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Examining the Benefits of Educating Caregivers About Tummy Time in the Acute Care Setting

Alexandra L. Turner
Eastern Kentucky University, allie.gartseff@gmail.com

EXAMINING THE BENEFITS OF EDUCATING CAREGIVERS ABOUT TUMMY TIME IN THE ACUTE CARE SETTING

Presented in Partial Fulfillment of the

Requirements for the Degree of

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Allie Turner

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EASTERN KENTUCKY UNIVERSITY

COLLEGE OF HEALTH SCIENCES

DEPARTMENT OF OCCUPATIONAL SCIENCE AND OCCUPATIONAL THERAPY

Certification

We hereby certify that this Capstone project, submitted by Allie Turner, conforms to acceptable standards and is fully adequate in scope and quality to fulfill the project requirement for the Doctor of Occupational Therapy degree.

Shirley O'Brien, PhD, OTR/L, FAOTA
Program Coordinator, Doctor of Occupational Therapy

8/19/19
Date

Dana Howell, PhD, OTD, OTR/L, FAOTA
Chair, Department of Occupational Science and Occupational Therapy

8/19/19
Date

EASTERN KENTUCKY UNIVERSITY

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This project, written by Allie Turner, under direction of Colleen Schneck, ScD, OTR/L, FAOTA, Faculty mentor, and approved by members of the project committee, has been presented and accepted in partial fulfillment of requirements for the degree of

DOCTOR OF OCCUPATIONAL THERAPY

CAPSTONE COMMITTEE

Colleen Schneck — 8-19-19

Colleen Schneck, ScD, OTR/L, FAOTA
Faculty Mentor

Date

8-21-19

MaryEllen Thompson PhD, OTR/L
Committee Member

Date

Executive Summary

Background: This project addressed providing parents with education on tummy time in the acute care setting. This is based on a gap in the literature on occupational therapy (OT) services in the acute care setting.

Purpose: The purpose of this research project was to conduct a pilot study to examine the benefit of educating parents of infants in the acute care setting on providing tummy time as a developmental education measure.

Theoretical Framework: The occupational therapy practice theory, of the Model of Human Occupation (MOHO) supports the holistic supporting of families, in their role as a parent, to meet the needs of both the infant and the family.

Methods: This project used a pre-survey to address parents current knowledge of tummy time and how often they were using tummy time at home. They were provided with a five-minute education session and handout about tummy time. The families completed a post-survey to see if the education session was impactful for their tummy time sessions with their infants at home.

Results: The results show a positive interval increase in the amount of tummy time from the pre-survey to the post-survey, but does not demonstrate a statistically significant change.

Conclusions: This was a pilot study that investigated how educating parents in this setting, could facilitate the parents adopting these strategies at home. Despite the small sample size, the initial results showed that the education session could positively impact the total amount of tummy time that the infants were receiving and the developmental changes reported by parents at home. Future work should focus on recruiting additional participants to increase the sample size.

Acknowledgements

There are so many individuals that I have to thank throughout the OTD program. I have to think to that my grandmother was probably the catalyst for my pursuit of my OTD. She always encouraged me to be pursue a career where I could help people, and to always use good old fashioned common sense. I would like to thank my parents who set the standard of hardwork and perseverance. I am so grateful of the time they gave to help with late night paper edits and calls with love and inspiration when needed. They are truly two of the greatest, hardest working people that I know. I have to thank too my sweet son, Luke, who was born not long after I started this program. His smile and laughter remind me why my work is important, and how I want to set a great example for him to live by. I have to especially thank my sweet husband, Aaron. He achieved his doctorate right alongside me. He has been my sounding board, my cheerleader, and always my tech support. I know that together we are going to achieve some amazing things.

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CERTIFICATION OF AUTHORSHIP

Submitted to (Faculty Mentor's Name): Colleen Schneck, ScD, OTR/L, FAOTA
Student's Name: Allie Turner
Title of Submission: Examining the Benefits of Educating Caregivers about Tummy Time in the Acute Care Setting

Certification of Authorship: I hereby certify that I am the author of this document and that any assistance I received in its preparation is fully acknowledged and disclosed in the document. I have also cited all sources from which I obtained data, ideas, or words that are copied directly or paraphrased in the document. Sources are properly credited according to accepted standards for professional publications. I also certify that this paper was prepared by me for this purpose.

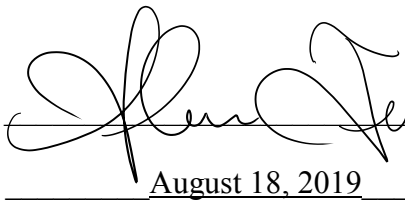
Student's Signature: 

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Table of Contents

List of Figures

List of Tables

Section 1: Introduction

In 2008, AOTA released their position statement on play, which recognizes the role that the occupational therapist (OT) holds as an advocate for developmental play skills. This position reaffirms a professional responsibility to work in alignment with the practice guidelines that support OT's role in providing developmental play education. In order to support educating parents on developmental education, this can begin with educating parents on tummy time. Tummy time is defined by Russell, Kriel, Joubert, and Goosen (2009) as: "The supervised prone positioning of an infant specifically when awake". Prone play was greatly decreased when the American Academy of Pediatrics introduced the back to sleep campaign to reduce the risk of sudden infant death syndrome in the 1990s (Pollack & Frohna, 2002). One unexpected outcome of this campaign was that parents were not incorporating prone play into their routine. Through occupational therapists' work in creating purposeful interventions for their clients (Trombly, 1995), OTs can work to provide parent education about tummy time to help facilitate infants in improving development (Russell, Kriel, Joubert, & Goosen, 2009).

Kaiser and Hancock (2003) supported the idea that through teaching parents strategies about developmental play, they can be better equipped to perform these tasks at home. With learning experiences provided from an expert position, parents can be more confident and empowered to play with their infant children when they are discharged home (Kemp & Turnbull, 2014). Occupational therapists are key in providing this information and education as they can truly focus on the holistic nature of each individual. Based on their training, OTs can better personalize their treatments and anticipate how to grade the activity than can other professionals (Persch, Braveman & Metzler, 2013).

Problem Statement

Families are not receiving developmental play education, specifically on tummy time, while their infant is admitted in the acute care setting, and therefore their infant may not be achieving appropriate development milestones.

Purpose

The purpose of this research project was to conduct a pilot study to examine the benefit of educating parents of infants in the acute care setting on providing tummy time as a developmental education measure.

Project Objective

The objective of the study was to examine if providing developmental information on tummy time to parents of infants in the acute care setting increases their awareness and follow through of play with their infant child. The benefits of providing developmental play education in this setting were examined utilizing a pre and post education survey. Focusing on implementing evidence-based research in the acute care setting can help address a gap in the literature. Including developmental play education regarding tummy time in acute care OT treatment plans may encourage the family to initiate play tasks in prone with their infant when they discharge to their home.

Theoretical Framework

Providing developmental play information can enhance occupation-based practice in pediatric therapy assessments and interventions, as emphasized by research of Estes and Pierce (2012). The occupational therapy practice theory, of the Model of Human Occupation (MOHO) supports the holistic supporting of families, in their role as a parent, to meet the needs of both the infant and the family. Utilizing occupational therapy theory and creating a role for integrating

evidence-based-practice helps support occupational therapy practice in the acute care pediatric setting.

