time for infants admitted to the NICU. The REP steps are in alignment with the objectives of this quality improvement project. The framework identified the need for NICU tummy time guidelines. REP guided the project by

gathering staff input, initiating a tummy time package, and taking steps to support the protocols long-term.

Specific Aims and Purpose Statement

The ultimate purpose of this quality improvement (QI) project was to prevent positional plagiocephaly and developmental delays in infants admitted to the NICU while simultaneously promoting bonding and optimal development. This was achieved by implementing a tummy time protocol based on AAP recommendations that equipped parents with the tools and knowledge to confidently position their infants in the prone position as they transitioned to the home environment.

Smart Goals

Short-term:

1. Tummy time protocol education, including documentation expectations, will be completed and documented via a read-and-sign with >90% of unit staff before the implementation start date.
2. Educational tummy time pamphlets regarding the importance of daily tummy time starting at the initiation of back-to-sleep practices will be designed, approved by the unit's practice council, and printed one week before the implementation start date.
3. Tummy time tracker calendars will be designed, approved by the unit's practice council, and printed one week before the implementation start date.
4. The tummy time reminder checklist will remain in the unit's huddle room and at the nurses' station 100% of the time during the project.

Medium-term:

1. Tummy time education pamphlets and tracker calendars will be placed in 100% of bedside packets during the project.
2. Tummy time education will be completed and documented via the bedside tracker sheet once an infant is medically eligible for safe sleep practices in 75% of patients.
3. Tummy time return demonstration will be completed and documented via the bedside tracker sheet once an infant is medically eligible for safe sleep practices in 100% of patients.

Long-term:

1. During week 2 of the project period, 75% of eligible infants will have at least one documented tummy time session on the bedside tracker every 24 hours. The goal will increase gradually each week as listed: week 4, 80%; week 6, 90%; and week 8, 95%.
2. Parents will express confidence in positioning their infant for tummy time, measured using a Likert scale survey provided at the time of the infant's discharge.
3. Tummy time education will be completed and documented via the bedside tracker sheet once an infant is medically eligible for safe sleep practices in 95% of patients.
4. After project implementation, 95% of staff will complete a survey to gather information on perceived positives and barriers to implementing the tummy time protocol.

Methods

Implementation Summary

The Tummy Time Protocol is a Quality Improvement (QI) project implemented in an inpatient Neonatal Intensive Care Unit (NICU) in the northwestern region of the United States.

This NICU provides care to a wide range of infants, from extremely premature babies to those requiring surgical intervention. The Tummy Time Protocol aimed to introduce early integration of tummy time for hospitalized infants to optimize development and reduce the incidence of plagiocephaly. Daily tummy time was initiated at 32 weeks CGA in infants who meet the medical eligibility criteria. A bedside tracking sheet was used to monitor tummy time progress. Parental education and a demonstration were provided to improve bonding and confidence during tummy time with their infant. This project was completed over six weeks between January 2024 and February 2024. The nursing staff was surveyed to evaluate the perceived benefits and barriers of the protocol.

Intervention and Implementation

The proposed QI project was implemented within an inpatient NICU in the Northwestern region of the United States. The proposed tummy time protocol aimed to provide infants admitted to the NICU with optimal developmental care, promote parental bonding, and reduce the risk of plagiocephaly. The protocol allowed for a streamlined process to initiate tummy time once an infant transitioned to safe sleep practices, aligning with a system-wide policy and AAP recommendations. The proposed intervention involved parent education, tummy time initiation, and confidence evaluation at discharge.

Education

In the first step of the implementation process, the nursing staff was educated on the system-wide policies and current recommendations of the AAP. Furthermore, the nursing staff received evidence-based literature on initiating a tummy time protocol to improve patient

outcomes. Handouts were provided to staff, which provided instructions on implementing the tummy time protocol and where to find materials. Once the education process was completed, the staff completed, read, and sign a document to confirm that they had read and understood the handout and the implementation process.

Timeline

The project's timeline took place between January and February 2024. The implementation budget was minimal, as staff were not required to attend educational sessions outside their regularly scheduled shifts. The cost of implementation was related to printing the protocol materials.

The goal was to ensure that 90% of nursing staff read and sign the protocol document one week before implementation to acknowledge their understanding and responsibility. By the implementation date, education materials and bedside trackers were available to add to the neonate's bedside (figure 1.3, 1.2). Tummy-time protocol checklists were placed at the nurses' station and huddle room to serve as a reminder to initiate the tummy-time protocol (Figure 1.4).

Eligibility

The first step of the protocol was to identify eligible infants. This was done by checking the EHR to find infants following safe sleep guidelines. Nurses initiated the tummy time protocol if infants were at least 32 weeks corrected gestational age and did not require additional medical care such as reflux precautions or oxygen support. Once an eligible infant had been identified, the nurse obtained the tummy time protocol education packet and bedside tracker and placed it at the infant's bedside. The nurse then recorded when the baby transitioned to safe sleep, gestational age, and admission date on the tracker.

Data Collection

Tummy time could be initiated by the nurse immediately after hands-on care. Initially, the goal for tummy time was 1-2 minutes per session. The nurse marked the corresponding date on the bedside tracker to document that tummy time was completed. When the parents came to the bedside, the nurse provided them with tummy time education by reviewing the pamphlet and explaining how to document it on the tracker sheet. The nurse and parents then coordinated a time for a return demonstration to assist the parents with positioning their infants in the prone position. Tummy time education and return demonstration date were documented at the tracker sheet's top. Parents received an anonymous survey at discharge to evaluate their knowledge and confidence regarding tummy time. Surveys were placed in a folder in a secured part of the unit.

Barriers

It was anticipated that there could be some obstacles in implementing this QI project. These obstacles included reluctance from staff to participate, perceptions of time constraints, and difficulties in getting parents to be available. It was also possible that interrupted bonding and lack of knowledge may impact the implementation of the project. The manager of the NICU reported that there had been an increase in patient volume, which resulted in nurses having busier workloads than usual. Some families had to travel long distances to visit their baby in the rural NICU, making it challenging to see their child regularly. Most of these obstacles were addressed through education on evidence-based literature, limited patient risk, and the anticipated improved long-term patient outcomes.

Evaluation & Analysis

Data Collection

Evaluation of the implemented tummy time protocol occurred weekly for the duration of the project. Ensuring staff participation and engagement was crucial for the success of the quality improvement project. To achieve this, a survey was conducted among the staff before and after implementing the tummy time protocol. The survey evaluated their perspectives and comfort levels regarding the new protocol. The staff was also encouraged to share their perspectives and any barriers they faced during the implementation process.

The Bedside Tummy Time Tracker Data Sheet was the primary data collection source. The NICU educator recommended using bedside documentation instead of EMR due to the time-consuming process of creating a new flowsheet that requires system-wide approval. Nurses could have added comments to flowsheets, but extracting data requires going through documentation hourly. A bedside chart simplified data collection and reminded caregivers and parents to carry out tummy time. Chart reviews within the EMR were utilized to identify eligible patients. Discharge surveys were provided to parents to assess their confidence in continuing tummy time at home. The project coordinator collected tracker sheets and parent surveys weekly to capture short stays.

Statistical Analysis

Both inferential and descriptive statistics were used to evaluate data. Data was tracked using Excel spreadsheets on a password-protected computer. Qualitative descriptive data analysis was used to identify themes. Although this approach was less rigorous, it helped obtain rich data and better understand the phenomenon being studied. Quantitative data was used to determine if

infants in the NICU were getting enough tummy time. The number of days tummy time was completed was divided by the number of eligible days. According to unit experts, it was estimated that only 30% of infants are getting appropriate tummy time. The goal is to increase this to 80%. Data collected may also allow for future secondary analysis to determine whether there is a difference in tummy time implementation based on the infant's gestation at admission.

Staff received anonymous pre- and post-implementation surveys to gather qualitative and quantitative data on their perspectives. The data was evaluated for improvements. Upon discharge, surveys were distributed to parents to assess their comfort level and confidence level in placing their infant in the prone position. This survey was designed to gather valuable information on how effective the protocol was in preparing the family for discharge.

Safety and Confidentiality

Before implementing this quality improvement project, an ethical review by Montana State University's institutional review board (IRB) was completed, and approval was received from stakeholders. The project coordinator and team members had undergone HIPAA training. Throughout the project, staff adhered to patients' rights policies and confidentiality and privacy policies in protecting confidential data within the EMR system. Potential patient risks included poor tolerance of prone positioning, leading to crying. Infants who showed distress were repositioned, picked up, and comforted. Less than minimal potential risks to staff were identified.

The project lead collected primary data using tummy time tracking sheets at the patient's bedside. The sheets were marked with an identification number, and identifying information was removed and destroyed. Data was entered into a password-protected Excel sheet. Parents were provided an anonymous survey at discharge to measure their knowledge and confidence

regarding tummy time. Staff were surveyed anonymously regarding perceived barriers to implementing a tummy time protocol.

The project coordinator collected secondary data to identify patients eligible to start the tummy time protocol. Data was collected from the EMR through chart review, including the patient's corrected gestational age and when safe sleep was initiated. Chart reviews were conducted in a private area within the NICU that was limited to staff only. No identifying information was removed from the facility.

CHAPTER THREE

QUALITY IMPROVEMENT MANUSCRIPT

Contribution of Authors and Co-Authors

Manuscript(s) in Chapter(s) 1

Author: Taylor Christine Chaffin

Contributions: The author analyzed the clinical problem, reviewed the literature, proposed research methods, and implemented the study protocol. They collected and analyzed data using statistical methods and used the findings to write the first draft of the manuscript.

Co-Author: Dr. Benjamin Miller

Contributions: Benjamin Miller played a crucial role in completing the manuscript. He offered expert guidance and feedback throughout the process. He completed a comprehensive editorial review, which helped identify and correct any errors or inconsistencies in the text. He assisted in statistical analysis, ensuring the accurate and understandable presentation of data.

Co-Author: Dr. Julie H. Alexander Ruff

Contributions: During the finalization process, Julie Ruff played a crucial role as a second reader. She provided a comprehensive editorial review that included suggestions for improvement regarding the manuscript's structure, language, and flow.

Manuscript Information

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Clinical Problem

To reduce the incidence of sudden infant death syndrome (SIDS) in the United States, the American Academy of Pediatrics (AAP) launched the Back to Sleep campaign in 1992 (Hewitt et al., 2020). Parents were advised not to place infants on their stomachs while sleeping, resulting in a notable decrease in unexpected infant deaths (Santos et al., 2023). However, after implementing Back to Sleep techniques, the research demonstrated that extended supine positioning had a detrimental effect on motor development and raised the risk of cranial abnormalities and flattening of the posterior skull, known as plagiocephaly (Mendres-smith et al., 2020).

To combat this outcome, caregivers were encouraged to use supervised prone positioning while infants were awake. This form of physical activity, also known as tummy time, has helped decrease the implications associated with prolonged supine positioning and encourage play and family bonding (Santos et al., 2023). The AAP recommends that tummy time should begin when healthy infants are discharged from the hospital (Hewitt et al., 2020). However, premature infants admitted to the Neonatal Intensive Care Unit (NICU) may experience delayed discharge for days or months (Santos et al., 2023). This delay, combined with a higher risk of plagiocephaly and developmental issues associated with prematurity, underscores the importance of implementing recommended tummy time practices in the NICU.

Roughly 12.4 million babies were delivered preterm in 2020, making up over 10% of all births globally (WHO, 2023). Of the 3.8 million newborns born in the US in 2018, 10–15% required admission to a NICU (Goodstein & Stewart et al. 2021). March of Dimes (2022) estimates that one in ten babies in Montana are born prematurely. There were 10,791 live births

reported in Montana in 2020; of those, about 1,047 were preterm births, necessitating NICU care and close observation (March of Dimes, 2022). NICUs are classified into four levels based on facility capabilities and provider type. The levels range from I-IV and increase in complexity (Table 2.1).

The AAP recommends that medically stable neonates be placed on their backs to sleep starting at 34 weeks corrected gestational age (CGA) (Hewit et al., 2020). However, because newborns are often discharged from the NICU around their due date, there is a significant delay between beginning supine positioning and starting daily tummy time. While NICU stays are unavoidable, early integration of tummy time in the NICU can enhance motor development, lower the risk of plagiocephaly, and strengthen the bond between parents and child (Hewitt, et al., 2020, Carson et al., 2022, Uzark, et al., 2022).

Background and Significance

In the US, sudden unexpected infant death (SUID), which includes SIDS, continues to be the leading cause of post-neonatal mortality (Goodstein et al., 2021). In addition, compared to term infants with uneventful birth experiences, premature and small for gestational age infants have a two to three times greater chance of SIDS (Goodstein et al., 2021). SIDS was reported to have decreased by 40–60% after the Back to Sleep initiative was put into action, but unanticipated side effects included a 400–600% rise in cranial abnormalities (Marshall & Shahzad., 2020).

Plagiocephaly

The formation of a flat area on a baby's head is known as plagiocephaly. Hospitalization, prematurity, and extended supine positioning raise a patient's risk. The outward force of the expanding brain should cause the skull to expand during normal development (Marshall & Shahzad, 2020). In addition, the occipital bone is rounded out by muscles linked to the back of the skull (Marshall & Shahzad, 2020). As the baby spends more time raising their head while lying on their tummy, these muscles get stronger. However, when a baby lies on their back too much instead of on their stomach, the developing brain cannot resist the pressure from the outside on the back of the head, resulting in a flat spot. (Marshall & Shahzad, 2020).

Motor Development

Research has demonstrated that delayed developmental milestones are a result of inadequate tummy time (Laughlin et al., 2011; Hewitt et al., 2020; Carson et al., 2022; Lovell et al., 2023; Zhang et al., 2023). An infant's neck, back, and core muscles must be strengthened throughout time in the prone position (Laughlin et al., 2011). Strengthening enhances control of the head, neck, and upper body (Lovell et al., 2023). Future milestones in movement, such as rolling over, prone control, crawling on the belly, hands, and knees crawling, and so on, depend on this (Carson et al., 2022; Uzark et al., 2022; Lovell et al., 2023; Santos et al., 2023).

Further Research

More research is required to assess the benefits of early tummy time integration in the NICU despite evidence supporting the benefits of tummy time for term newborns. By thirty-two weeks, the AAP advises NICU babies to go to supine sleep, which allows for more extended supine positioning and potential complications (Goodstein et al., 2021). Long-term supine lying

raises the likelihood of cranial abnormalities and baby motor impairments, according to studies included in the scoping review. Premature babies that are admitted to the NICU are at even greater risk because of their more malleable skulls, which are more prone to positional molding (Laughlin et al., 2011).

These complications may require physical therapy and cranial helmets to correct abnormalities, resulting in significant costs and missed work for parents (Laughlin et al., 2011). Unit experts at a level 3b NICU in the Northwestern US estimate that only 30% of infants admitted receive tummy time while being held by parents or staff. Initiating tummy time before discharge has limited risk, and no adverse effects have been observed (Uzark et al., 2022). The AAP does not have a specific tummy time protocol for NICU infants, emphasizing its need for development.