Significance and Summary of Study

This project is significant because it is based on personal and professional interest from working in this setting. Based on professional experience in this practice setting, families are typically discharged prior to receiving developmental education, which could be beneficial for their children. Creating an opportunity to provide developmental education to parents on tummy time, could address the need identified by the hospital staff in a needs assessment survey in 2018, conducted by this researcher. The families who have infants in the acute care setting require support while they are admitted to the hospital and after they discharge to their home. Through providing appropriate developmental education, families can learn how to play with their infant children and give their infant an opportunity to meet developmental milestones.

Teaching tummy time programs to parents serves a need for providing developmental education that encourages prone play with their infant children. This may improve their impact on their infant's ability to achieve developmental milestones. Additionally, the importance of educating parents about developmental play in the acute care setting is needed, to improve the child's outcomes while hospitalized (Li, Chung, Ho, & Kwok, 2016). Engaging the whole family, especially focusing on parent-child dyads, can improve the parents' implementation of providing opportunities for their child to perform tummy time at home. This project serves a special population of families, specifically those families of infants aged birth to six months that are admitted to the acute care setting. These families may benefit from additional support to achieve the goal of creating impactful play with their infant children. The American Occupational Therapy Association has provided best practice guidelines for tummy time,

including provision of recommendations for daily tummy time for infants (Pumerantz & Zachry, 2018). With these professional guidelines, occupational therapists can be a key specialist to address this need.

This capstone project aimed to address a gap in the literature with respect to how occupational therapists can provide developmental play education for parents with infants in the acute care setting. To narrow the focus of this project, the research focused on educating parents on tummy time and follow up to see if this education was effective or not in encouraging parents to provide this type of play for their infant children. As an inclusive profession, occupational therapy maximizes health, well-being, and quality of life for all people, populations, and communities through effective solutions that facilitate participation in everyday living.

Section 2: Review of Literature

Definitions

Tummy Time. "The supervised prone positioning of an infant specifically when awake" (Russell, Kriel, Joubert, & Goosen, 2009).

Back to Sleep Campaign. "In 1992, the American Academy of Pediatrics (AAP) issued a recommendation that "healthy term infants" be placed on their backs (supine) to sleep and to avoid the prone sleeping position. This Back to Sleep campaign has been credited with reduced SIDS incidence during the 1990s" (Pollack & Frohna, 2002).

Prone to Play Campaign. The "Prone to Play" campaign began in 2001 with the goal of introducing prone play in the absence of prone sleeping patterns to encourage appropriate motor development (Kuo, Liao, Chen, Hsieh, & Hwang, 2008).

Decrease in prone play occurred as infants were placed on their back to sleep. The American Academy of Pediatrics introduced the "Back to Sleep Campaign" in April 1992, encouraging back and side sleeping with the intention to protect infants from sudden infant death syndrome or SIDS. This was a huge change in how parents would allow their infants to sleep, and it began to have notable physical changes in the head shapes of different infants because it limited the amount of time infants spent on their bellies (Turk, McCarthy, Thorne, & Wisoff, 1996). Graham (2006) states that: "normal brain growth combined with a constant supine postnatal resting position, can result in progressive cranial widening with occipital flattening" (p. 119). Parents were missing that not performing tummy time was affecting their child's development through only focusing on their position at rest, and not focusing on the child's position during alert times. Decreased tummy time has been shown to have skeletal deficits from poor positioning, which could cause positional plagiocephaly; muscular system deficits, which

could cause increased tightness leading to asymmetrical positioning increasing chances of torticollis; and behavioral organization, which could affect the infant's state regulation as shown in research by Waitzman (2007). Zachry even writes about her experience with patients who did not perform Tummy Time in a New York Times article, stating that many students she had seen for poor handwriting had poor shoulder girdle strength, and had also not performed tummy time as infants (Klass, 2018).

Importance of providing education to parents. Teaching tummy time programs to parents of infants serves a need to provide developmental education for children. Koren, Reece, and Kahn- D'Angelo (2010) identify that parents need educational support for implementing appropriate tummy time and sleep positioning to encourage adequate growth and development of infants. Families are in need of education that truly gives a more holistic picture of the positional needs of their child, without putting their child at risk for SIDS or developmental delays (Miller, Johnson, Duggan, & Behm, 2011). In a study by Mildred, Bead, Dallwitz, and Unwin (1995), the authors examine whether the change in the position in which the parent laid their child to sleep affected their positioning for play. They found that 26% of parents never placed their child in prone (p. 499).

The "Prone to Play" campaign began in 2001 with the goal of introducing prone play in the absence of prone sleeping patterns to encourage appropriate motor development (Kuo, Liao, Chen, Hsieh, & Hwang, 2008). The objective was to allow parents to have more understanding of prone play, allow engagement in developmental tasks, and prevent flat facial or cranial features (Zachry & Kitzmann, 2011). The American Occupational Therapy Association now recommends that infants receive between 40-60 minutes of prone play daily (Pumerantz & Zachry, 2018).

Tummy time positioning to encourage achievement of developmental milestones. Placing infants in prone has great benefits in encouraging developmental sequences of play, including progressing towards motor milestones of rolling, crawling, pulling up, and walking. Infants who primarily are placed in supine only do not develop head and neck extension patterns as quickly as those that are placed prone for play. Crawling and pulling to stand are two key areas that require extension against gravity to complete the movement (Russell, Kriel, Joubert, & Goosen, 2009). Additionally, through tummy time or prone play, infants decrease their risk of plagiocephaly as they are moving their head and neck muscles against gravity, instead of maintaining a supine position (Waitzman, 2007). As Graham (2006) discusses that the "Back to Sleep" initiative is very important for safe sleep, so is having parents place their child prone when they are awake and supervised to "encourage full range of neck rotation" (p.120).

Providing development education to families is an important element of occupational therapy practice. Salls, Silverman, and Gatty (2002) additionally discuss how important it is that parents understand how to position their infants both for play and for safe sleep to encourage appropriate growth. Parents need to be provided with education on the benefits and costs of not placing their infant prone towards achieving development milestones. Parents can also be taught how their infant might react negatively to tummy time, i.e., crying (Kadey & Roane, 2012). Before they get to this point the parents can be provided with education about how to read their infant's stress cues to know when they are ready to play and to know when they have missed these stress cues (Hotelling, 2004). There is an importance in helping parents feel supported and confident in their parenting journey with a task that can be so developmentally supportive. Zachry and Kitzmann (2011) even suggest "an optimal time to

educate caregivers on the importance of tummy time would be before the parent and infant leave the hospital" (p. 104).

There is not an extensive amount of research about providing developmental education in the acute care hospital setting. Therapists have a unique opportunity to work with families to support their educational needs. The therapist can work to engage the whole family, with a focus on the parent-child relationship, to provide parents support and increase parent's implementation of education provided at discharge. Enhancing developmental play teaching can provide occupation- based practice in our pediatric therapy assessments and interventions, as emphasized by research by Estes and Pierce (2012).