Conceptual Framework

The Replicating Effective Programs framework's (REP) four phases: pre-conditions, pre-implementation, implementation, and maintenance and evaluation were essential in bridging the gap between research on tummy time and integrating it into practice (Kilbourne et al., 2007). The REP framework provides a structured approach to integrating tummy time for infants admitted to the NICU. The steps taken by the REP are in alignment with the objectives of this quality improvement project. The need for NICU tummy time guidelines was identified during the pre-conditions phase of the framework. The REP served as a guide in collecting staff feedback, creating a tummy time package, and taking measures to ensure the long-term success of interventions.

Aims and Purpose

More than 300 babies are cared for each year at a level 3B NICU in the northwestern region of the United States. This facility did not have procedures in place to start inpatient tummy time before hospital discharge, increasing the risk of plagiocephaly and developmental delays. The ultimate purpose of this quality improvement (QI) project is to prevent positional plagiocephaly and developmental delays in infants admitted to the NICU while simultaneously promoting bonding and optimal development. This will be achieved by implementing a tummy time protocol based on AAP recommendations that equip parents with the tools and knowledge to confidently position their infants in the prone position as they transition to the home environment.

Ethical Considerations

Before implementation, the Tummy Time Protocol was submitted to Montana State University's Internal Review Board (IRB) for approval. It was determined that the project was exempt as the focus is Quality improvement (figure 2). Additionally, the protocol was approved by the NICU's practice council, which oversees practice changes in the unit. Potential patient risks included poor tolerance of prone positioning, leading to crying. Infants who showed distress were repositioned, picked up, and comforted. Minimal potential risks to staff were identified. It is important to note that the project lead is currently employed as a registered nurse in the NICU. To ensure the integrity of the improvement project, the project lead refrained from participating in the implementation process as a nurse, thus making great efforts to limit personal bias.

Methods

Context

The Level 3b NICU, where the quality improvement project took place, is a part of a comprehensive healthcare system that includes several hospitals in the northwestern region of the United States. The hospital serves a local population of approximately 120,000 people and patients from rural communities within the state and neighboring states.

The NICU admits an average of 384 patients annually, including newborns delivered at the facility and transfers from other hospitals. On average, 12 infants are in the unit at any given time. The mean gestational age at admission is 31 weeks, and the average length of stay is 16 days. The NICU receives a wide range of infants with varying acuity levels. The neonatal intensive care unit is staffed by three neonatologists, five neonatal nurse practitioners, 37 registered nurses, two unit clerks, two case managers, and one nurse manager. Additional departments involved in the care team include respiratory therapy, dietary, and therapies (PT/OT, etc.).

Infants in the NICU receive hands-on care every three hours. Nurses conduct assessments, take vital signs, change diapers, and provide feedings during this time. After the care is completed, infants at least 32 weeks of corrected gestational age (CGA) and medically stable are placed on their backs to sleep until the next hands-on care time per the AAP recommendations. Parents, staff, or volunteer cuddlers may hold the infants between care times, though these practices are inconsistent. Tummy time education is usually initiated at discharge, and parents are instructed to start at home.

Intervention

The tummy time protocol aimed to provide developmentally appropriate care for infants admitted to the NICU while promoting parental bonding and reducing the risk of plagiocephaly. The protocol involved initiating tummy time for infants transitioning to safe sleep practices at 32 weeks CGA, per AAP recommendations and a system-wide policy.

The project lead collaborated closely with the unit's practice counsel, responsible for overseeing practice change within the unit. Committee approval was obtained for the tracker sheets, education, visual aids, and surveys (figure 3.1-3.4). The tracker sheets are a single-page calendar; circling a date indicates the completion of daily tummy time. One week before the protocol was implemented, staff members received information on executing the tummy time protocol, documentation, and where to find materials. Staff members were asked to read the protocol and sign a document confirming their understanding of the handouts and implementation process. The goal was for 90% of the staff to complete a read-and-sign educational tool to ensure that most nurses received the necessary training and could implement the protocol successfully. Following the read-and-sign, a pre-implementation survey collected information on nurse perspectives. As they completed the required education during their scheduled shifts, the budget for implementation was minimal. The only cost incurred was related to printing the protocol materials.

Tummy time trackers, education, and surveys were approved by the unit's practice counsel and distributed to the neonate’s bedsides the night before data collection. Additional trackers were placed in a designated cabinet easily accessible by staff. Visual tummy time checklists were distributed as reminders at the nurse's workstation and huddle room. Data

collection for the quality improvement project was conducted over six weeks between January and February 2024.

At the start of the protocol, eligible infants were identified by evaluating their medical stability and gestational age in the EHR. Nurses initiated the tummy time protocol if an infant was at least 32 weeks corrected gestational age and did not require additional medical care, such as reflux precautions or significant oxygen support. The nurse would then record the baby's transition to safe sleep, gestational age, and admission date on the tracker.

Tummy time sessions could be started by the nurse immediately after providing hands-on care. The goal for the tummy time sessions began at 1-2 minutes daily. The session could occur in the infant's bed or while being held by parents or staff. The nurse or parent circled the corresponding date on the bedside tracker to document that the tummy time was completed. When more than one session was completed in 24 hours, the circled date was filled in. When parents visited their infant in the hospital, the nurse was responsible for educating them on how to perform tummy time. This was done by reviewing an educational pamphlet and explaining how to document the sessions on a tracker sheet. The nurse and parents then set a time for a return demonstration to help the parents position their infants correctly. The tummy time education and return demonstration date would be documented at the top of the tracker sheet for future reference. Parents were given an anonymous survey at discharge to evaluate their knowledge and confidence regarding tummy time. Following data collection, a post-implementation survey was distributed to staff to assess perspectives and barriers. The surveys and completed trackers were placed in a folder in a secure place within the unit.

Measures

Data for the tummy time protocol was collected through various measures. Pre- and post-implementation surveys were crucial in gathering staff perspectives on implementation ease and barriers to success. The surveys included the use of 5-point Likert questions, which are known for their simplicity and ease of comprehension. The surveys included open-ended questions, allowing staff to provide more detailed feedback on their perceptions regarding the identified barriers and ways to improve them. Quantitative and qualitative data were collected by including both questions in the survey to provide valuable insights into the staff's perceptions and experiences.

The tummy time tracker sheets were designed to gather client-specific information such as the infant's gestational age, date of admission, and date when they became eligible for tummy time. The tracker sheets displayed the months 2024 and included clear instructions for parents to circle the date when tummy time is completed. Furthermore, if tummy time was completed more than once in 24 hours, parents were instructed to fill in the circle accordingly.

The project lead conducted direct observations within the unit. During this time, the project lead ensured that tummy time tracker sheets were placed at the bedside of eligible patients. Direct observation of staff provided valuable insight into the protocol's effectiveness and helped identify challenges that staff and parents faced during implementation.

Analysis

Demographics were evaluated for eligibility, including a corrected gestational age of at least 32 weeks and the date infants were transitioned to safe sleep practices. The next step

involved calculating the frequency of values for each Likert question. This was done to determine the number of times the participants chose a particular response. The mean and standard deviations were calculated for each score. Additionally, a t-test was performed to compare the pre- and post-implementation survey responses. Next, the frequency of tummy time sessions was calculated by dividing the number of circled days by the total number of eligible sessions. Finally, raw values from the open-ended questions and direct observations were evaluated to identify common themes. This approach allowed for a more comprehensive understanding of participants' experiences and perspectives, enabling the identification of areas for improvement.

Results

Out of a total of 37 nurses, 23 staff nurses completed the pre-implementation survey, indicating a response rate of 62% (table 3.1). Moreover, 28 bedside nurses out of 37 acknowledged their understanding of the protocol by completing the protocol read and sign, representing a response rate of 75%. Finally, 23 nurses out of 37 completed the post-implementation survey, a Response rate of 62% (table 3.2). One voluntary parent survey was completed at the end of the data collection. The feedback was positive, but some survey questions were not applicable due to the short stay.

Throughout the six-week implementation phase, 42 infants qualified to participate in the tummy time protocol based on gestational age of 32 weeks and medical stability. A total of 23 tracker sheets were obtained by the end of the project. Out of the 504 eligible days, tummy time sessions were recorded on 214 days, which accounts for 42% of the total eligible days (figure 4). More than one session in 24 hours was recorded 24 times, representing 5%.

Post-implementation surveys of staff showed positive results with the majority ranking agree to strongly agree regarding their confidence in educating others and the ease of implementation. The t-test comparing the means of the survey found no significance (table 3.3). However, some common obstacles to compliance were identified, such as difficulty integrating new workflows, perceived time constraints for completing education, tummy time, and documentation. Suggestions for improvement were provided, focusing on incorporating documentation into the electronic health record (EHR) system to improve compliance and reduce the risk of losing tracking sheets.

Discussion

During the implementation of the tummy time protocol, the participation was lower than expected, and the goal of achieving 90% compliance on the read and sign was not met. Moreover, the daily tracking of tummy time was also below the target threshold. Only one parent survey was received, making it difficult to generalize. However, despite the barriers, the tummy time protocol was still successful. During implementation, 42% of infants received tummy time while admitted, compared to an estimated 30% before the protocol.

The protocol created a new level of staff awareness of the implementation of the intervention. It is too early to determine the long-term impacts of the tummy time protocol and its effect on infant development and risk for plagiocephaly. Aligning with the literature, tummy time was easy to implement, but some infants did not tolerate the positioning. This was quickly addressed by picking up or comforting a crying infant. Parent education and reassurance helped extend the sessions where infants became fussy.

The tummy time protocol impacted 23 documented infants who had tummy time initiated while they were inpatient. This practice may have otherwise been started at home as education was previously available at discharge. Parents of infants had the opportunity to see how to do tummy time with their infant before discharge, allowing time for clarifying questions. Several factors may have affected the results, including tracking starting later than the initial eligible date. Additionally, both pre-implementation and post-implementation surveys were anonymous, making it unclear if nurses who took the initial survey also took the second one, making it difficult to compare the two groups.

Limitations

Staff Buy-in

During the implementation of the tummy time program, it was found that not all staff members had completed the required pre-education read-and-sign process or the pre-implementation survey. While some absences were understandable, there were instances where some staff members did not participate. This initially led to low participation rates, which was concerning. To address this issue, the project lead attended two staff meetings where the protocol was reviewed and clarifying questions were answered. Additional signage was added to parent areas, encouraging parents to ask their nurse about daily tummy time. This helped to increase awareness and parental participation in the program.

Despite efforts, some issues with staff participation persisted. A typical response from staff members was that they forgot to mark the tracker sheet. During unit rounding, staff were observed placing infants in the prone position but were inconsistent with tracking. These observations suggest that infants may have received more tummy time than documented.

Parent Participation

Several challenges with involving parents in the protocol were identified throughout the implementation process. One major issue was that parent participation was inconsistent. Some parents visited their infants between care times and did not want to disturb them while they were sleeping, making it difficult to involve them in certain aspects of the protocol, such as tummy time exercises. Moreover, some infants had parents who lived out of town, leaving the staff responsible for completing tummy time exercises entirely.

Another challenge was coordinating a time for parents to complete the required education or return demonstrations. Due to conflicting schedules, finding a suitable time that worked for parents and the staff was often difficult. Despite efforts to encourage parental participation, only one parent survey was returned. This may be due to parents feeling overwhelmed and stressed during discharge as they prepare to take their newborn home.

Facility Considerations

Implementing the tummy time protocol faced various barriers due to high census, short staffing, and busy assignments. Nurses were frequently floated from other departments without receiving the necessary training, which led to missed opportunities for implementation and documentation of tummy time. Additionally, due to the high patient census in the NICU, the nursing staff had to rearrange the infants in the unit. This meant some infants had to be moved to different locations to accommodate new admissions. Regrettably, tacker sheets were misplaced during the transition. Furthermore, some data sheets were unintentionally given to parents while discharging patients from the hospital. These errors made monitoring the protocol's progress challenging and resulted in missing data.

Two new protocols for visitor screening and assessing infant acuity created an additional barrier to implementation. This led to increased paperwork that nurses were required to complete during each shift. During rounding, multiple nurses expressed feeling overwhelmed with the paperwork that needed to be addressed, making it challenging to implement the protocol effectively. Furthermore, additional bedside paperwork sometimes covered the tracker sheets, making them difficult to access and complete.

Integration with EMR

Due to the recent integration with an extensive health system, the ability to customize EMR flowsheets has significantly decreased. As a result, tracking tummy time sessions in the EMR has become challenging. Although it would have been the preferred method of data collection, the approval timeline to add a new documentation session in the EMR did not align with this project's timeline. Therefore, the project lead utilized physical tracker sheets to document tummy time sessions.

Another consistent challenge nurses faced was integrating bedside documentation into their routines, as identified through surveys and rounding. Nurses suggested adding a section to the EMR documentation to improve tracking compliance and provide a better picture of completed tummy time. An electronic prompt may have increased compliance and decreased the occurrence of missing data due to losing the physical trackers.

Changes in Infant Acuity

As part of the data collection process, three infants who were eligible for the study experienced unexpected changes in their health status. One required emergent intubation due to acute decompensation, another required abdominal surgery, and the third developed an infection

at their gastrostomy tube (g-tube) site. As a result, the days these infants were not medically stable were excluded from the overall eligible tummy time days. Once the infants became medically stable again, tracking was resumed.

It is worth noting that two of the parents expressed concerns to the nursing staff about placing their infants in a prone position with a g-tube. This unexpected barrier needed to be addressed through parental education and encouragement. The nursing staff provided the parents with the necessary education to help them understand the importance of tummy time and how to safely position their infants to avoid any risks associated with the g-tube. With the nursing staff's help, the parents could overcome their concerns and participate in tummy time.

Recommendations

EMR

Collecting data through the EMR is essential to ensure successful implementation in future projects. One of the major obstacles during the project was missing tracking sheets, resulting in an incomplete data set. Prompts built into the EMR would help eliminate missing data and capture all necessary information.

Electronic Surveys

Additionally, transitioning towards electronic surveys would prevent individuals from skipping open-ended questions, providing more valuable feedback. Furthermore, online survey platforms could help increase response rates by sending reminder emails to individuals who did not complete a survey, ensuring that all necessary data is collected.

Soft Roll-out

To prepare staff members for data collection, a two-week soft roll-out before the start of data collection would be beneficial. This would allow staff to become familiar with the tracking process, ask any questions they may have, and incorporate tracking into their daily routine. Integrating these recommendations for future projects is crucial for efficient data collection and effective implementation.