Fisher (2012) discusses the importance of focusing on occupation when creating intervention plans and documenting this progress. In the pediatric population, it is important that children have an element of their lives that is focused on play. The authors, as representatives of their organization, recognize the essential importance to learning that is required through development of functional play skills. These authors acknowledge the challenges of the variety of functional play skills between different age groups and the necessity to change the complexity of purposeful play skills to address the appropriate developmental needs of the population being served. Individualizing the unique needs of each client through understanding a variety of play skills, improves the holistic nature of intervention planning.

Enhancing play skills addresses improving physical, social, emotional, and cognitive development. Through educating and providing opportunities for play, the whole family has an opportunity to be engaged in the task and allows the parents to drive play with their children. Li, Chung, Ho, and Kwok (2016) even recognized that through integrating play into the hospital environment, patients and families had an improved overall hospital experience with better

outcomes. By encouraging implementation of occupation-based treatments of play in an inpatient setting, parents and their children can have improved overall satisfaction (Nielson, 2011). This is a good opportunity to ensure holistic care for parents of young infants while in the hospital setting.

Research by Kaiser and Hancock (2003) supports that through teaching parents strategies about developmental play, they can be better equipped to perform these tasks at home. By providing learning experiences from an expert position, parents can be confident and empowered to play with their children at discharge (Kemp & Turnbull, 2014). Occupational therapists are key in providing this information as they truly focus on the holistic nature of the client. Based on their training, OTs can better individualize their treatments and anticipate how to grade the activity than can other professionals (Persch, Braveman & Metzler, 2013). The best way to appropriately provide these interventions for clients, is to produce further evidence to support OT assessments and interventions, as discussed by Bennett and Bennett (2000). Occupational therapists need to work to grow and add to the existing research and address gaps in the literature to address the changing needs of their communities. This project identifies a need at a midwestern children's hospital during a time of growth. The objective would be to provide parents with the right tools and knowledge to support developmental health and well-being for their children, as outlined by the Healthy People Topics and Objectives for Early and Middle Childhood; EMC-1 (Healthy People 2020, 2017).

Summary of the Literature

Establishing a program to support individuals to adapt and thrive with a new infant creates opportunities to support communities both small and large (American Occupational Therapy Association, 2017). Occupational therapy is a very diverse profession, but the core

values of serving the community is ever present in holistic care. Examining the effectiveness of providing developmental education (tummy-time) in the acute setting provides an opportunity to initiate the practice of providing developmental handouts, in this study on tummy time, in a short session to capture education opportunities before families discharge from the hospital.

Section 3: Methods

Design

This pilot study looked at the effectiveness of providing education to the parents of infants in the acute care setting. A small sample size was obtained to address if providing developmental education to parents would be effective. Tummy time was selected for the pilot study to isolate one aspect of developmental education. The purpose of the capstone project is to evaluate the effects of providing parents with developmental education in order to determine if it improved their implementation of play practices at discharge.

Setting

The acute care setting was chosen, as there is limited research in this setting on the effects of developmental play education. This project addressed a gap in the literature. The project took place at a midwestern children's hospital based on the needs assessment completed through staff surveys.

This project was significant as this hospital was partnering with other children's hospitals to expand the services provided and meet the diverse needs of this patient population. This can be best met with providing evidence-based interventions.

Participant Recruitment

The inclusion criteria for this study was parents or caregivers, aged 18- 65 years old, for infants birth to six months old who were hospitalized in a pediatric acute care setting and who had received an occupational therapy consult, and consented to receiving information in the study through participation. Participants were excluded if they did not voluntarily choose to participate or if the participant's child had a medical condition that prevents their ability to

participate in tummy time play. The average age of the parent receiving education was 23.8 years old, with a range of 19-27.

Project Methods

The parents were provided with a consent form as to whether they would like to participate in an educational session. This study focused on parents/caregivers ages 18 to 65 who were able to provide consent. The primary investigator was responsible for gaining informed consent from participants. Participants received verbal and written information with description that their participation in this research project was completely voluntary. Consent was documented on signed, individual consent forms for each participant. The education occurred during an occupational therapy session for their infant, aged zero to six months. The intervention consisted of education provided to families and did not directly involve interaction with the patient. Any demonstrations were performed using a doll.

Phase 1 data collection. Prospective participants were identified after their infant had been referred for inpatient occupational therapy services. The parents were provided with a consent form as to whether they would like to participate in an educational session. Participants received verbal and written information with a description that their participation in this research project is completely voluntary. Consent was documented on signed, individual consent forms for each participant.

Once families consented to participate in the research study, one family member was asked to fill out a pre-survey (see Appendix A) to assess their knowledge about tummy time. The parent/caregiver was provided with a written, pictorial, and verbal instruction sheet about developmental play (See Appendix C). The Principle Investigator (PI) demonstrated the information on the handout using a doll and not on the infant. There was additional time

provided for questions and demonstration from the parent. The whole process took approximately 15 minutes.

Phase 2 Data Collection. The parent/caregiver who filled out the form provided contact information to fill out a post-survey two weeks after they had been provided with education about tummy time. The Co-Primary Investigator (Co- PI) was responsible for conducting the post education survey. This post survey took approximately five minutes to complete. Medical records only indicated therapeutic interventions provided. Pre and post survey results are not part of the medical record. The participants were families of patients that the PI would normally interact with in the course of her normal responsibilities. Occupational therapists routinely give tummy time education as part of the standard of care for infants age birth to six months. However, tummy time tasks performed specifically for this study were demonstrated on a doll.

Data Analysis

By encouraging implementation of occupation-based treatments of play while the infant is an inpatient, parents and their children will have improved overall satisfaction (Nielson, 2011). The outcome measures were the results of a survey completed, and provision of a home exercise program guideline provided by acute care occupational therapists.

The data collected was through a survey (please see Appendix A) provided to the parents prior to the tummy time education. The subjects were contacted two weeks following their education session and to complete follow-up questions via e-mail or a phone call based on the choice they designate, to complete the post-survey (please see Appendix B). The survey responses indicated if there had been an improvement in quantity and quality of tummy time before and after the implementation of the tummy time education. The goal was to show how the intervention impacted the parent's behavior. This was based on the parent's pre-survey

information detailing their current implementation of tummy time and the typical time allotted to prone play.

Through yes/no survey questions, parents had the opportunity to indicate whether they had an increase in knowledge of tummy time; an increase in the tummy time they are doing at home; an increase in the child's endurance; and an increase in developmental changes.

The frequency and duration of tummy time were examined to see if there was an interval shift toward an increase in the time parents were performing tummy time to provide a descriptive change from the pre-survey to post survey. Questions 5,6,7 were addressed to look at the mean and standard deviation for each question to assess change. Additionally a non-parametric test, the Wilcoxon signed paired test was performed to assess for any statistical significance between the pre and post survey. The parents/caregivers were also asked for the total time they are performing tummy time in both the pre and post survey.