Conclusion

Implementing the tummy time protocol was crucial in changing practice patterns to align with best practices for infants admitted to the NICU. Initiating tummy time for hospitalized infants is a low-cost, simple intervention with significant health benefits. However, more work must be done to integrate tummy time sessions, early education, and documentation into a new workflow. In addition, future research is necessary to evaluate the long-term effects of tummy time implementation within the NICU. Specifically, research should focus on rates of plagiocephaly and outpatient therapy referrals following discharge from the NICU. Admission to the NICU is sometimes unavoidable. However, early integration of tummy time promotes motor development, decreases the risk of plagiocephaly, and promotes parental bonding.

CHAPTER FOUR

ADVANCED NURSING ESSENTIALS REFLECTION

Introduction

The American Academy of Colleges of Nursing (AACN) has laid out a detailed list of eight essentials that serve as the foundation for all Doctor of Nursing Practice (DNP) programs, regardless of the specialty (AACN, 2006). These essentials ensure DNP graduates have the knowledge and skills to provide high-quality patient care. Over the past four years, Montana State University (MSU) has provided ample opportunities for students to meet these essentials through various coursework, clinical experience, and the implementation of a quality improvement project. This experience has given me a comprehensive understanding of the DNP essentials and how they can be practically applied in clinical settings. The fourth and final chapter will review how different essentials were met through the curriculum and how they will inform my future as a Family Nurse Practitioner.

Essential I

Essential I focuses on the scientific underpinnings for practice. Evidence-based practice is crucial for informing clinical decision-making and providing high-quality patient care. As a nurse practitioner, staying up-to-date with the latest research and best practice recommendations is essential to provide safe and effective care. During my DNP education, I had the opportunity to enhance my knowledge and skills by studying numerous journal articles, viewing lectures, and participating in discussions with my peers and professors. The Evidence-Based Practice I and II courses provided me with the necessary skills to conduct a thorough analysis of research studies

and categorize literature based on the level of evidence. Furthermore, my statistics course enhanced my proficiency in evaluating peer-reviewed articles and determining their quality and validity. Through various discussion posts, group projects, and research papers, I was able to synthesize literature and apply this knowledge. This allowed me to better understand the importance of evidence-based practice and its impact on patient outcomes. This approach benefits the patients and contributes to building a stronger healthcare system.

Completing a quality improvement project in the final semester of the program utilized skills gained from courses over the last four years. During the project, I researched the available literature on the significance of tummy time for infants, analyzed the themes, and devised a safe plan to integrate this practice into a neonatal intensive care unit. The project utilized the replicating effective programs framework (REP) for guidance. At the project's conclusion, more infants received tummy time while inpatient than before the protocol. By completing this quality improvement, I contributed to improving the quality of care for neonates and their families.

Essential II

Essential II focuses on system leadership and systems thinking. Nurse practitioners are influential leaders in healthcare and work closely with other providers, nurses, medical assistants, and ancillary staff. As a provider, it is crucial to demonstrate leadership skills to patients and staff. Over the past four years, I have had the opportunity to participate in various group projects. During these projects, I took on leadership roles to ensure that the workload was distributed fairly, assignments were ready for submission, and deadlines were met. Participating in the leadership course equipped me with the skills to overcome obstacles while working with

staff and patients. During the implementation of my quality improvement project, I noticed inconsistent participation. To address this issue, I realized I needed to communicate with the staff and address their questions and concerns. I worked closely with the manager to arrange a brief amount of time during the scheduled staff meeting. During the meeting, I explained the project, offered clarifications, and answered any questions.

As a Nurse Practitioner, it is essential to understand healthcare systems and how improving processes can result in cost savings for clinics and patients. As part of the healthcare design course, I identified an organizational process that needed improvement and developed a plan to address the identified gaps. I chose to focus on NICU admissions and the associated delay in patient care caused by broken communication channels. Developing a value stream map for this process was eye-opening and enhanced my skills in breaking down workflows and identifying potential solutions.

As part of the budget and finance course, students identified an area where equipment upgrades could be beneficial in a healthcare setting. The goal was to identify a piece of equipment that could improve patient outcomes while simultaneously reducing costs. In my project, I found that the NICU could benefit from cordless monitoring to facilitate skin-to-skin holding, which has been proven to positively impact patient outcomes and reduce the length of stay. The project provided a valuable learning experience where I researched new technologies, conducted cost analyses, and assessed their benefits. This experience will be valuable in the future as a nurse practitioner as I advocate for equipment to streamline processes, cut costs, and improve patient outcomes.

Essential IV

Essential IV focuses on information systems and technology for improving and transforming health care. In recent years, healthcare has significantly transformed from traditional paper charting to a more technology-driven healthcare system. Technology plays a vital role in providing quality patient care. As a Nurse Practitioner, I will use an electronic medical record (EMR) daily. The use of technology has transformed the way providers access and manage patient information. One can access a patient's medical history, lab results, medication, imaging, allergies, and more with a few clicks.

Through my clinical experiences, I have come to appreciate the numerous benefits of EMRs. EMRs have messaging systems that enable me to communicate results to patients quickly and efficiently. Moreover, EMRs are designed with systems that help identify care gaps, such as missed vaccinations and preventative screenings, ensuring patients receive the care they need. These notifications have assisted me in improving my efficiency and guided me in developing better care plans. Additionally, EMRs have built-in safety features, such as alerts for medication allergies and insurance coverage. This ensures that patients receive the proper medication that is safe and affordable. Another feature is the dictation software, a helpful tool for efficient and accurate documentation. As technology advances, I aim to keep up with the latest developments and learn how to utilize them to benefit my practice and patients.

Essential V

As leaders in healthcare, nurse practitioners are often called upon to advocate for policy changes that can improve patient outcomes and ensure access to high-quality care. Healthcare advocacy can include meeting with policymakers, participating in public health initiatives, and

collaborating with other professionals to implement evidence-based practices. At the local and regional level, nurse practitioners are critical in promoting healthcare policies that benefit their patient's and community's health. Nurse practitioners help ensure all patients have access to the care they need by raising awareness about healthcare issues and advocating for health equity.

During the ethics, Law, and Policy course, I had an opportunity to write a letter to a local representative, advocating for a policy that would introduce suicide screening in Montana high schools. In the letter, I presented alarming statistics about suicide rates in Montana and explained how screening could be instrumental in identifying individuals who are struggling with mental health issues. By connecting these individuals with adequate mental health resources, we hope to reduce Montana's suicide rates in general, and particularly among Montana students. This project served as a helpful introduction to identifying policy-influencing stakeholders and drawing attention to important issues.

Essential VI

As a Nurse practitioner, I will be working closely with various support staff and providers with an overarching goal to provide high-quality patient care. Medical assistants and registered nurses are pivotal in the clinical setting, emphasizing the importance of collaborating to meet patient needs. As a new graduate, I will work closely with other AAPs and physicians as I learn the role. When a patient’s condition requires specialized care, I look forward to collaborating with specialists closely to develop a plan that best supports the patient. This mentorship will provide the support needed to develop as a provider and ensure that my patients receive high-quality care.

Over the last four years, this curriculum has provided several opportunities to work with my colleagues as we participated in several group projects. To be successful, clear communication was essential as we navigated through different research projects. During my quality improvement project, I worked closely with the unit's practice council to identify a gap in care within the unit. Additionally, I met with occupational therapists to gather their perspectives. Collaboration with the nursing staff, providers, management, and ancillary staff was crucial for the project's success. Thanks to this teamwork, the project was a success, and tummy time was integrated into the NICU to promote the healthy development of neonates.

Essential VIII

As a nurse practitioner, I will work closely with patients by taking their histories, performing assessments, synthesizing information, and creating individualized care plans. To meet Essential VIII, I completed both didactic coursework and clinical hours. Lectures, discussions, and exams helped me prepare for the clinical setting. Additionally, I learned how to use valuable resources such as respected guidelines like the American Heart Association's hypertension algorithm or the GOLD criteria for COPD diagnosis. The didactic portion of these clinical courses prepared me to care for patients and formulate plans. Clinical hours seeing patients helped me refine my history-taking and assessment skills. Formulating care plans with actual patients was instrumental in solidifying my confidence in making evidence-based recommendations.

I recently encountered a patient who suffered from migraines with aura and was receiving hormone replacement therapy (HRT) for vasomotor symptoms. However, upon reviewing the medical eligibility criteria from the CDC, I discovered that HRT is not recommended for people

who have migraines with aura. This realization led to an important educational session with the patient and a collaborative decision-making process to establish an appropriate care plan.

Conclusion

Over the past four years, I have had the privilege of meeting all eight essentials enlisted by AACN. Montana State University offered a curriculum that satisfied the objectives and equipped me to be a skilled nurse practitioner who can positively influence the nursing profession. In the future, I am excited to apply the knowledge and skills I have gained from the DNP program to my future career as a Family Nurse Practitioner. I am confident that my education at MSU has sufficiently prepared me to provide high-quality, patient-centered care grounded in evidence-based practice and informed by the latest healthcare technologies. I am committed to exploring ways to enhance systems that positively impact patients and the healthcare system overall. After completing this DNP program, I plan to reflect on my extensive education at MSU by fulfilling all eight essentials throughout my professional practice.

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APPENDICES

APPENDIX A

TABLES

Table 1.1 Short-term Goals

SMART GOAL #1		
Tummy time protocol education, including documentation expectations, will be completed and documented via a read-and-sign with >90% of unit staff before the implementation start date. • This goal is at >90%, as various FTEs, vacations, and maternity leaves may prevent 100% compliance by the deadline. • Read and sign will be created for staff. • Information on where to find tracker sheets and education packets will be provided.		
Data to be collected	**Method of Collection and who is responsible**	**Planned data analysis**
Read and sign for nursing staff, providers, and ward clerks.	The lead investigator will collect the signature sheet from the huddle room.	The lead investigator will evaluate the signature sheet one week before implementation.

SMART GOAL #2		
Educational tummy time pamphlets regarding the importance of daily tummy time starting at the initiation of back-to-sleep practices will be designed, approved by the unit's practice council, and printed one week before the implementation start date. • The NICU has a practice counsel that drives evidence-based practice change within the unit. • Approval is required before implementation.		
Data to be collected	**Method of Collection and who is responsible**	**Planned data analysis**
Written approval from practice counsel.	The lead investigator will collect the approval document.	The lead investigator will evaluate the document for approval or necessary edits before approval.

SMART GOAL #3		
Tummy time tracker calendars will be designed, approved by the unit's practice council, and printed one week before the implementation start date. • The NICU has a practice counsel that drives evidence-based practice change within the unit. • Approval is required before implementation.		
Data to be collected	**Method of Collection and who is responsible**	**Planned data analysis**
Written approval from practice counsel.	The lead investigator will collect the approval document.	The lead investigator will evaluate the document for approval or necessary edits before approval.

SMART GOAL #4		
The tummy time reminder checklist will remain in the unit's huddle room and nurses' station 100% of the time during the project. • The goal is 100%, as placing the checklists in each location will be quick and easy. • Checklists are eye-catching and easy to read.		
Data to be collected	**Method of Collection and who is responsible**	**Planned data analysis**
Evaluate that both the huddle room and nurses' stations have a checklist visible.	The lead project investigator will place a checklist in each room.	The lead investigator will evaluate each bedside and ensure that there is a checklist prior to and throughout implementation.

Table 1.2 Medium-term Goals

SMART GOAL #1		
Tummy time education pamphlets and tracker calendars will be placed in 100% of bedside packets during the project period. • This goal is set at 100% as the unit already has a patient packet at each bedside. • Adding the tummy time information will be straightforward to integrate.		
Data to be collected	**Method of Collection and who is responsible**	**Planned data analysis**
Evaluate that each bedside packet has the tummy time protocol information and tracker sheet.	The lead project investigator will add paperwork to packets.	The lead project investigator will observe that packets have protocol paperwork.

SMART GOAL #2		
Tummy time education will be completed and documented via the bedside tracker sheet once an infant is medically eligible for safe sleep practices in 75% of patients. • This goal is set at 75% as a new practice may take time to integrate into the workflow. • Visual checklists will serve as reminders. • Visual reminder of bedside tracker sheet.		
Data to be collected	**Method of Collection and who is responsible**	**Planned data analysis**
Number of infants with education documented on tracker sheet	The lead project investigator will gather data and evaluate the documented number of infants with education.	The lead investigator will divide the number of infants with education documentation by the total census.

SMART GOAL #3		
Tummy time return demonstration will be completed and documented via the bedside tracker sheet once an infant is medically eligible for safe sleep practices in 100% of patients. • This goal is set at 75% as a new practice may take time to integrate into the workflow. • Visual checklists will serve as reminders. • Visual reminder of bedside tracker sheet.		
Data to be collected	**Method of Collection and who is responsible**	**Planned data analysis**
The number of return demonstrations documented.	The lead project investigator will gather data and evaluate the number of infants with a return demonstration documented.	The lead investigator will divide the number of infants with return demonstration documentation by the total census.

Table 1.3 Long-term Goals

SMART GOAL #1		
During week 2 of the project period, 75% of infants will have at least one documented tummy time session on the bedside tracker every 24 hours. The goal will increase gradually increase each week as listed: week 4, 80%; week 6, 90%; and week 8, 95%. • This goal is set at 75% as a new practice may take time to integrate into a workflow. • Visual checklists will serve as reminders. • Visual reminder of bedside tracker sheet.		
Data to be collected	**Method of Collection and who is responsible**	**Planned data analysis**
Days tummy time was initiated out of the total eligible days.	The lead investigator will collect data and evaluate the number of days tummy time was documented.	The lead investigator will divide documented tummy time days by the eligible days.

SMART GOAL #2		
Parents will express confidence in positioning their infant for tummy time, measured using a Likert scale at discharge. • The goal is for parents to demonstrate confidence in their understanding and ability to perform tummy time at discharge • A survey will be created for parents		
Data to be collected	**Method of Collection and who is responsible**	**Planned data analysis**
Parental surveys at discharge	The lead project investigator will collect anonymous surveys after the project.	The lead investigator will evaluate the surveys.

SMART GOAL #3		
Tummy time education will be completed and documented via the bedside tracker sheet once an infant is medically eligible for safe sleep practices in 95% of patients. • The goal is to have improved compliance after the protocol has been rolled out for a significant period. • Worked into the bedside nurses' workflow.		
Data to be collected	**Method of Collection and who is responsible**	**Planned data analysis**
Number of infants with education documented on tracker sheet	The lead project investigator will gather data and evaluate the documented number of infants with education.	The lead investigator will divide the number of infants with education documentation by the total census.

SMART GOAL #4		
After the project is implemented, 95% of staff will complete a survey to gather positives and barriers to implementing the tummy time protocol. • Staff buy-in is imperative for this quality improvement project. • Staff opinions regarding barriers to implementation are crucial for adjusting and long-term success.		
Data to be collected	**Method of Collection and who is responsible**	**Planned data analysis**
Staff survey after the project	The lead investigator will collect anonymous surveys after the project.	The lead investigator will evaluate surveys for perceived barriers or suggestions for improvement.