Ethical Considerations

Ethical considerations included ensuring participants were guarded against any potential risks. IRB approval obtained for this study on 2/13/ 2019 at the University of Kentucky and on 03/04/2019 through Eastern Kentucky University. Participants were asked if they have any pre-existing physical conditions or current complicated procedures that would prevent participation in the study. If so, their participation would be immediately terminated. Additionally, to address any psychological risks, family members were encouraged to use the tummy time handout as a supplemental tool to their current playtime routine. The risks for this study were minimal in that the benefits of tummy time for infants, exceeded potential risks for families that would be providing care. There was no more risk to the parent than they would normally have in playing with their child. There was a minimal incentive to participate in the study. The participant

received a $5 Starbucks gift card at the time of consent to participate in the study, regardless if they elected to participate or not. The incentive was of a small and non-cash value, thereby not providing undue pressure to participate. If at any time the participant chose to end their participation, they still received the full amount of the gift card. There was no cost to the families to participate in the study.

Participant recruitment began following IRB approval for this study, received on 2/13/ 2019 from the University of Kentucky and following additional IRB approval from Eastern Kentucky University, received on 03/04/2019. Each participant was contacted by the PI who was provided a pre-survey and a one time 15 minute question and answer session. The study collected data for 3 months. Two weeks after participants have been educated, they were contacted by phone or e-mail, per their selection for follow up questions by Co- PI. The Co-PI completed data compilation after all post-survey information had been collected, then analyzed the data to examine the increase in duration and frequency in parents report of tummy time as a result from receiving education while an inpatient. A full timeline for completion of this project can be found in Table *1*.

Table 1. Capstone Project Timeline

Capstone Project Timeline	
Dates (2019)	**Project Task Items**
March 4th	Participants begin to be recruited
March 4th through July 3rd	Participants complete their pre-survey, education session, and are contacted for follow–up to complete post-survey.
July 4th	Survey response collection closed at this time.

July 5th -23rd	Data Analysis
July 10th-July 23rd	Write-up of Capstone report

Section 4: Results and Discussion

Results

The pre-survey was distributed to four potential participants with four individuals responding. The post-survey was conducted two weeks after the educational material was distributed, and the three of the four individuals responded, resulting a 75% response rate. Given the small sample size this study is best interpreted as a pilot study. Data is presented in the following tables and figures.

Demographics

Table 2 shows a breakdown of the participant demographics. The average age of the parent receiving education was 23.8 years old, with a range of 19-27. The number of children in the families was a 50-50 split with half of the participants having a single child in the household and half having two. The age range of the children who participated in tummy time ranged from three months to six months. This was based on the youngest child's ages reported on the survey.

All four of the study participants were familiar with tummy time, and had tried multiple approaches. This intuitively makes sense given that some of the participating families already had older children. All four participants reported doing tummy time on the caregiver's chest, and other common themes were using a pillow or on the floor/playmat. Given the acute care setting where participants were found, several participants cited health or injury related as the limiting factor related to preforming regular tummy time.

Table 2. Participant Demographics

Parental Age in years	Range: 19-27, Mean: 23.8
Number of children	Range: 1-2 Mean: 1.5
Child age in months (based on youngest child)	Range: 3-6 Mean: 3.9
Heard of tummy time	4-yes 0-no
Tried multiple approaches	4-yes 0-no
Biggest limitation to completing regular tummy time	Injury –1 Health -1 Cries-1 N/A-1
Current tummy time approaches used	Pillows, floor/playmat, on parent's chest

Results of Responses for Survey Question 5— Frequency of Tummy Time

Question 5 of the pre and post survey asked participants: "How many times per day are you doing tummy time with your child?" Participants had the option to select 0-2x per day, 3-5x per day, 6-8x per day, 9-11x per day, 12-15x per day, and the final option stating: my child does not do tummy time. The response frequency for the number of tummy time session per day for both the pre and post survey can be seen in Figure *1*. All other options on the survey questionnaire are not shown on the figure as they did not receive any responses.

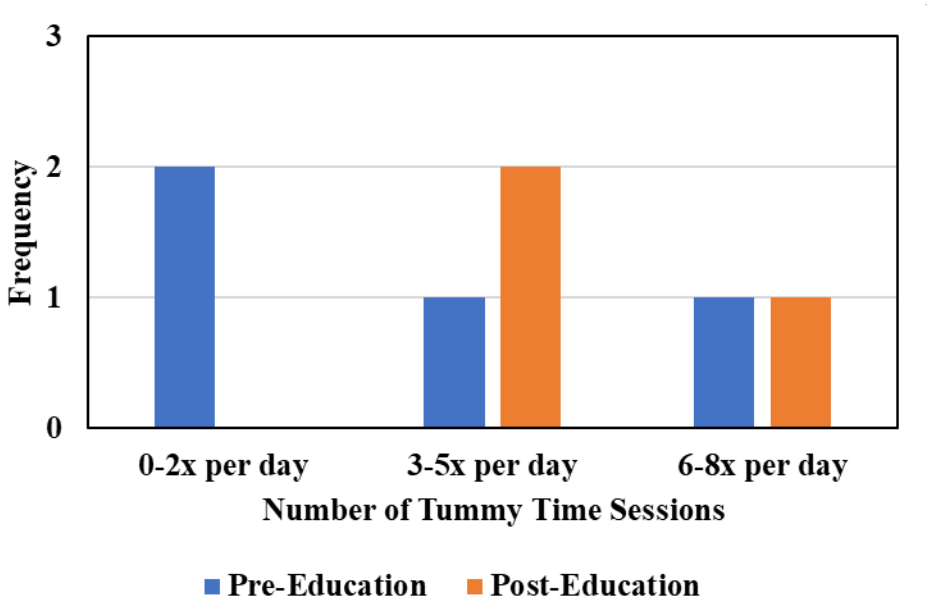


Figure 1: Frequency of tummy time session pre and post education (Survey question 5)

For the pre-survey, the 0-2x per day response had the highest frequency with two responses. The pre-survey 3-5x per day category had a single response, as did 6-8x per day category. The total sample size for the pre-survey was 4 (n). In the post survey, there were no responses in the 0-2x per day category. The 3-5x per day category increased to a frequency of two, making it the most common selection on the post survey. The 6-8x per day category remained unchanged with one response. The post-survey had one fewer respondent, resulting in a sample size of three. Assuming tummy time was occurring at a frequency equal to the mid-point of each category (i.e. for 0-2x per day, on average, tummy time was occurring once per day), respondents to the pre-survey indicated they were performing tummy-time an average of 3.25x per day. The post-survey indicates an average of 5x per day with a median of 3-5x per day. This demonstrates an interval increase in frequency from the pre and post survey results.

Results of Responses for Survey Question 6—Duration of Tummy Time

Figure *2* shows a summary of responses to survey question 6 of the pre and post survey, which asked participants: "How long is your child's average tummy time session?" Participants had the option to select 0-2 minutes, 3-5 minutes, 6-10 minutes, 11- 15 minutes, > 16 minutes, and the final option stating: my child does not do tummy time. Again, the sample size for the pre and post survey are four and three, respectively.