Table 2.1 Levels of Neonatal Care

Level of Care	Capabilities	Provider Types
Level I	Provide neonatal resuscitation at every delivery	Pediatricians, family physicians, nurse practitioners, and other advanced-practice registered nurses
Well newborn nursery	Evaluate and provide postnatal care to stable term newborn infants.	
	Stabilize and provide care for infants born 35–37 weeks gestation who remain physiologically stable.	
	Stabilize newborn infants who are ill and those born at <35 weeks gestation until transfer to a higher level of care.	
Level II	Level I capabilities plus:	Level I health care providers plus:
Special care nursery	Provide care for infants born ≥32 weeks gestation and weighing ≥1500 g who have physiologic immaturity or who are moderately ill with problems that are expected to resolve rapidly and are not anticipated to need subspecialty services on an urgent basis.	Pediatric hospitalists, neonatologists, and neonatal nurse practitioners.
	Provide care for infants convalescing after intensive care.	
	Provide mechanical ventilation for brief duration (<24 h) or continuous positive airway pressure or both.	
	Stabilize infants born before 32 weeks gestation and weighing less than 1500 g until transfer to a neonatal intensive care facility.	
Level III	Level II capabilities plus:	Level II health care providers plus:
NICU	Provide sustained life support.	Pediatric medical subspecialists, *pediatric anesthesiologists,* pediatric surgeons, and pediatric ophthalmologists.
	Provide comprehensive care for infants born <32 weeks gestation and weighing <1500 g and infants born at all gestational ages and birth weights with critical illness.	
	Provide prompt and readily available access to a full range of pediatric medical subspecialists, pediatric surgical specialists, pediatric anesthesiologists, and pediatric ophthalmologists.	
	Provide a full range of respiratory support that may include conventional and/or high-frequency ventilation and inhaled nitric oxide.	
	• Perform advanced imaging, with interpretation on an urgent basis, including computed tomography, MRI, and echocardiography	
Level IV	Level III capabilities plus:	Level III health care providers plus:
Regional NICU	• Located within an institution with the capability to provide surgical repair of complex congenital or acquired conditions	Pediatric surgical subspecialists
	• Maintain a full range of pediatric medical subspecialists, pediatric surgical subspecialists, and pediatric anesthesiologists at the site	
	• Facilitate transport and provide outreach education	

A Includes all providers with relevant experience, training, and demonstrated competence.
B At the site or at a closely related institution by prearranged consultative agreement.

Note. Reprinted from "Levels of neonatal care" W.D. Barfield, 2012, *Pediatrics (Evanston), 120(3), 587-597*

Table 3.1 NICU Staff Pre-Implementation Perspectives Survey

n 23	Level of Agreement Strongly agree n (%)	Agree n (%)	Neutral n (%)	Disagree n (%)	Strongly Disagree n (%)	M(sd)
The tummy time protocol will be easy to implement.	10 (43.0)	11 (48.0)	2 (9.0)	0 (0.0)	0 (0.0)	4.52(0.51)
I feel confident educating parents on the benefits of tummy time.	16 (70.0)	7 (30.0)	0 (0.0)	0 (0.0)	0 (0.0)	4.68(0.49)
I have enough time to learn the tummy time protocol.	9 (39.0)	12 (52.0)	2 (9.0)	0 (0.0)	0 (0.0)	4.32 (0.76)
I have enough time to implement the tummy time protocol.	8 (35.0)	12 (52.0)	3 (13.0)	0 (0.0)	0 (0.0)	4.14 (0.65)
Please share barriers you may encounter with implementation.	• Remembering the protocol n=1 • Time constraints n=1 • Parental involvement n=3					
Please share ways to improve the tummy time protocol.	• Staff reminders during report n=1 • Tracker is visible n=1 • Visual reminders in unit n=2					

Table 3.2 NICU Staff Post-Implementation Perspectives Survey

n 23	Level of Agreement Strongly agree n (%)	Agree n (%)	Neutral n (%)	Disagree n (%)	Strongly Disagree N (%)	M (SD)
The tummy time protocol was easy to implement.	12 (52)	11 (48)	0 (0.0)	0 (0.0)	0 (0.0)	4.38 (0.65)
I feel confident educating parents on the benefits of tummy time.	15 (65)	8 (35)	0 (0.0)	0 (0.0)	0 (0.0)	4.70 (0.47)
I had enough time to learn the tummy time protocol.	12 (52)	7 (30)	4 (17)	0 (0.0)	0 (0.0)	4.30 (0.64)
My questions were answered.	14 (61)	8 (35)	1 (4)	0 (0.0)	0 (0.0)	4.55 (0.59)
I have enough time to implement the tummy time protocol.	7 (30)	13 (57)	3 (13)	0 (0.0)	0 (0.0)	4.22 (0.67)
Please share barriers you encountered with implementation.	• Remembering to implement n=7 • Finding time n=4 • Not having families present n=2					
Please share ways to improve the tummy time protocol.	• More time to work into routine n=2 • Add to EMR n=4 • Add to hand off report n=1					

Table 3.3 Staff survey t-test

	Pre-implementation N=23 Mean(sd)	**Post-implementation** N=23 Mean (sd)	**Significance**
The tummy time protocol was easy to implement.	4.52 (0.51)	4.38 (0.65)	P=0.29
I feel confident educating parents on the benefits of tummy time.	4.68(0.49)	4.70(0.47)	P=0.75
I had enough time to learn the protocol.	4.32(0.76)	4.30(0.64)	P=0.76
I had enough time to implement the tummy time protocol.	4.14(0.65)	4.22(0.67)	P=0.83
My questions were answered.	4.55(0.59)	Not asked on post-implementation	N/A

Note. Likert questions were scored 1 to 5, with 1 being Strongly Disagree and 5 being Strongly Agree.

Table 3.4 Parent Survey

	Level of agreement				
n 1	**Strongly agree n (%)**	**Agree n (%)**	**Neutral n (%)**	**Disagree n (%)**	**Strongly Disagree n (%)**
I understand the importance of daily tummy time with my infant.	1 (100)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
I feel confident placing my infant in the prone position.	1 (100)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
I will continue to do daily tummy time after discharge from the NICU.	1 (100)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Did staff discuss tummy time more than one week prior to discharge?	Yes.				
How many days was your infant in the NICU?	Three days.				
Does your baby have any older brothers or sisters?	Yes.				
How can we improve tummy time education?	Keep doing what you are doing.				