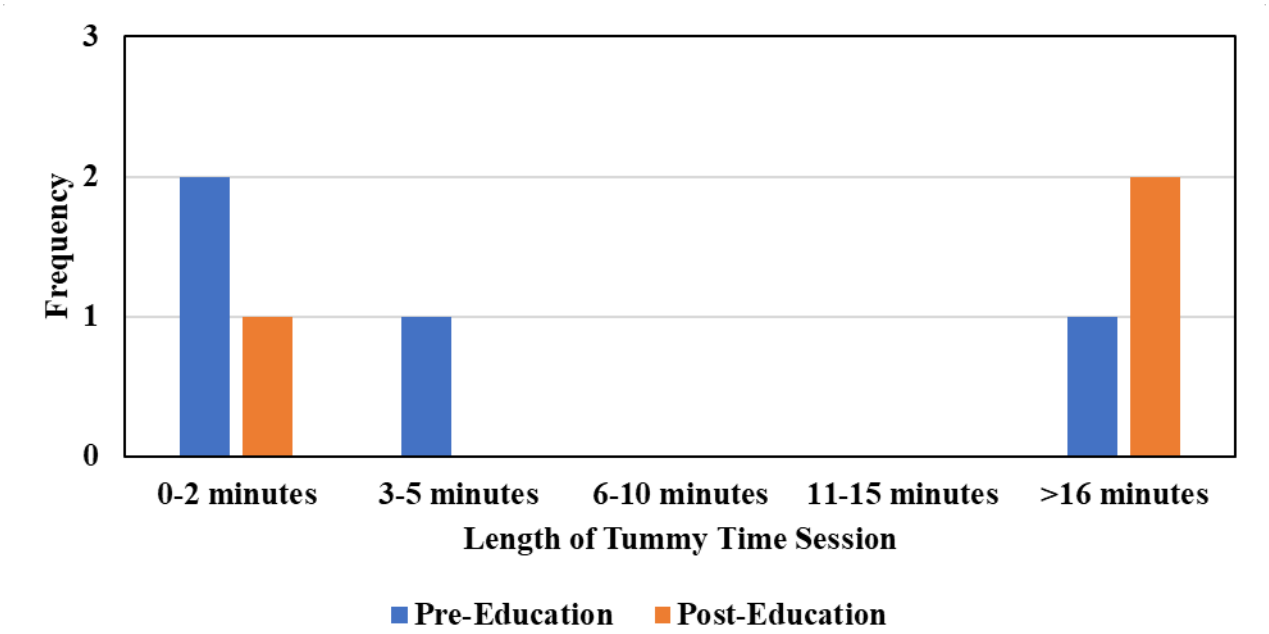


Figure 2: Duration of tummy time session pre and post education (Survey question 6)

As indicated by Figure *2*, the length of time parents allowed for one session of tummy time increased after the education seminar. Prior to the seminar parents, more parents had short tummy time sessions (indicated by the blue bars). The change in height of the orange bars indicates that following education in tummy time, parents increased the amount of time their child spent in prone. The uneven number of responses to the pre and post survey make this figure difficult to interpret, but the biggest thing to note is that at least one participant moved into the

greater than 16 minutes group. The use of central tendency is not indicated for measurement of change due to different interval sizes and a small sample size. This figure does show an increase in minutes, as reported in frequency, of tummy time from the pre survey to post survey.

Results of Responses for Survey Question 7—Total Tummy Time

Question 7 on the pre and post survey asked participants: "What is the total amount (on average) of tummy time your child completes each day?" This survey response was the one that can most readily be quantified. The results are shown on an individual level in Figure 3 and aggregated based by pre and post survey in Figure 4.

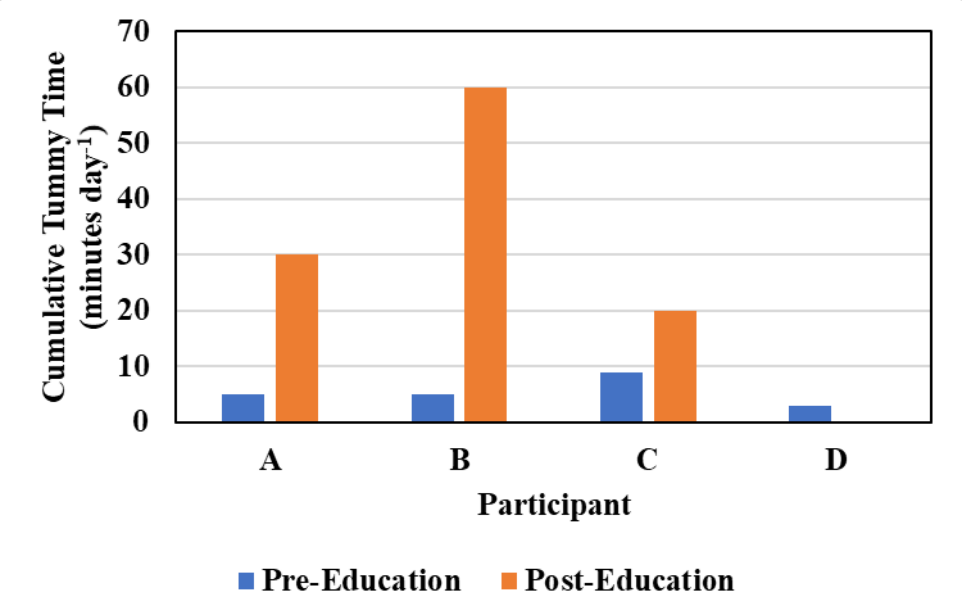


Figure 3:Cumulative daily tummy time pre and post education, separated by participant (Survey question 7)

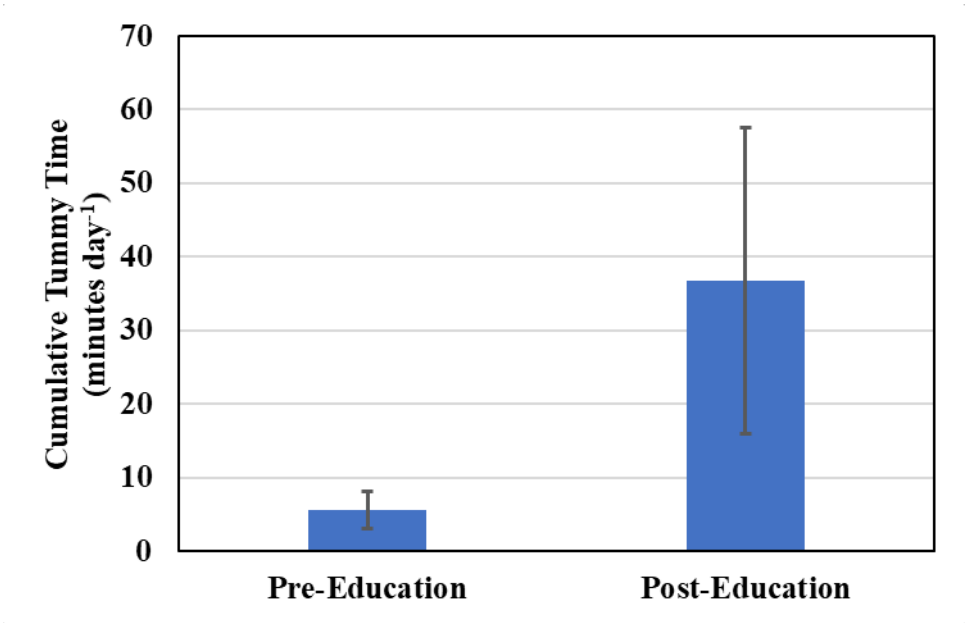


Figure 4: Mean cumulative daily tummy time pre and post education, error bars represent ± one standard deviation (n=4 pre education, n=3 post-education) (Survey question 7)