APPENDIX B

FIGURES

Figure 1.1 PRISMA

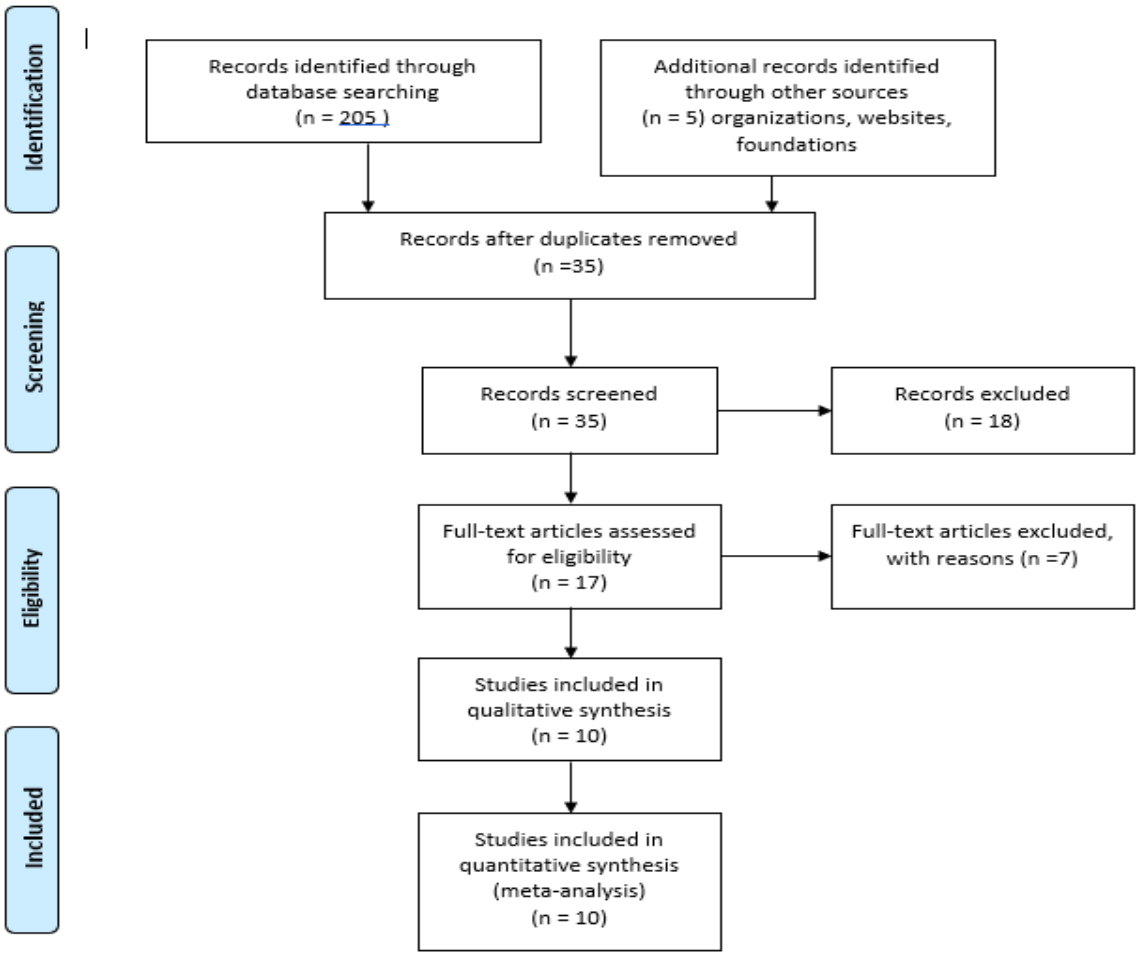


Figure 1.2 Tummy Time Tracker Data

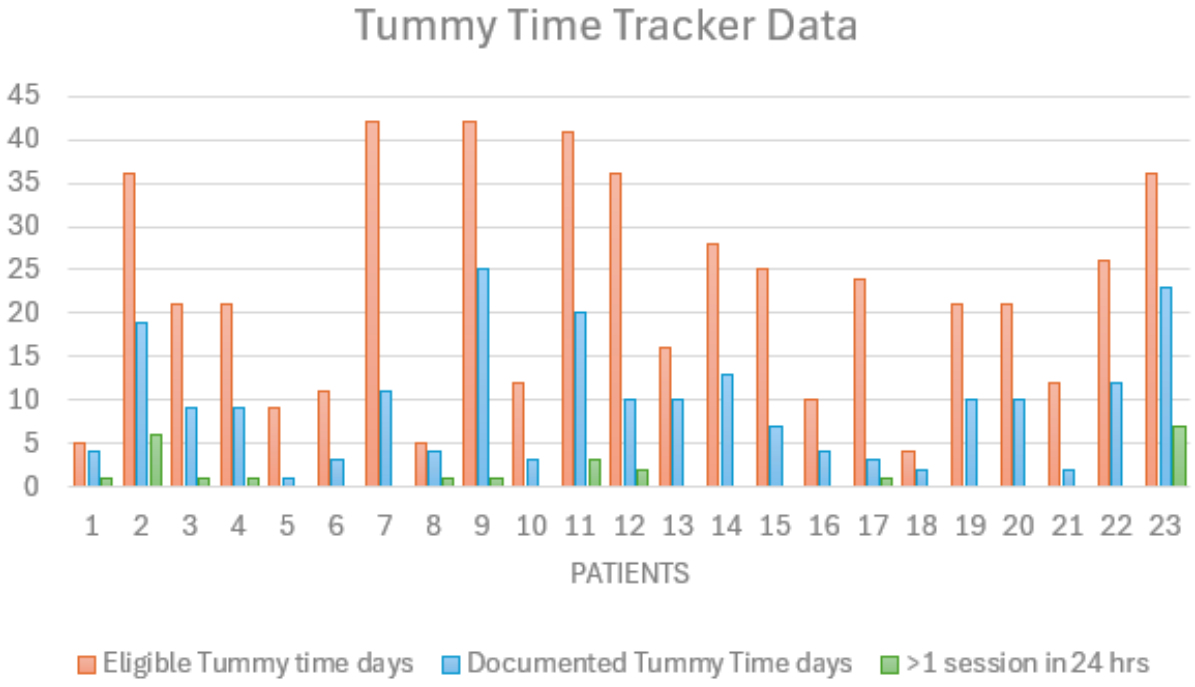


Figure 1.3 Bedside Tracker Sheets

Figure 1.4 Tummy Time Protocol Checklist

Figure 1.5 Tummy Time Packet Education

Tummy Time

It is important for babies to sleep on their backs to reduce the risk of Sudden Unexpected Infant Death (SUID). However, a baby needs time on his or her tummy for stretching and strengthening his back and neck muscles.

So to help your baby learn these skills, it is important for him to spend time on his tummy while he is **awake** and you are with him.

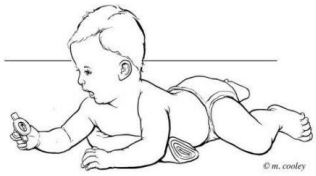
Benefits

Tummy time helps your baby build strength in his neck, shoulders, arms and trunk. This will help him learn to roll, sit and crawl. Tummy time while he is **awake** also helps him maintain a round head shape.

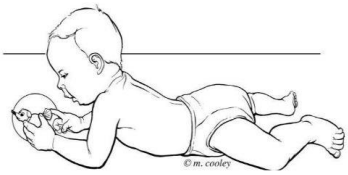
Picture 1 - Tummy time on Mom's chest.

How to Provide Tummy Time

- The best time for tummy time is when your baby is **awake**. He can practice holding his head up, looking side-to-side and supporting weight on his arms.
- Start slowly. Place your baby on his tummy for 1 to 2 minutes at a time. Try to do this 4 or 5 times a day. The goal is to increase each tummy time session to 10 minutes, 4 to 5 times a day. By 4 months of age, he can be on his tummy 90 minutes a day.
- During rest breaks, help him roll and reach.
- Try placing baby on your chest while you lie down. Place his arms forward to push up **(Picture 1**).
- Place a small rolled towel under your baby's chest from armpit to armpit. This makes it easier for your baby to lift his head and to push up **(Picture 2**).
- Give your baby something to look at or to play with while on his tummy. A mirror is a great idea. Help him reach for toys **(Picture 3**). Help your baby bear weight through his arms by keeping his elbows under his shoulders.
- Some babies don't like tummy time at first. Try shorter periods of tummy time several times a day. Giving baby a toy to play with may distract him and help him hold his head up. You can place your hands under his chest and lift him up gently to help him push up. When carrying him, hold him tummy side down or play airplane with him. As babies spend more time on their tummies, they get stronger and tummy time gets easier.



Picture 2 - Tummy time on towel.



Picture 3 - Tummy time with toy.