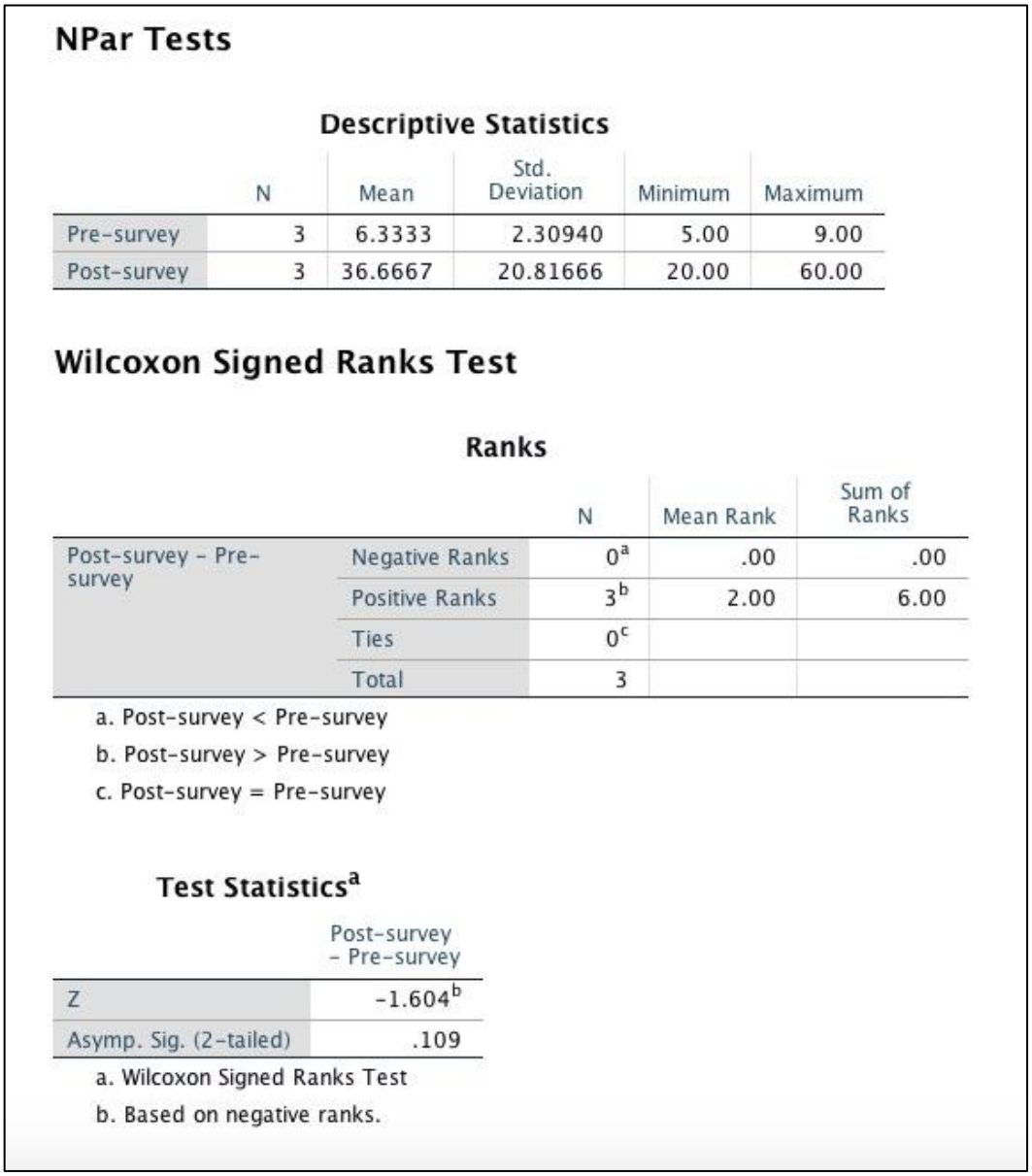
Figure 3 demonstrates the increase in the cumulative tummy time per day on an individual level. Of the respondents, all indicated an increase in total tummy time. This increase ranged from between 122% and 1100%, with the largest increase being 55 minutes. The average length increased by an average of 30.3 minutes per day. This indicates that there was a visible change from the total amount of time for each tummy time session.

Figure 4 shows the pre and post survey cumulative tummy time on an aggregated basis, and the error bars represent ± one standard deviation. The average cumulative tummy time per day prior to receiving education was 5.5 minutes, with a standard deviation of 2.5 minutes. Post education, the cumulative length of tummy time was 36.7 minutes per day with a standard deviation of 20.8 minutes. This indicates that there was a change in the total amount of reported time, however this does not demonstrate statistical significance. This could be partly due to the

small sample size, large amounts of variability in the size of the increase, or attrition with the respondents, as only three out of four participants responded to the study.

Non-Parametric Testing

Due to the nature of the small sample size, in this pilot study, additional non- parametric tests were considered. With the paired samples of the pre and post survey, the Wilcoxon signed- rank test was utilized, using SPSS software (Version 25, IBM Inc, Armonk, NY) to analyze the data. As three out of four participants responded, only the three who completed the pre and post survey could be considered for the data set. This analyzed whether the mean ranks differ. The null hypothesis would be that the median of differences between the pre survey and post survey equal zero. The test performed using SPSS looked at related samples of the Wilcoxon Signed Rank Test with a significance of .109, asymptomatic differences displayed. With a significance level of .05, the decision is made to not reject the null hypothesis. A Wilcoxon signed- ranks test indicated that the post-survey ranks were not statistically significantly higher than the pre-test ranks $Z= -1.604$, $p>.109$. A summary of the statistical output from SPSS can be seen in Figure 5.



NPar Tests

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Pre-survey	3	6.3333	2.30940	5.00	9.00
Post-survey	3	36.6667	20.81666	20.00	60.00

Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
Post-survey - Pre-survey	Negative Ranks	0[a]	.00	.00
	Positive Ranks	3[b]	2.00	6.00
	Ties	0[c]		
	Total	3		

a. Post-survey < Pre-survey

b. Post-survey > Pre-survey

c. Post-survey = Pre-survey

Test Statistics[a]

	Post-survey - Pre-survey
Z	-1.604[b]
Asymp. Sig. (2-tailed)	.109

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

Figure 5: Non- parametric results from Question 7 of survey responses using the Wilcoxon Signed (paired) ranks test

The parents' responses demonstrated some positive feedback for the importance of occupational therapist roles in providing education in the acute care setting. A summary of these responses is shown in Table 3. The biggest impact shown in the responses seems to be directly related to the impact of the education session on the tummy time sessions for the individual

families. Although not all the families indicated an increase in tummy time knowledge, all families responded that there was an increase in the tummy time performed at home. All responded that their child's endurance had increased. Finally all respondents noted developmental changes as well. The interview responses demonstrate how the families saw change in addition to the numeric increase as well.

Table 3 Post Survey Yes/No Responses

Did the handout and education enhance your tummy time knowledge	Yes-2 No-1
Have you increased the amount of tummy time you are doing at home?	Yes-3 No-0
Has your child's endurance increased?	Yes-3 No--0
Have you noticed any developmental changes	Yes-3 No-0

Discussion

An increase in tummy time performed. Although all participants indicated that they had heard of tummy time prior to participating in the study, all responding participants indicated an interval shift change in the frequency and duration of tummy time performed. This information was gathered two weeks after the initial education session. The results of the pre and post survey indicate that families were receptive to education sessions about developmental play, specifically tummy time, in the acute care setting.

Developmental changes. All responding participants indicated "yes" when asked if they had noted any developmental changes. One parent reported that they were noticing their child reaching for more toys. Another parent reported that when they placed their child on their belly, that they would try to crawl.

Next steps for the project. In an age with an increase in social media and different forms of communication, it is important to be able to provide parents education in the least restrictive environment. One family indicated that one education session was enough. Another family indicated that they would prefer to be contacted via e-mail. Lastly, one family indicated they would prefer further education sessions via a Facebook Live Video.

Learner's Reactions. Reviewing this sample of participants is encouraging that this is in an area of occupational therapy education that needs to be explored. Parents responded positively to the education sessions and all respondents indicated some learning from the education session. As a pilot study, this was an excellent opportunity to examine if this was an area that would benefit from further research. The gap in the literature indicates that there is a need for occupational therapists to provide further evidence-based support in acute care occupational therapy, especially with the pediatric population. This pilot study is encouraging in that families, even in a small sample size, found a benefit to the developmental education sessions.

Limitations

There were many limitations to this study. One of the most important limitation is the time of sampling. During the winter months, acute care hospitals tend to have a higher census of infants aged birth to six months. The IRB for this study was not approved until March, 2019. Because of this timeline, there was a limited available population to recruit for this study.

Because of the limited sample size, it makes it challenging to perform standardized testing. With the small sample size, even non-parametric testing is limited. Although the total amount of tummy time increased, and there was some interval shift in session time and session

frequency between pre and post responses for this study, the frequency changes are reflective of a small population.

Future Implications

The intent of this study was to demonstrate the importance of providing developmental education to parents in the acute care setting. The hope is that this pilot study is a launch point for other researchers to seek to provide further research in this area. As there is limited research about pediatric intervention for occupational therapy in the acute care setting. Occupational therapists can recognize this now identified gap in the literature, and work to produce further evidence-based research to support the position of the occupational therapist in the pediatric acute care setting. The hope is that future researchers will be able to use this pilot study to further assess the effectiveness of providing parent education on tummy time in the acute care setting, to analyze if there is a statistically significant difference if education is provided.

Summary

Encouraging tummy time is an important area where occupational therapists can provide education in the acute care setting. This was a pilot study that investigated how educating parents in this setting, could facilitate the parents adopting these strategies at home. Despite the small sample size, the initial results showed that the education session could positively impact the total amount of tummy time that the infants were receiving and the developmental changes reported by parents at home.

References

American Occupational Therapy Association. (2017). Vision 2025. *American Journal of Occupational Therapy*, *71*(3). https://doi.org/10.5014/ajot.2017.713002

Bennett, S., & Bennett, J.W. (2000). The process of evidence-based practice in occupational therapy: Informing clinical decisions. *Australian Occupational Therapy Journal, 47*(4), 171-180. doi: 10.1046/j.1440-1630.2000.00237.x

Estes, J., & Pierce, D. (2012). Pediatric therapists' perspectives on occupation-based practice. *Scandinavian Journal of Occupational Therapy, 19*(1), 17-25. http://dx.doi.org/10.3109/11038128.2010.547598

Fisher, A. (2012). Occupation-centered, occupation-based, occupation focused: Same, same or different. *Scandinavian Journal of Occupational Therapy, 20*(3), 162-173. http://dx.doi.org/10.3109/11038128.2012.754492

Graham Jr, J. M. (2006). Tummy time is important. *Clinical Pediatrics*, *45*(2), 119-121. https://doi.org/10.1177/000992280604500202

Healthy People 2020 (2017). Leading health indicators: Early and middle childhood. Retrieved September 03, 2017, from https://www.healthypeople.gov/2020/topics-objectives/topic/Early-and-Middle-Childhood/objectives#4359

Hotelling, B. A. (2004). Newborn capabilities: Parent teaching is a necessity. *The Journal of Perinatal Education*, *13*(4), 43. doi: [10.1624/105812404X6225]

Isenberg, J. P., & Quisenberry, N. (2002). A position paper of the Association for Childhood Education International PLAY: Essential for all children. *Childhood Education*, *79* (1), 33-39. https://doi-org.libproxy.eku.edu/10.1080/00094056.2002.10522763

Kadey, H. J., & Roane, H. S. (2012). Effects of access to a stimulating object on infant behavior during tummy time. *Journal of Applied Behavior Analysis*, *45*(2), 395-399. https://doi.org/10.1901/jaba.2012.45-395

Kaiser, A. P., & Hancock, T. B. (2003). Teaching parents new skills to support their young children's development. *Infants & Young Children*, *16*(1), 9-21. https://doi.org/10.1097/00001163-200301000-00003

Kemp, P., & Turnbull, A. P. (2014). Coaching with parents in early intervention: An interdisciplinary research synthesis. *Infants & Young Children*, *27*(4), 305-324. https://doi.org/10.1097/iyc.0000000000000018

Klass, P. (2018, June 18). The benefits of tummy time. Retrieved from: https://www.nytimes.com/2018/06/18/well/the-benefits-of-tummy-time.html?rref=collection%2Fsectioncollection%2Fhealth

Koren, A., Reece, S. M., Kahn-D'angelo, L., & Medeiros, D. (2010). Parental information and behaviors and provider practices related to tummy time and back to sleep. *Journal of Pediatric Health Care*, *24*(4), 222-230. https://doi.org/10.1016/j.pedhc.2009.05.002

Kuo, Y. L., Liao, H. F., Chen, P. C., Hsieh, W. S., & Hwang, A. W. (2008). The influence of wakeful prone positioning on motor development during the early life. *Journal of Developmental and Behavioral Pediatrics*, *29*, 367–376. doi: 10.1097/DBP.0b013e3181856d54

Li, W. H., Chung, J. O. K., Ho, K. Y., & Kwok, B. M. C. (2016). Play interventions to reduce anxiety and negative emotions in hospitalized children. *BMC Pediatrics*, *16*(1), 36. https://doi.org/10.1186/s12887-016-0570-5

Mildred, J., Beard, K., Dallwitz, A., & Unwin, J. (1995). Play position is influenced by knowledge of SIDS sleep position recommendations. *Journal of Paediatrics and Child Health*, *31*, 499–502. https://doi.org/10.1111/j.1440-1754.1995.tb00871.x

Miller, L. C., Johnson, A., Duggan, L., & Behm, M. (2011). Consequences of the "back to sleep" program in infants. *Journal of Pediatric Nursing*, *26*(4), 364-368. https://doi.org/10.1016/j.pedn.2009.10.004

Nielsen, F. (2011). Child's play: Parents' satisfaction of a multidisciplinary playgroup in an acute care setting: 34702. *Australian Occupational Therapy Journal*, *58*, 111.

Persch, A. C., Braveman, B. H., & Metzler, C. A. (2013). P4 medicine and pediatric occupational therapy. *American Journal of Occupational Therapy*, *67* (4), 383-388. https://doi.org/10.5014/ajot.2013.674002

Pollack, H.A. & Frohna, J.G. (2002). Infant sleep placement after the back to sleep campaign. *Pediatrics*, 109 (4), 609-614. https://doi.org/10.1542/peds.109.4.608

Primeau, L. A., Murphy-Fischer, D., Braveman, B., Delany, J. V., Glantz, C., Padilla, R., ... & Gwin, C. H. (2008). AOTA's societal statement on play. *American Journal of Occupational Therapy*, *62*(6), 707-708. https://doi.org/10.5014/ajot.62.6.707

Pumerantz, C., & Zachry, A. (2018). Establishing tummy time routines to enhance your baby's development. Retrieved from https://www.aota.org/About-Occupational-Therapy/Patients-Clients/ChildrenAndYouth/Tummy-Time.aspx

Russell, D. C., Kriel, H., Joubert, G., & Goosen, Y. (2009). Prone positioning and motor development in the first 6 weeks of life. *South African Journal of Occupational Therapy*, *39*(1), 11-14.

Salls, J. S., Silverman, L. N., & Gatty, C. M. (2002). The relationship of infant sleep and play positioning to motor milestone achievement. *American Journal of Occupational Therapy*, *56*(5), 577-580. http://dx.doi.org/10.5014/ajot.56.5.577

Trombly, C.A. (1995). Occupation: Purposefulness and meaningfulness as therapeutic mechanisms. *The American Journal of Occupational Therapy, 49*(10), 960-972. https://doi.org/10.5014/ajot.49.10.960

Turk, A. E., McCarthy, J. G., Thorne, C. H., & Wisoff, J. H. (1996). The "Back to Sleep Campaign" and deformational plagiocephaly: Is there cause for concern? *The Journal of Craniofacial Surgery*, *7*(1), 12-18.

Waitzman, K. A. (2007). The importance of positioning the near-term infant for sleep, play, and development. *Newborn and Infant Nursing Reviews*, *7*(2), 76-81.

Zachry, A. H., & Kitzmann, K. M. (2011). Caregiver awareness of prone play recommendations. *American Journal of Occupational Therapy*, *65*(1), 101-105. doi:10.5014/ajot.2011.09100

Appendix A

Parent perception of Tummy Time (Pre-Survey)

1. What is your age? _____
2. How many children do you have? _____
3. What are your children's ages? _____
4. Have you heard of tummy time before? Yes or No

   *If "Yes", please go on to question #5

   *If "No", please go on to question #10
5. How many times per day are you doing tummy time with your child?
   a. 0-2x per day
   b. 3-5x per day
   c. 6-8x per day
   d. 9-11x per day
   e. 12-15x per day
   f. My child does not do tummy time.
6. How long is your child's average tummy time session?
   a. 0-2 minutes
   b. 3-5 minutes
   c. 6-10 minutes
   d. 11-15 minutes
   e. >16 minutes
   f. My child does not do tummy time.
7. What is the total amount (on average) of tummy time your child completes each day? _____
8. Have you tried different ways of using tummy time? ☐Yes ☐No

9. What is the biggest limitation to having your child complete tummy time regularly?
    a. Time
    b. Understanding how to perform tummy time
    c. Schedule
    d. My child cries during tummy time
    e. Other (please describe) _____
10. If yes, what is your child's favorite thing to do?
    a. Play on the floor
    b. Play in their bouncy seat
    c. Play with toys while they are on their belly
    d. My child does not have preferred play
    e. Other (please describe) _____

Appendix B

Parent understanding of Tummy Time (Post-Handout Education)

1. Did the handout and education you received enhance your knowledge of tummy time?

   ☐Yes ☐No

2. Have you increased the amount of tummy time you are doing at home? ☐Yes ☐No

3. How many times per day are you doing tummy time with your child?

   a. 0-2x per day

   b. 3-5x per day

   c. 6-8x per day

   d. 9-11x per day

   e. 12-15x per day

   f. My child does not do tummy time.

4. How long is your child's average tummy time session?

   a. 0-2 minutes

   b. 3-5 minutes

   c. 6-10 minutes

   d. 11-15 minutes

   e. >16 minutes

   f. My child does not do tummy time.

5. What is the total amount (on average) of tummy time your child completes each day? _____

6. What is the biggest limitation to performing tummy time?

   a. Time

b. Understanding how to perform tummy time

c. Schedule

d. My child cries during tummy time

e. Other (please describe) _____

7. How would you like to receive further information about tummy time?

a. E-mail

b. Facebook Live Video

c. Letter Handout in the Mail

d. I would not like to receive any more information

e. Other (please describe) _____

Appendix C

TUMMY TIME!

For all babies, including newborns

Always supervise your baby and place baby on firm and safe surface

Image retrieved from: http://www.laurlebeard.com/tummy-time/

Why?

- To strengthen head, neck and upper body muscles.
- To improve coordination for rolling, crawling, reaching, and playing.
- Infants who do tummy time daily have been found to have higher scores on gross motor skills assessments.
- Tummy time can reduce chances of baby developing flat spots on head.

Start with 3-5 minutes per session throughout the day. Work up to a total of 40-60 minutes daily. Pay attention to baby's responses! If baby is crying, end Tummy Time before baby becomes too tired.

- Make sure baby is putting weight on both arms to strengthen muscles equally.
- Roll up a thin towel or blanket to provide extra support under baby's chest.
- Use blankets or towels with different textures and colors so baby can experience different sensations.

Image retrieved from: https://www.pinterest.com/pin/115756652901686150/?lp=true

Information obtained from The American Occupational Therapy Association; www.aota.org

Handout modified and used with permission from Lauren Huter, OTS

TUMMY TIME!

For all babies, including newborns

Always supervise your baby and place baby on firm and safe surface

Image retrieved from: https://www.tummytimemethod.com/for-parents.html

- Hold toy or mirror in front of your baby's face to encourage them to lift their head them to lift their head and reach.
- Put toys in a circle around your baby to encourage them to reach in different directions.
- Lie down in front of baby and talk, coo, or sing to your baby. The more involved you are, the better the results.

For newborns, place your baby on your chest while you are awake and in a reclined position, so baby gets used to this position.

Image retrieved from: http://lifewithlucablog.blogspot.com/2012/06/our-favorites-0-3-months-part-ii.html

Image retrieved from: https://www.littlemoversphysiotherapy.com/single-post/2016/08/03/tummy-time

Information obtained from The American Occupational Therapy Association; www.aota.org
Handout modified and used with permission from Lauren Huter, OTS